

MODEL: C, CM

SERIAL NO: 4500 TO 15999

YEAR: 1964 - 1970

MANUAL NO: MC-432-98

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### GENERAL DESCRIPTION

This vehicle is designed to be driven on smooth surfaces in and around industrial plants, nurseries, institutions, motels, mobile home parks and resorts. It is not designed to be driven on public highways. It is not designed to go in excess of 15 m.p.h. on level surfaces or downhill. Speeds in excess of this may result in difficulty in steering. It is not designed to be towed in excess of 15 m.p.h.

### MODEL NO.

The following Models are covered by this manual 1430C and 1431CM.

### SERIAL NO.

The serial number of your unit is stamped into the front main frame of the bed, 6" from the left side. Lift deck cover to find number. The model number and serial number are on a nameplate riveted to the dash panel steering support shelf forward of the steering column.

In ordering parts or referring to your unit, please use these numbers. Replacement parts can be purchased directly from the factory in Anaheim, California or from distributors located across the United States.

1. Preparation & Operating Instructions

When first receiving your new Taylor-Dunn vehicle, examine it carefully to make sure that it was not damaged in shipment. Read battery and charger instructions before starting vehicle. Full information regarding the care and operation of your power source will be found in this manual. See that the battery is fully charged and that the electrolyte is at the proper level. Before using vehicle for the first time, sit down and familiarize yourself with controls and make sure that they are all working freely. On the dash to the right of steering column is located the forward-reverse switch. To go forward, push the handle to the left and to go backward, push the handle to the right. On the upper right corner of switch plate is where the lock is located. The key can only be removed from lock in the locked position. The accelerator pedal is designed for right foot operation, same as your automobile. The pedal is located on the right side of floor board. The brake pedal is designed for right foot operation and is located to left of accelerator pedal. The hand operated parking brake is located in left forward corner of floor board. To engage hand brake pull top part of handle back towards seat. To release, push handle all the way forward. On gear drive hydraulic brake truck never depress the brake pedal and try to engage the hand parking brake at the same time. If you do you will throw the adjustment of the parking brake off and it then must be readjusted. To steer turn steering wheel clockwise to go to the right and counter-clockwise to go to the left. If all controls are working freely you are ready to go under power.

2. General Operating Instructions

To put your new vehicle into operation, turn key counter-clockwise. Next select direction by moving red handle to right or left. Make sure hand parking brake is released, then slowly depress accelerator pedal to go in direction desired. When depressing accelerator pedal, you will feel 5 speeds in either direction. It is recommended to operate your truck in the fastest speed, to commensurate with you and your passengers safety. Your truck requires almost the same amount of current to go slow as it does to go at it's fastest speed. This is the most efficient way to operate the truck. When you stop and leave the truck, it is best, for safety reasons, to turn forward and reverse switch to off position, set hand brake, and

lock and remove key. If it is necessary to stop, going up hill, use brake pedal to hold vehicle and do not hold vehicle by depressing accelerator pedal. Using accelerator pedal can damage motor and wiring of truck. A way to prolong life of switch contacts and motor, is not to change position of forward and reverse switch until foot is removed from accelerator pedal and truck is completely stopped.

# LUBRICANTS

- ① EXTREME PRESSURE GREASE SAE 90 TO 140
- ② PRESSURE GUN GREASE
- ③ ENGINE OIL- ALL PURPOSE
- ④ BRAKE FLUID - SAE 70R1

GREASE  
LEVEL  
PLUG

DRAIN

GREASE  
LEVEL  
PLUG

DRAIN

FIG. 1-5

FIG. 1-5

NO.	DESCRIPTION	LENGTH	QUAN.	REVISED DATE	REVISION
	430 SERIES				
	TOL. FRAC. ± DEC. ±				
	SCALE NONE				
	DRAWN BY REA				
	DATE 10-14-68				

FIGURE

1

## LUBRICATION CHART

GEAR DRIVE  
1945 TO 1970 MODELS

TAYLOR DUNN MFG. CO.  
2114 West Ball Rd.  
Anaheim, Calif.



MAINTENANCE GUIDE CHECKLIST

This guide is provided as a check list for servicing your vehicle, so you will have a good running and trouble free unit. The guide is set up for average use. For extreme usage, more frequent service is recommended. Your Taylor-Dunn dealer will gladly perform these services for you, if desired. He has expert service men in the field to perform these services. Do not hesitate to call Service Manager if you have any questions at all.

	Every Week	Every Month	Every 3 Months	Yearly
Check and fill batteries, if necessary with distilled water (see Sec.19)	X	X	X	X
Check Rheostat Adjustment, (see Sec. 15)	X	X	X	X
Check Belt or Chain Adjustment (see Sec. 12 to 14)	X	X	X	X
Check Tire pressure (see Sec.18)	X	X	X	X
Clean all dirt and grease off and between power bars and J-Hook and lubricate with chassis lube (see Sec. 15)	X	X	X	X
Lubricate all zerk fittings (see lube chart)		X	X	X
Lubricate all moving parts with engine oil, all purpose (see lube chart)		X	X	X
Lubricate chain drive with <u>Chester Spra-Flex</u> open gear and chain lubricant or equal.		X	X	X
On belt models, use Fels Naptha (bar) soap or belt dressing - if belts are noisy.		X	X	X
Check all wire connections and make sure they are all tight		X	X	X
Wash off batteries with water, use soda if necessary.		X	X	X
Check service and parking brake adjustment (see Sec. 4 to 9)		X	X	X
Check hydraulic brake for leaks and check brake fluid level (see Sec. 6)		X	X	X
Check differential oil level (see lube chart)			X	X
Check motor brushes. Blow out carbon dust (see Sec. 17)			X	X
Check brake lining for wear (see sec. 4 to 6)			X	X
Check and adjust front wheel bearings and fork spindle bearing (see Sec. 1 and 2)			X	X
Drain differential and replace with SAE 30 oil on belt drive and SAE 90 - 140 oil on gear drives				X
Repack rear wheel bearing. Use wheel bearing grease. Also repack fork spindle bearings.				X
Repack front wheel bearing. Use wheel bearing grease.				X

MAINTENANCE PROCEDURE AND ADJUSTMENT

1. FRONT WHEEL AND FORK - 3 WHEEL

Your front wheels are mounted on a 3/4" axle and turn on two Timken bearings. With proper care these should last indefinitely. If by chance the front axle is submerged in mud or water, it is recommended that you remove and strip down front axle assembly and wash completely in solvent, repack and reassemble bearings. Be sure to use good wheel bearing grease. With normal usage repack front wheel yearly. There is a zerk fitting on front hub, a grease gun can be used if desired. To adjust front wheel bearings, go to nut on end of axle on either side and then tighten nut until there is bearing drag. Then back nut off 1/4 turn, or until there is no bearing drag.

Your fork is constructed of heavy material for your safety and for as little maintenance as possible. It is mounted to the frame by means of a 1 1/2" spindle that has two Timken bearings that are adjusted by means of a large nut on top of the spindle. To get to nut remove hub cap on top. Adjust the same as axle bearings. These bearings require very little care other than proper adjustment and greasing. At the pivot point, there is one zerk fitting for grease, at upper middle of the collar.

2. STEERING COLUMN AND LINKAGE

The steering column is constructed of heavy wall tubing with ball bearings at each end. This unit is a low maintenance item, requiring oil at top and bottom. On lower end of column the sprocket held in place with a flex lock nut and woodruff key. From this sprocket to front fork sprocket is a #40 chain. This chain should be kept oiled with chain lube. To adjust this chain use adjustment bolt located above floor board and to the front of column. Adjust to where there is little free travel when moving steering wheel back and forth. Be sure to retighten lock nut. If kept lubricated this chain and sprockets should last indefinitely.

3. CONTROL LINKAGE

These linkages are located under floor board of truck. The maintenance on linkage is nil, except to put oil on each end of clevis pins monthly.

4. BRAKE, MECHANICAL ON DRIVE SHAFT OF BELT AND CHAIN DRIVES

There are two places to adjust the foot brake. One place is the turnbuckle on either cable that runs from the foot brake assembly to the brake arm. To adjust, loosen lock nut and shorten cable until proper free pedal travel, about 1 1/2". If by chance turnbuckle is all the way in, a major adjustment



can be made by first lengthening cable, then tighten 3/8" bolt located on top side of brake drum which also holds one end of brake shoe 5 to 6 turns, then readjust cable so there is proper free pedal travel. Make sure when brakes are released there is no drag on brake drum by the brake shoe. Before retightening lock nut on brake cable, push brake pedal down hard and then release to make sure everything is seating properly, if needed readjust cable and tighten nut.

5. BRAKES, MECHANICAL WHEEL BRAKES ON GEAR DRIVE ADJUSTMENT

To adjust mechanical wheel brakes, jack up rear wheels until off ground. Loosen nut on turnbuckle on main cable that runs from brake pedal assembly to equalizer assembly. Adjust turnbuckle until brakes drag and then back off until just free and tighten nut. If it is found the one wheel brake engages before the other wheel brake, the individual brake rod that runs from the equalizer to the brake cam arms can be adjusted to equalize the brakes. To do this, adjust main cable until one brake just drags and then adjust the individual brake rod up on the other brake until it just drags. Then back off on main cable until brake is free.

It is possible that as the shoes wear that one brake shoe on a wheel may engage before the other shoe on the same wheel. If this is the case, loosen the anchor bolt nut on top side of backing plate. Disconnect rod from brake cam lever. Work anchor bolt back and forth while applying more and more pressure to brake cam arm with hand until anchor bolt will not move. Maintain pressure on brake cam arm and tighten nut on anchor bolt. Repeat with opposite wheel.

REPLACEMENT

When cam arm is 40° forward of vertical when brakes are applied, it is time to replace shoes. To replace the brake shoes jack up rear of vehicle and remove hub and drum assembly with axle knocker or wheel puller. This brake design does not allow full use of lining as most of the wear is on the cam end of the shoe. There will be approximately 1/8 of an inch of lining left on cam side and more on the opposite side. Remove shoes by removing nut on anchor bolt and replace in same manner as they were. Install hub and brake drum on axle. Center shoes as described in previous paragraph. Adjust brake as described in previous paragraphs.

6. BRAKES - HYDRAULIC ON GEAR DRIVE

Check fluid level in master cylinder reservoir monthly. Should be  $\frac{3}{8}$  to  $\frac{1}{2}$ " from top of reservoir.

To adjust hydraulic brake, jack up rear wheels until off ground and disconnect spring and brake rod from parking brake cam lever so that parking brake cam lever has nothing attached to it. Center brake cam lever vertically. Each individual shoe must be adjusted. Loosen  $\frac{1}{2}$ " nut on front adjusting cam and put  $\frac{1}{2}$ " wrench on from above on adjusting cam and turn toward wheel cylinder until brake drags and back off until free. Tighten  $\frac{1}{2}$ " nut on cam. Loosen  $\frac{1}{2}$ " nut on rear adjusting cam and put  $\frac{1}{2}$ " wrench on from top and turn toward wheel cylinder until brake drags and back off until free. Tighten  $\frac{1}{2}$ " nut on cam. Repeat this process three times. Now go to second wheel and follow same process. Reconnect parking brake rod and return spring on cam arm.

If leaks develop in wheel cylinders or master cylinder, the cylinders should be replaced. To replace, remove all worn cylinders and replace with new cylinders. After cylinders are replaced or if any other component is replaced the system must be bled of air. If available use a brake bleeder tank and install on master cylinder. If brake bleeder tank is not available, fill master cylinder to top with brake fluid and then by use of extra man, apply pressure with brake pedal to master cylinder. With either brake bleeder or extra man applying pressure, open bleeding valve individually on wheel cylinders until fluid flows out without any air and then close valve. Remove brake bleeder tank. Refill master cylinder to  $\frac{3}{8}$  of an inch of top. Readjust brakes as stated above.

To replace brake shoes, jack up rear of vehicle and remove hub and drum assembly with axle knocker or wheel puller. Remove shoes by removing horse-shoe spring that holds shoes in place. Replace new shoe in same order. Install hub and brake drum on axle. Readjust brake as stated in previous paragraphs.

7. HAND PARKING BRAKE ADJUSTMENT ON MECHANICAL BRAKES

Adjust hand parking brake lever with knob on end of handle until it travels through last third of its travel. The third of its travel, where lever at bottom of handbrake lever assembly (underneath vehicle) moves only when handle goes from  $\frac{2}{3}$  up to locked position. This gives you greatest leverage on parking brake handle. Tighten nuts on connecting rod from parking brake lever to brake assembly until proper adjustment is reached. Minor adjustment can be made by knob on end of brake lever, but a point will be

reached where hand parking brake lever must be adjusted as above and major adjustment made on connecting rod.

8. HAND PARKING BRAKE ADJUSTMENT ON HYDRAULIC BRAKES ON BELT AND CHAIN DRIVE

On this model we use the same brake as the mechanical drive-shaft beake. Use adjustment instruction as stated in section 4. Also adjust brake lever and connecting rod as covered in section 7.

9. HAND PARKING BRAKE ADJUSMENT ON HYDRAULIC BRAKES ON GEAR DRIVE

To adjust this brake properly, the brake rod and return spring on the brake cam arm on rear end must be first disconnected. Follow complete instructions and adjust the hydraulic portion of the brake as stated in section 6. To get the mechanical brakes adjusted properly the hydraulic brakes must be adjusted first. Next adjust the parking brake lever as stated in section 7, so that the last third of travel is used. Now adjust the connecting rod that goes to the brake assembly so that the strap that it is connected to on the assembly moves the same distance forward when brake is on, as it moves back when brake is off. Next loosen up and connect individual brake rods and return spring to brake cam arm on rear end. Adjust the individual rod that connects to brake cam arms so that you get the proper parking brake setting to hold the unit on the hill.

10. DIFFERENTIAL UNIT - BELT AND CHAIN DRIVE

General - The drive pinion is held in position by the shoulders in the differential carrier upon which the pinion bearing cups seat. The pinion position is maintained by a washer or shims located between the pinion head and the rear bearing cone. Shims between the bearing spacer and the front bearing cone are used to adjust pinion bearings. The threaded nut type of differential bearing adjustment is used.

Pinion and bearings, Replace - The differential unit must be removed before the drive pinion can be taken out, but it is not necessary to remove the drive pinion or differential unit if only the drive pinion bearing oil seal is replaced. To remove the oil seal, take off the pinion flange retaining nut and use a suitable tool to remove the flange. The oil seal may then be pulled out of the carrier. Pull the drive pinion through the gear end of the differential carrier. The bearing spacer, front bearing and shims may then be taken out. Using a bearing puller, remove the rear bearing cone from the pinion shaft and unless the ring gear and pinion are to be replaced with new parts, use care not to allow the front and rear shim packs to become mixed. If the differential unit was satisfactory from the standpoint of noise before the unit was dismantled, the drive pinion may be assembled

with the original shims (or washer) behind the rear bearing. If new parts are used or if an adjustment was necessary, change the shims until the correct combination is obtained to locate the pinion properly.

To Assemble - Place the front bearing in position in it's cup and install the pinion shaft oil seal, using a suitable tool. Place the washer or shims on the pinion shaft against the pinion head and press on the rear bearing. Slip the bearing spacer against the rear bearing, then place the front in the carrier, passing the forward end of the pinion and assembled parts in the carrier, passing the forward end of the pinion through the front bearing. Replace the pinion flange, slip the washer, screw on the retaining nut and tighten it securely.

Pinion Bearing, Adjust - The only occasion for adjusting the drive pinion bearings is when a new pinion or differential carrier is installed. To make the adjustment, install sufficient shims between the bearing spacer and front bearing so that when the pinion retaining nut is tightened against the pinion flange, all rollers in the bearings are tight, but still permit rotating the pinion by hand. The bearing pre-load should be .0015 to .0025 inch. To check and adjust the preload (tension) mount a dial indicator on the carrier with the stem of the indicator contacting the pinion flange. Then if the indicator, for example, shows .004 inch and play, remove the parts including .006 inch of shimming to give necessary .002 inch draw tension or pre-load on the bearings.

Pinion, Adjust - After adjusting the pinion bearings, the position of the pinion should be checked. If a pinion setting gauge is available, check the pinion depth. If a correction is necessary, disassemble the parts and, if the pinion is to be moved toward the center of the axle, add shims or install a thicker washer (whichever is used) between the pinion head and the rear bearing cone. If the pinion has to be moved away from the center of the axle, remove shims or install a thinner washer. If no pinion setting gauge is available, assemble the differential unit in the carrier and check the tooth contact by painting the ring gear teeth. When the adjustment is correct, install a new cotter-pin in the pinion retaining nut.

Axle Shaft - To remove the axle shaft and inner oil seal, remove the wheel hub. Do not use a knock-out type puller or strike the ends of the axle shafts to loosen wheel hubs as this may damage bearings. Keep each set of shims separate to assure proper assembly. Use a suitable puller to remove axle shaft and bearing from the housing. Then pull the inner oil seal from the housing. To adjust axle shaft end play, add or remove shims to

obtain the desired end play of .003" to .008". When adjusting bearings, remove or install an equal thickness of shims on the right and left sides of the axle housing to maintain central position of thrust block.

#### 11. DIFFERENTIAL AND GEAR DRIVE UNIT

General - The rear axle is a 3/4 floating type. Bell forgings welded to steel tubing make up the axle shaft housing which is bolted to the differential housing. The driving pinion hub is exceptionally heavy and as the pinion is carried on double taper roller bearings alignment of the gear is always assured.

Dis-Assembly of Rear Axle - To disassemble rear axle, first remove wheels and pull rear hubs from the taper ends of axle shafts. Next, remove left rear axle housing and torque tube by unbolting it from the differential housing. Then with a special puller the drive shaft double taper roller bearings can be removed from the differential housing. Then install the ring gear and pinion and replace and adjust drive pinion taper roller bearing.

Adjustment - Adjustment of the double taper roller bearing on the drive pinion shaft can be made by taking up on the driving pinon adjusting nut and locking in position with lock nut. This adjustment should be made by taking out all the play, but caution however must be used not to adjust the bearing too tight, but leaving bearing to revolve freely.

Gear Replacement Ring & Pinion - When replacing driving gear (ring gear) and driving pinion, care should be taken to see that these gears have been kept in sets, which can be determined by observing if the same number on the pinion is on the ring gear.

Gear Replacement (Spur Gear Reduction) - Remove five 5/16 bolts and nuts and the three 3/8 bolts. This will allow the gear case to come apart. To remove the pinion gear, remove nut and use gear puller to pull gear. Replace new gear and lock down with nuts. To replace driven gear, remove two (2) bolts and slide off splined shaft. To replace new gear slip over spline. The wing nut might have to be loosened slightly to get proper alignment of holes. Bolt down gear. Re-assemble gear case.

#### 12. BELT ADJUSTMENT

Belt driven units have four of the 3V section belts that require very little attention other than adjustment and proper alignment. The proper adjustment is 3/8" free play each way from a straight line from pulley edge to pulley edge. To make this adjustment loosen lock nut on bolt that holds motor away from differential and then set in or out to make proper belt adjustment. When removing or replacing belts, do not force belts over the

edge of pulleys. This will damage the belt structure and cause possible vibration or belts will roll over groove.

13. CHAIN ADJUSTMENT

Chain drive units have two sprockets and a silent chain that need to be lubricated weekly with chain lube to give longer and quieter life. Adjust chain tension same as belt drive except for  $\frac{1}{4}$ " free travel in each direction from a straight line from sprocket edge to sprocket edge. When replacing a sprocket it is recommended that the chain be replaced also.

14. PULLEY & SPROCKET ALIGNMENT

Make sure pulleys and sprockets are aligned with each other. To do so take a straight edge and place across both pieces. If they are out of line, loosen the four bolts that hold the motor to the round bracket and slide forward or back as needed to align pulleys or sprockets. Then tighten these four bolts.

15. RHEOSTAT

The rheostat, controls the speed of your vehicle through the use of coils of nichrome wire for resistance. With this type of resistance, you use approximately the same amount of power from batteries in low speed as you do in high speed. The 5 flat copper bars and a movable J-Hook are the major parts in the rheostat. With proper adjustment and lubrication the rheostat will give many months of trouble free use. To adjust rheostat put the forward-reverse switch in off position, with J-Hook in neutral position, you should be able to move J-Hook up and down between neutral bar and pressure bar with very little pressure. To adjust, there are two nuts on the bolt at rear of pressure bar opposite spring, loosen or tighten them accordingly to get proper adjustment. When J-Hook is moved back and forth across the bar, there should be very little noise as J-Hook goes from one bar to another. If there is noise the J-Hook is not aligned to bar or pressing evenly on bars. In some cases the strap holding J-Hook may have to be twisted one way or the other so that J-Hook will make full contact on bars. Spring tension on pressure bar should be enough to hold J-Hook snugly on bars in all speeds. Be sure tension on accelerator return spring (under floor board) is sufficient to return J-Hook to neutral bar when foot is taken off accelerator pedal. Also when accelerator pedal is all the way to floor the J-Hook should be on 5th bar completely - not a little over or behind. The adjustment for J-Hook is corrected by turning clevis in or out. The clevis is located at the front right hand side under the front cowl.

Keep rheostat lubricated with lubricant. It doesn't take much grease to do the job, but it should be done weekly. Monthly the space between bars should be cleaned with a piece of wood or plastic or steam cleaned if possible. When J-Hook is worn to 1/8" thickness, replace J-Hook and power bars.

16. FORWARD AND REVERSE SWITCH

Your forward and reverse switch on your vehicle does the same job as does the transmission on your automobile and should be given the same respect. It is designed for trouble free use if properly used. The four fingers should make even and snug contact with rotor contacts. If they become burned through mis-use, replace with new fingers. To do this, remove main positive lead at battery for safety, next remove nut holding wire lug to post. Then remove nut holding finger on post. Make sure nuts are tight when replacing. The rotor contacts can be replaced by removing rotor from switch. Remove handle first, then two screws holding switch body to mounting plate, rotor then can be lifted out. Remove nut on end of shaft and carefully remove plastic spacer and contacts so they can be replaced in same position as they were removed. Replace in reverse of removal.

17. MOTOR MAINTENANCE AND REPAIR

Bearings: This motor is provided with high grade ball bearings prelubricated and permanently sealed. The lubrication is sufficient for life of the bearings. When bearings become worn, they will produce excessive noise, which is a warning that the bearings should be replaced. They should be replaced in the following manner. Pull brushes out of brush holder. Remove pulley end bell, withdrawing rotor. Pull off bearing by means of bearing puller, taking care not to mar center in end of shaft. The new bearing is pushed on the shaft gently by pressure on the inner race or by gently tapping on the inner race. Oil bearing housing and any felt that is in bearing retainer. See that no dirt enters the bearing housing. Reassemble motor, taking care that the bearing shims are properly assembled so that the brushes ride properly on commutator.

Brushes: Periodically, the brushes should be inspected and the carbon dust blown out of motor. When brushes are worn down to about 3/4 of an inch they should be replaced. If at this time the commutator is badly bruned, it should be turned in a lathe, the mica recut, and the commutator polished. Reassemble, sand in new brushes and be sure rocker arm is set on neutral. In normal service, a set of brushes should give about 3,000 hours operating life.

Repairs: Unless the maintenance man is properly qualified, it is advisable that the repair work be done at a qualified service station. When ordering replacement parts, give complete name plate data.

18. TIRE PRESSURE

On 400 x 8 tires, and 300 x 5 tires use only recommended pressure below as these tires are designed for hard surfaces.

300 x 5      4 ply tires    -   90 lbs.

400 x 8      4 ply tires    -   65 lbs.

CAUTION: Do not over inflate because they will wear out before their normal life time.

19. BATTERIES

Your vehicle is equipped with batteries designed especially for electric vehicles. They require the same attention as all lead-acid type storage batteries. Your vehicle utilizes six, 6-volt batteries wired in series to produce thirty-six volts. With proper care these batteries can be discharged and recharged approximately 350-400 times. The average life of batteries is around two years. This is due mainly to the care given to the batteries. A battery is nothing but a chemical device to produce electricity. It's main composition is lead and a solution of water and sulphuric acid. These compounds are placed in a compartment with the lead, in the form of plates, submerged in the solution of sulphuric acid and water. Electricity is produced by the acid of this solution soaking into the lead plates. As the acid is absorbed by the plates electricity is given off. The acid will not soak into the plates unless the electricity is being used, except at a very low ration (self discharging scale follows). When all of the acid in a battery has been absorbed by the lead plates the battery is no longer capable of producing electricity. It is then completely discharged. To restore the battery to it's normal capabilities, a reverse cycle is introduced to the battery charger. By passing current thru the battery in the opposite direction (still negative to negative and positive to positive, but in the opposite direction) the acid is forced out of the plates allowing the battery to again produce electricity by repeating the same process described above. As previously mentioned a properly cared for battery, designed for deep cycling, should be capable of about 350-400 cycles. To determine whether or not a battery is properly charged, a measuring device known as a hydrometer should be used. A hydrometer consists of a glass tube or body with a rubber bulb at one end and a small spout at the other. Inside the tube is a graduated float that is hollow except for one end which is weighted. In pure water this float will rise, as the water is pulled into the tube



of the hydrometer, when the water level reaches about 100 on the graduated scale. Since sulphuric acid is heavier than water, if some acid is mixed with the water this float will rise as the level of the solution reaches a point lower than 1000 on the scale. (This scale is graduated from 1100 to 1300 starting with 1100 at the top of the scale). This means that the more acid there is in the acid water solution the higher the float will rise. (Caution: Never add acid to a battery. This solution is at proper strength when battery is manufactured.) As previously mentioned a fully charged battery has all of it's acid in the solution. A discharged battery has all of it's acid soaked into the lead plates. Therefore by using the hydrometer, one can accurately determine the state of charge of any battery. The specific gravity of the battery when it is fully charged is 1.260. You have been cautioned not to overcharge your batteries. It is just as important if not more important, not to undercharge them. You can readily see that if only part of the acid is forced out of the plates, they can only perform at partial efficiency. Probably more important than partial efficiency is the fact that if the acid is allowed to remain in the lead plates they will harden and become sulphated. This will shorten their life as much as overcharging. In this sulphated condition the battery fails to deliver it's rated capacity or come up to full charge. Several long slow charges and discharges are then necessary to correct the sulphation and hard plates.

Once a month the battery should be given an equalizing charge of 25% over and above the regular charge. Whenever the temperature reaches 125 degrees F. the charging rate should be reduced or the battery taken off charge and allowed to cool down to room temperature. Always correct hydrometer specific gravity reading to temperature of solution. For each ten degrees above 80 degrees F. add 4 points to hydrometer reading. --EX. 90 degrees F. 1.250 plus 4 equals 1.254. For each ten degrees below 80 degrees subtract 4 points from hydrometer reading. --EX. 70 degrees F. 1.250 minus 4 equals 1.246.

Do not overfill the cells when adding water. When the cells are filled too full the solution will expand as it becomes warm from charging. It then siphons out the hole in the vent cap. Each time this happens, the solution is weakened by adding water. Loss of ampere hour rated capacity is the result. FILL TO 1/8" BELOW BOTTOM OF CHAMBER IN VENT HOLE. Never add acid to the cell. Only use distilled water and keep solution up to proper level. Water should always be added to the battery AFTER the charge is complete. Never add water

to a battery before charging unless the level of water is below the plates. If no water is in sight, it is permissible to add just enough water to bring the level up to the top of the plates only.

Solution will freeze at following temperatures:

- 1.250 specific gravity - 62 degrees F.
- 1.200 specific gravity - 16 degrees F.
- 1.150 specific gravity + 5 degrees F.
- 1.100 specific gravity +19 degrees F.

Batteries self discharge when idle as follows:

- 100 degrees F. - 3 points in gravity per day
- 80 degrees F. - 2 points in gravity per day
- 50 degrees F. -  $\frac{1}{2}$  point in gravity per day
- 30 degrees F. -  $\frac{1}{19}$  point in gravity per day

Store batteries FULL CHARGED in a cool place in winter. If stored at 80 degrees F. they should be recharged each 30 days to prevent sulphation and hard plates.

In order for a battery to give maximum service, it should be recharged after every day's use. A battery charger is supplied with every vehicle unless otherwise specified. This charger requires 110-115 volt, 20 amp, 60 cycle single phase electrical circuit per charger.

If you plan to have several chargers working at once, it is necessary to have the electrical requirement problem worked out by an experienced person. With the electrical problem solved, experience of a few weeks operation will reveal the exact charging rate and time required by your vehicle batteries. The length of your driving will govern the charging rates and the length of time required to properly charge the batteries.

## 20. BATTERY CHARGER

Your vehicle comes with 3620A Charger as standard equipment. With this charger you have to predetermine the amount of charging time and then set the clock accordingly. An average to go by is two hours charge for one hour of use, Re:- four hours of driving, set charger at eight hours.

The amount of charge required can be determined by referring to section on batteries and use of hydrometer. If your truck has a 3630T charger all you have to do is set it at four hours and forget it. This charger has a transistor unit in it that automatically turns the clock on when the batteries reach 85% of charge and then runs for four hours to finish the charge. If a fuse should blow out, replace it with a 30 amp buss type fuse only. Make sure fuse is screwed in tight. If service is required call a qualified service man to check out your charger.

SUGGESTED SPARE PARTS LIST

PART#	DESCRIPTION	QUANTITY OF
		1-20 UNITS
11000	Tube, 300 x 8	1
11030	Tube, 400 x 8	1
13522	Tire, tube, wheel and 3" hub with 300 x 5, 4 ply, super rib tire and 3/4" tapered roller bearing	1
13731	Tire, tube and demountable wheel, 400 x 8, 4 ply, super rib tire with five 1/2" holes on 4 1/2" bolt circle on wheel	1
30619	Belt 3V375 (3V section) (belt drive only) (optional)	4
41610	Brake shoe, 1 1/2" wide mechanical, set for one wheel (gear drive only)	2
41660	Brake band for drive shaft brake (belt drive only)	1
45501	Oil seal for Baldor motor with gear case flange. (Motor with specification number starting with 28 (Garlock 63 x 261)	1
45504	Oil seal for G.E. motor with gear case flange	1
61830/5CB	Sliding bar rheostat, 5 speed, complete with 78212A, B, B & C, coils (61830B-10 plus 61830G-15)	1
61830A	Power bar (5 to set)	10
61830B	Sliding J-Hook bar	2
70047	DC electric traction motor, 2.5 H.P. 36 volts, 2600 RPM swivel base (belt drive)	1
70053	DC electric traction motor 3.5 H.P., 36 volt, 2600 RPM, NEMA C face (gear drive)	1
70100	Motor brushes, GE, 1/2 x 5/8 with one wire and hook (Price per set of 4)	1 set
70124	Motor brushes, Baldor, 7/8" x 3/8" with one wire and tab (priced per set of 4)	1 set
71040H	Rotor contact (set of 2, one right and one left)	1 set
71040I	Spacer washer	2
71040J	Switch fingers, silver plated with 1/2" mounting hole	8
71040K	Finger board with 1/2" mounting holes	2
71040L	Metal switch handle (red)	1
71100	Switch, light (single pole, single throw)	1
71502	Horn button (Newtone PB 1)	1
72022	Light, stop & tail, 4" rubber mount (12 volt)	1
72072	Headlight, sealed beam bulb 4" (12 volt)	1
73000	Horn (12 volt)	1
75231	Battery jumper #4 wire, 8" long	5
76001	Charging plug (T-plug) 20 amp.	3
76011	Charging receptacle (T-plug) 20 amp.	3

PART #	DESCRIPTION	QUANTITY OF
		1-20 UNITS
77200	Hydrometer	2
77201	Battery filler	1
78010	Secondary fuse holder, inline type	2
78212A	Resistor coil #9 wire, 14 turns (used between 1st and second speed)	1
78212B	Resistor coil #6 wire, 9 turns (used between 2nd and 3rd speed, all rheostats and 3rd and 4th speed on 5 speed rheostats)	2
78212C	Resistor coil #5 wire, 6 turns (used between last speeds on 4 and 5 bar rheostats)	1
79820	Fuse, 30 amp, screw type	10
79823	Fuse, Buss type, 20 amp	3
85060	Spring, compression 5/8" O.D. X 2 1/4" long (half band brake) (belt drive)	2
85231	Spring extension, 3/4" O.D. X 6-9/16" free length inside loops (accelerator return)	4
85270	Spring extension 1 1/2" O.D. X 4-3/8" free length inside loops (brake return) (gear drive)	4

FIG. 2-9

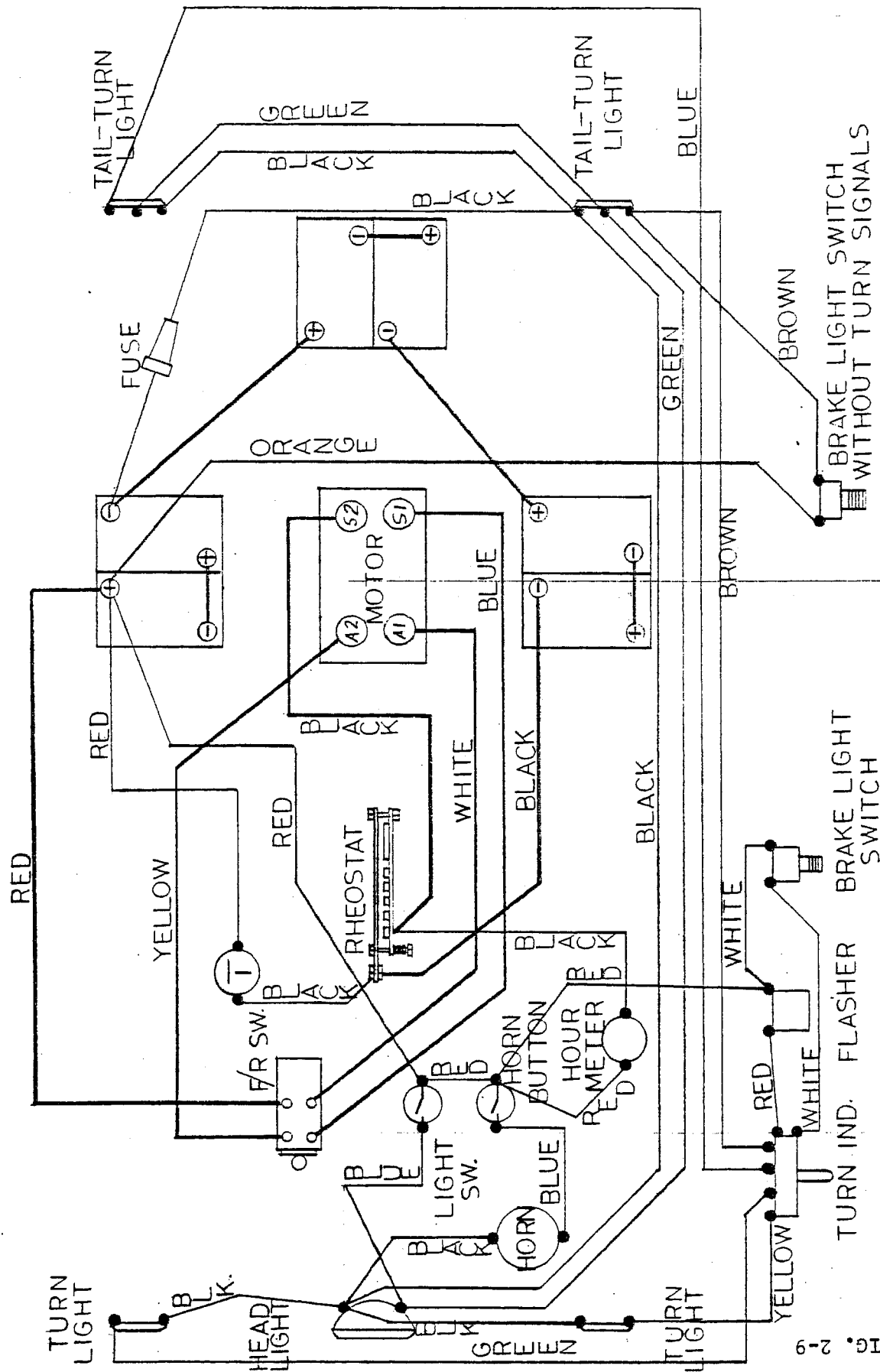


FIG. 2-9

NO.		DESCRIPTION		LENGTH	QUAN.	REVISED DATE	REVISION
TOL. FRAC. ±		DEC. ±		400 SERIES		FIGURE	
SCALE						2	
DRAWN BY DH						MODEL C	
DATE 6-12-68							

TAYLOR DUNN MFG. CO.  
2114 West Ball Rd.  
Anaheim, Calif.

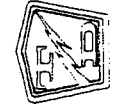


FIG. 3-1

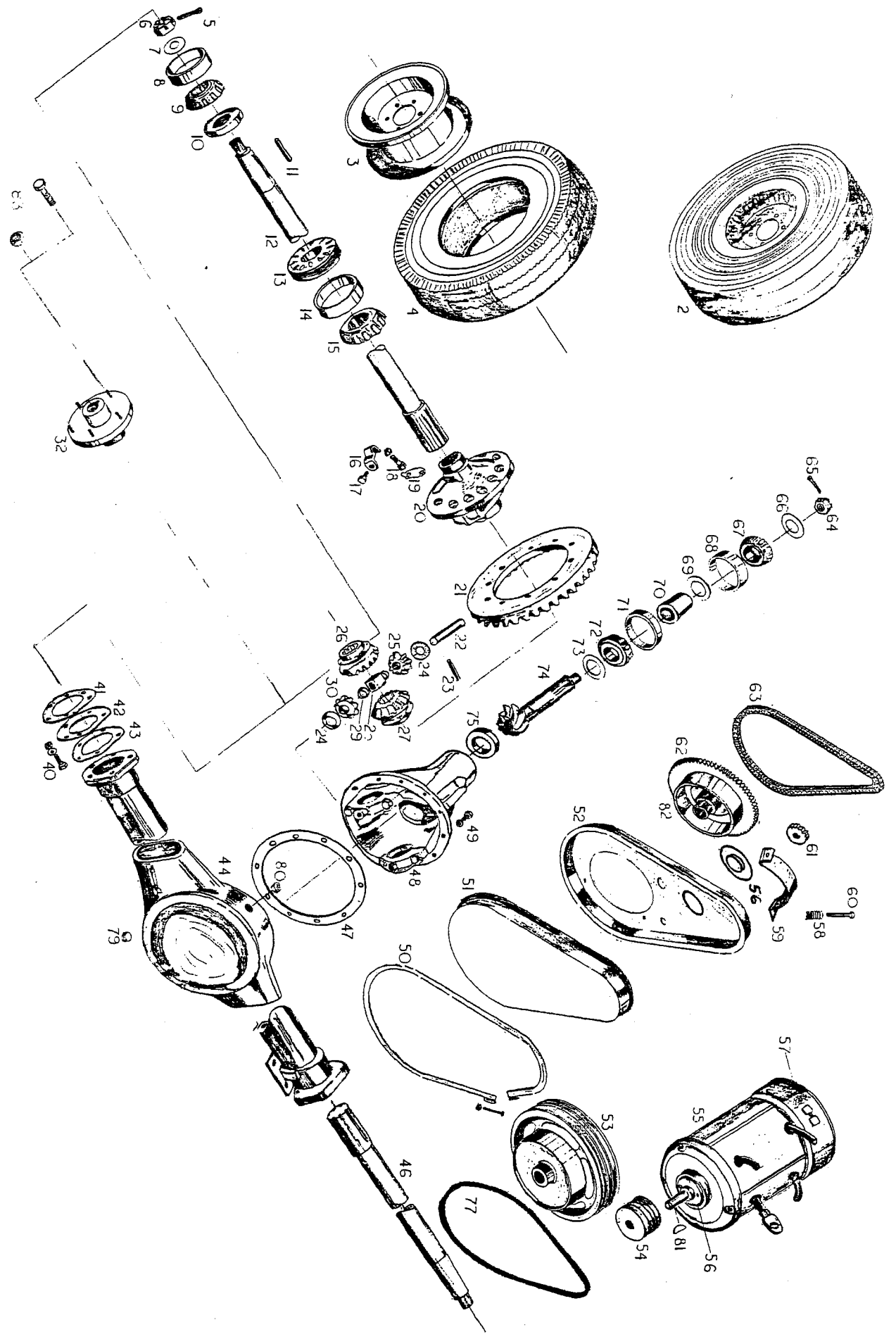



FIG. 3-1

TOL. FRAC. $\frac{1}{16}$	DEC. $\frac{1}{16}$	100 SERIES	<p>CHAIN AND BELT DRIVE REAR AXLE</p> <p>FIGURE 3</p>	<p>196 10 1970 MODELS</p>	 <p>TAYLOR DUNN MFG. CO. 2114 West Ball Rd. Alhambra, Calif.</p>
SCALE					
DRAWN BY					
DATE					

TROUBLE SHOOTING PROCEDURES

<u>SYMPTOM</u>	<u>PROBABLE CAUSE</u>	<u>CORRECTIVE ACTION</u>
1. <u>Steering:</u>		
(a) Pull in one direction	1. Check for bent fork	Replace or straighten
(b) Hard Steering	1. Bad or frozen bearing in fork spindle collar. 2. Low tire pressure	Replace Inflate to recommended pressure.
(c) Sloppy or loose steering.	1. Loose spindle bearing 2. Loose wheel bearing	Adjust. Adjust.
2. <u>Brakes:</u>		
(a) Soft Brakes	1. Check for worn lining 2. Alignment of brake shoes 3. Oil on brake lining 4. Dirt on brake lining 5. Bind in linkage 6. Weak spring 7. Air in hydraulic brake lines. 8. Bad seals in brake cylinders	Adjust or replace when 1/8 or less of lining left. Realign. Find oil source and correct, Wash brake band. Clean Loosen or Realign Replace Bleed brakes Replace.
(b) No Brakes	1. Broken Shoe 2. Broken connection in linkage 3. Broken Axle 4. Break in hydraulic line 5. Seal failure in brake cylinder.	Replace Replace Replace Repair Replace
3. <u>Drive Axle:</u>		
(a) No power	1. Discharged batteries 2. Check rheostat for contact 3. Check motor brushes for contact 4. Poor contact on forward-reverse switch. 5. Check for loose wire 6. Check continuity through motor.	Recharge or replace. Adjust or replace bars. Clean or Replace. Replace Tighten or replace Repair or replace
(b) Erratic Operation	1. Rheostat making poor contact. 2. Motor brushes 3. Check motor commutator for burning or wear. 4. Check for loose wiring 5. Badly worn drive sprockets or belts.	Adjust or replace Clean or replace Turn or replace Tighten Adjust or replace sprockets, chain and belts.

<u>SYMPTOM</u>	<u>PROBABLE CAUSE</u>	<u>CORRECTIVE ACTION</u>
(c) Jerky Starting	<ol style="list-style-type: none"> <li>1. Resistor coil burned open</li> <li>2. Resistor shorted together</li> <li>3. Poorly adjusted rheostat</li> <li>4. Badly worn J-Hook</li> <li>5. Dirt between power bars causing shorts.</li> </ol>	Replace Spread apart Re-adjust Replace J-Hook and ba Clean
(d) Takes off in forward or reverse without accelerator depressed.	<ol style="list-style-type: none"> <li>1. Dirt shorting out neutral bar.</li> <li>2. Check rheostat adjustment</li> <li>3. Short in wiring circuit</li> <li>4. Burned forward-reverse switch.</li> </ol>	Clean readjust or replace bars.  Correct Replace
(c) Lack of power or slow operation	<ol style="list-style-type: none"> <li>1. Dragging brake</li> <li>2. Tight front wheel bearings</li> <li>3. Rheostat not making contact on high speed bar.</li> <li>4. Loose connection in wiring</li> <li>5. Partially burned out motor or thrown lead.</li> <li>6. Weak batteries</li> <li>7. Bind or drag on differential</li> </ol>	Re-adjust Readjust Readjust or replace bars. Tighten Replace or re-solder Replace Repaid
(f) Thump or grinding noise in drive axle.	<ol style="list-style-type: none"> <li>1. Motor bearing</li> <li>2. Loose motor on base</li> <li>3. Worn sprockets</li> <li>4. Defective bearing in differential.</li> <li>5. Defective gears in differential.</li> </ol>	Replace Tighten Replace sprocket and chain. Replace.  Replace



PARTS LIST AND PROCUREMENT INFORMATION

Parts can be ordered direct from your local dealer or from the factory if desired. When ordering parts be sure to specify the type unit you have, the unit serial number, the full part number and description, and the quantity required. When ordering parts for the drive motor give the specification number of the motor. Be sure to give proper billing address and shipping address on all parts orders.

When ordering parts under warranty, be sure to place all orders direct to the factory in Anaheim, California. Also, be sure to give the invoice number and the date of shipment of the vehicle.

TAYLOR-DUNN MANUFACTURING CO.  
2114 West Ball Road  
Anaheim, California 92804

PHONE: 714-956-4040

FIG. 4-4

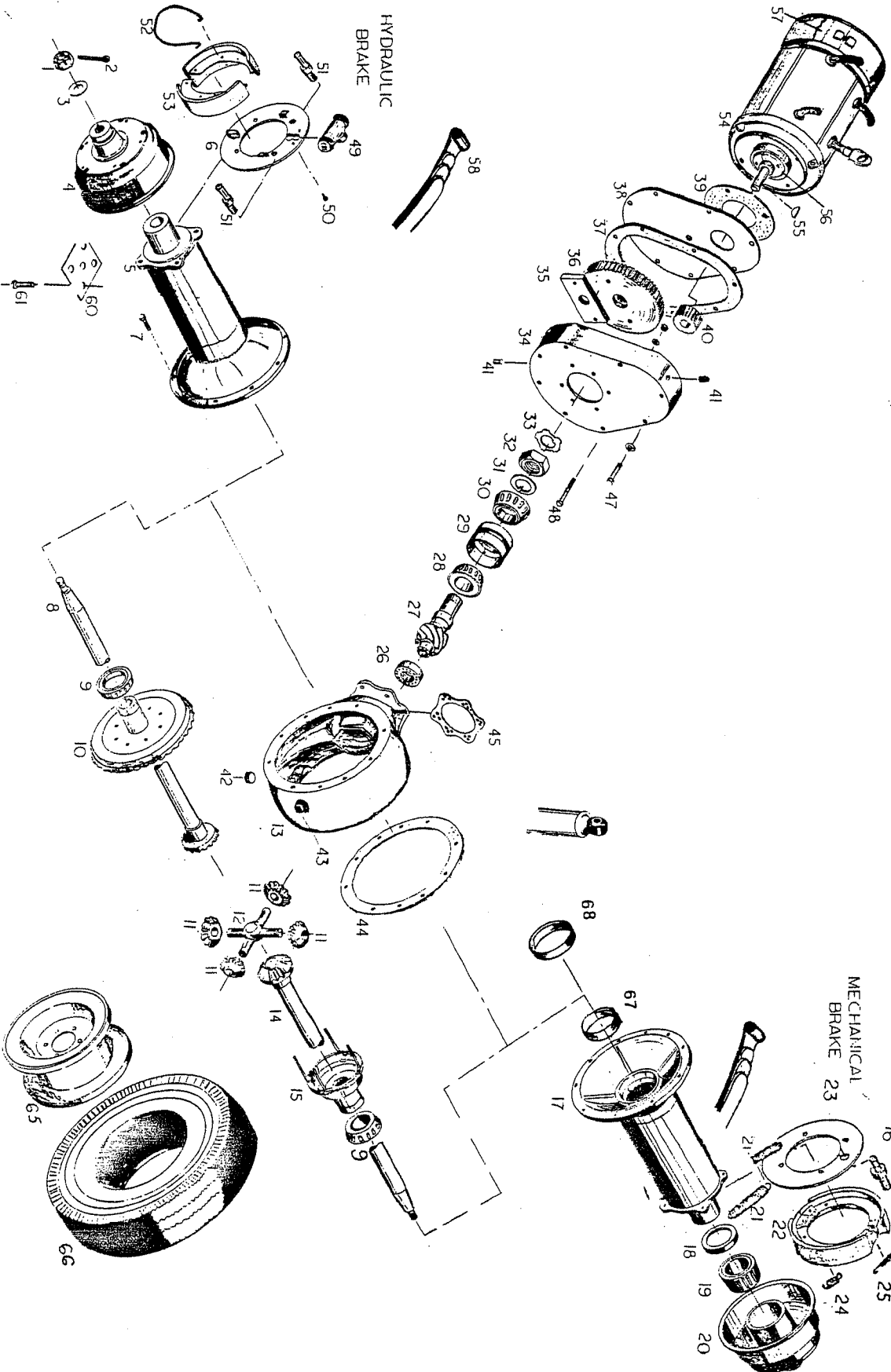


FIG. 4-4

TOL. FRAC. ± DEC. ±

SCALE

DRAWN BY

DATE 4 -76

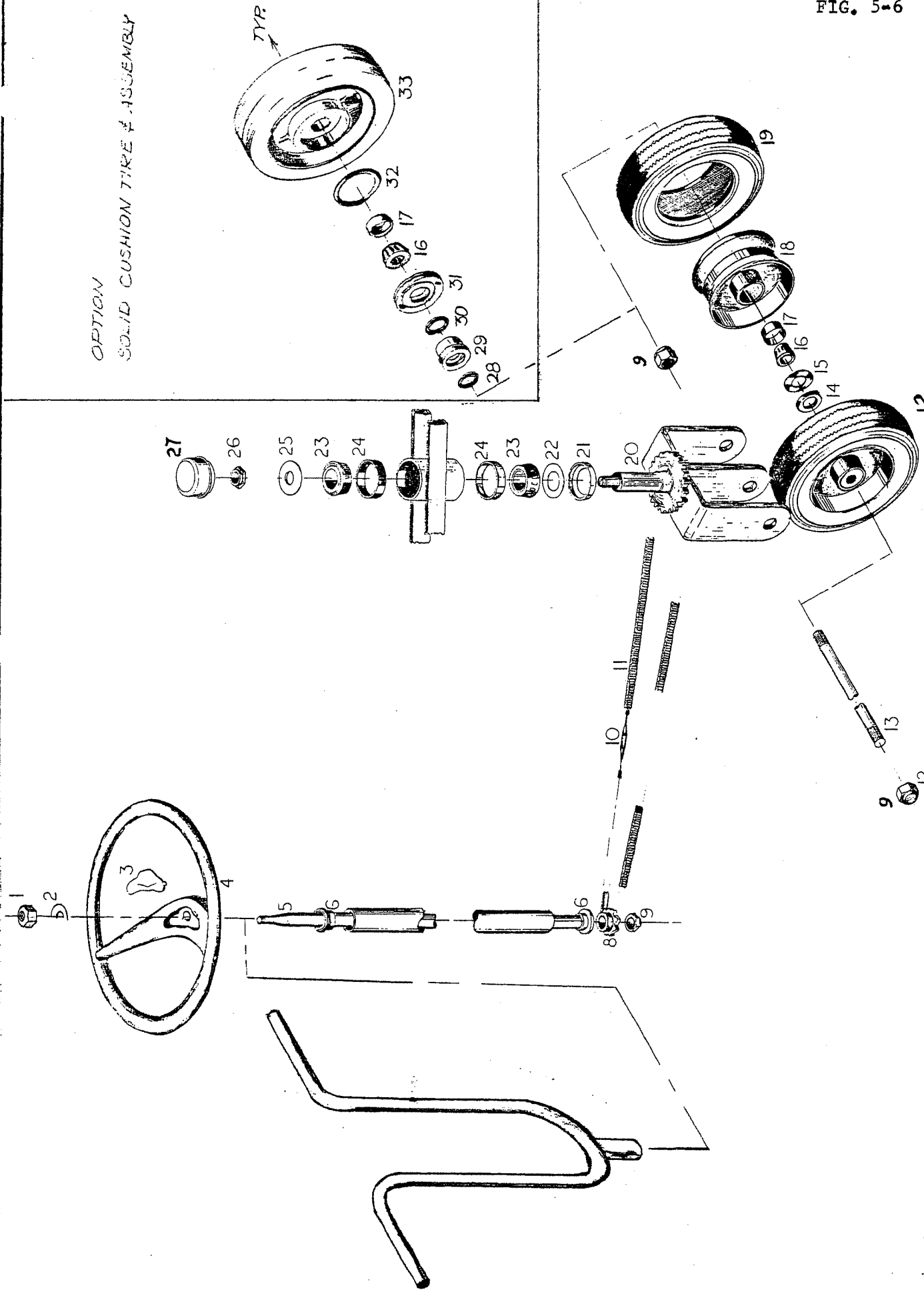
400 SERIES

GEAR DRIVE REAR AXLE  
1967 TO 1970 MODELS

FIGURE  
4

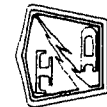


TAYLOR DUNN MFG. CO.  
2114 West Ball Rd.  
Heim, Calif.



OPTION  
SOLID CUSHION TIRE & ASSEMBLY

FIG. 5-6



TAYLOR DUNN MFG. CO.  
2114 West Ball Rd.  
Anaheim, Calif.

FIGURE  
5

FRONT STEERING AND FORK  
1965 TO 1970 MODELS

FIG. 5-6

TOL. FRAC. ± DEC. ± 400 SERIES

SCALE

DRAWN BY

DATE 6-7-68

FIG. 9-2

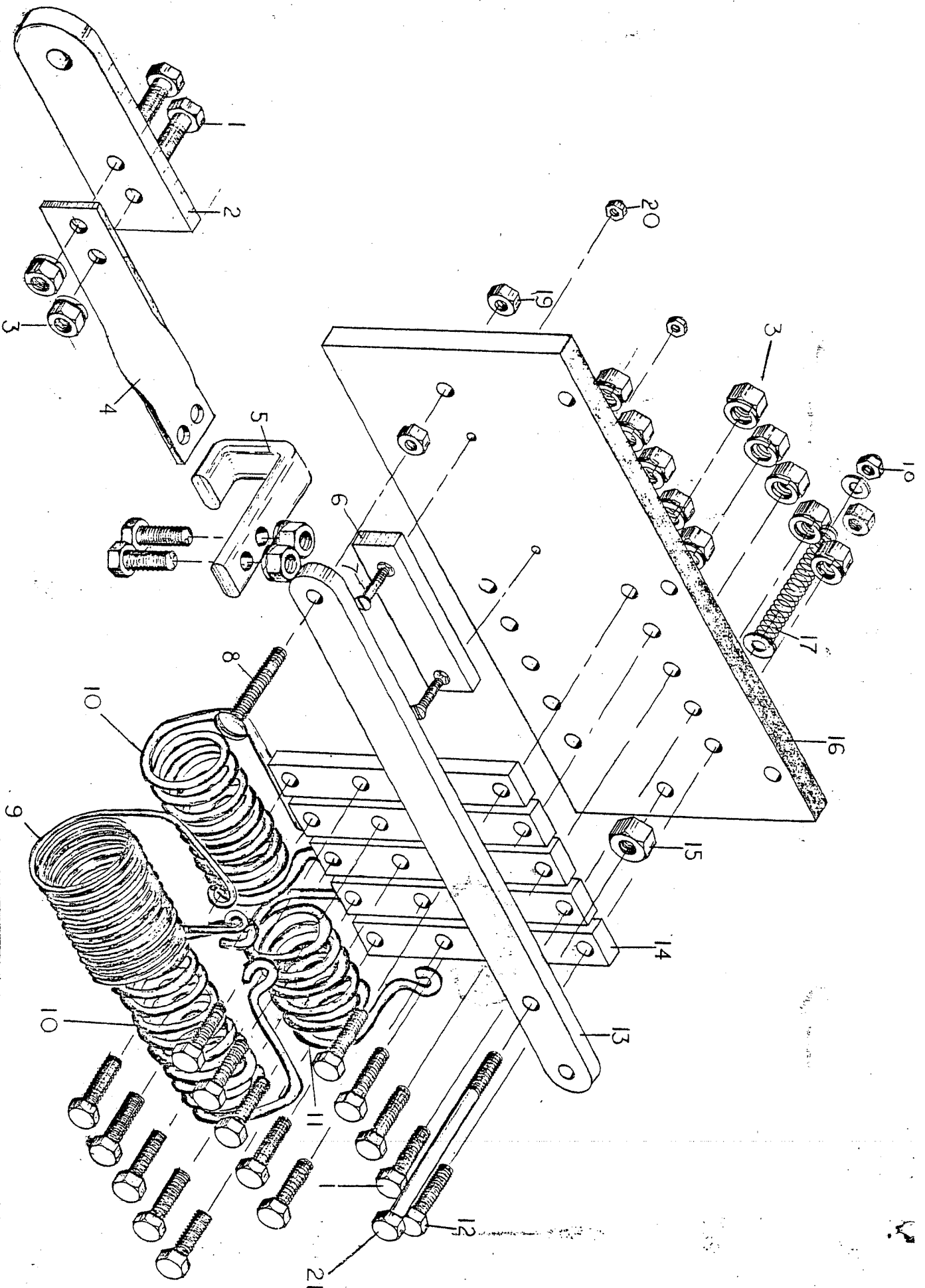


FIG. 9-2


TOL. FRAC. ±	DEC. 1 <sup>st</sup>	PART NO. 300 SERIES	SPEED CONTROL RHEOSTAT	FIGURE	 TAYLOR DUNN MFG. CO. 2114 West Ball Rd. A. Helm, Calif.
SCALE		REVISED DATE 200 SERIES	1965 TO 1970 MODELS	9	
DRAWN BY		400 "			
DATE 6-	8-67				

FIG. 7-5

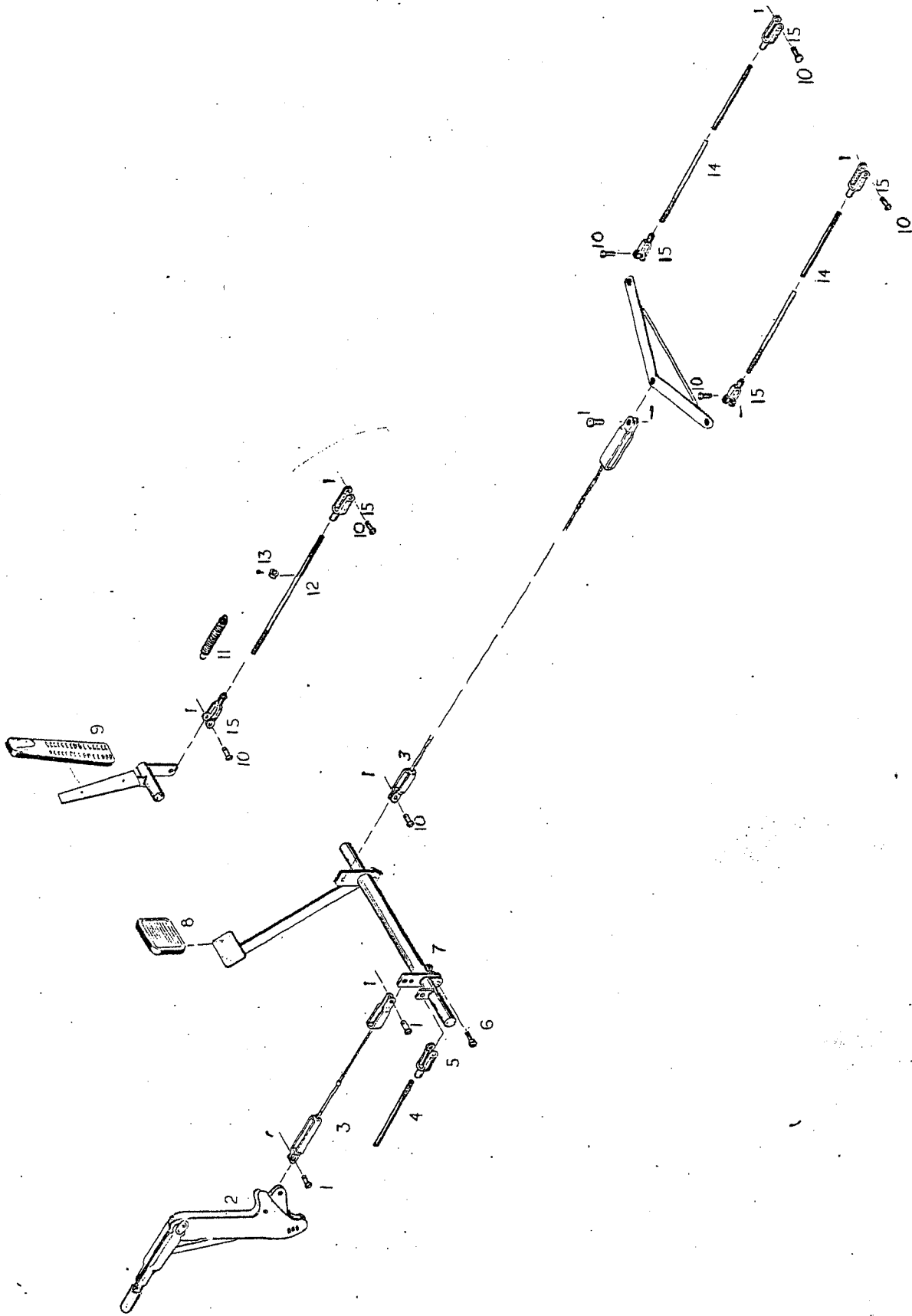


FIG. 7-5

<div>TOL. FRAC. <math>\pm</math> DEC. <math>\pm</math></div> <div>SCALE</div> <div>DRAWN BY</div>	<div>400 SERIES</div>	<div>CONTROL LINKAGE</div> <div>1965 TO 1968 MODEL</div>	<div>FIGURE</div> <div>7</div>	<div>TAYLOR DUNN MFG. CO.</div> <div>2114 West Ball Rd.</div> <div>Anaheim, Calif.</div>
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FIG. 11-1

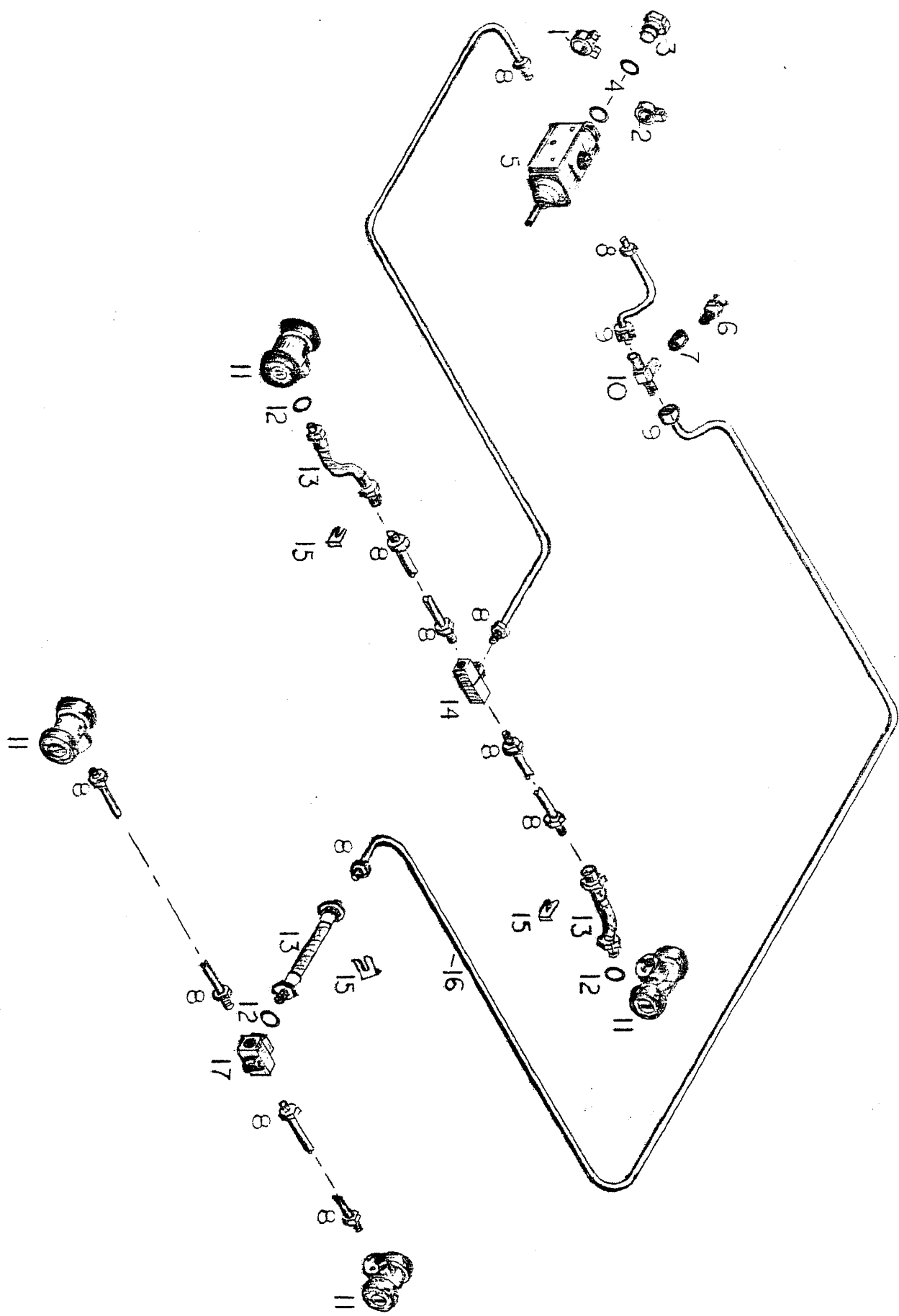


FIG. 11-1

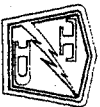
TOL. FRAC. ±	DEC. ±	PART NO.	HYDRAULIC SYSTEM		FIGURE	 TAYLOR DUNN MFG. CO. 2114 West Ball Rd. Anaheim, Calif.
SCALE 1/4" = 1"		REVISED DATE	2 & 4 WHEEL		11	
DRAWN BY J. DUNN		200 SERIES				
DATE 9-1-5		300 SERIES				

FIG. 10-1

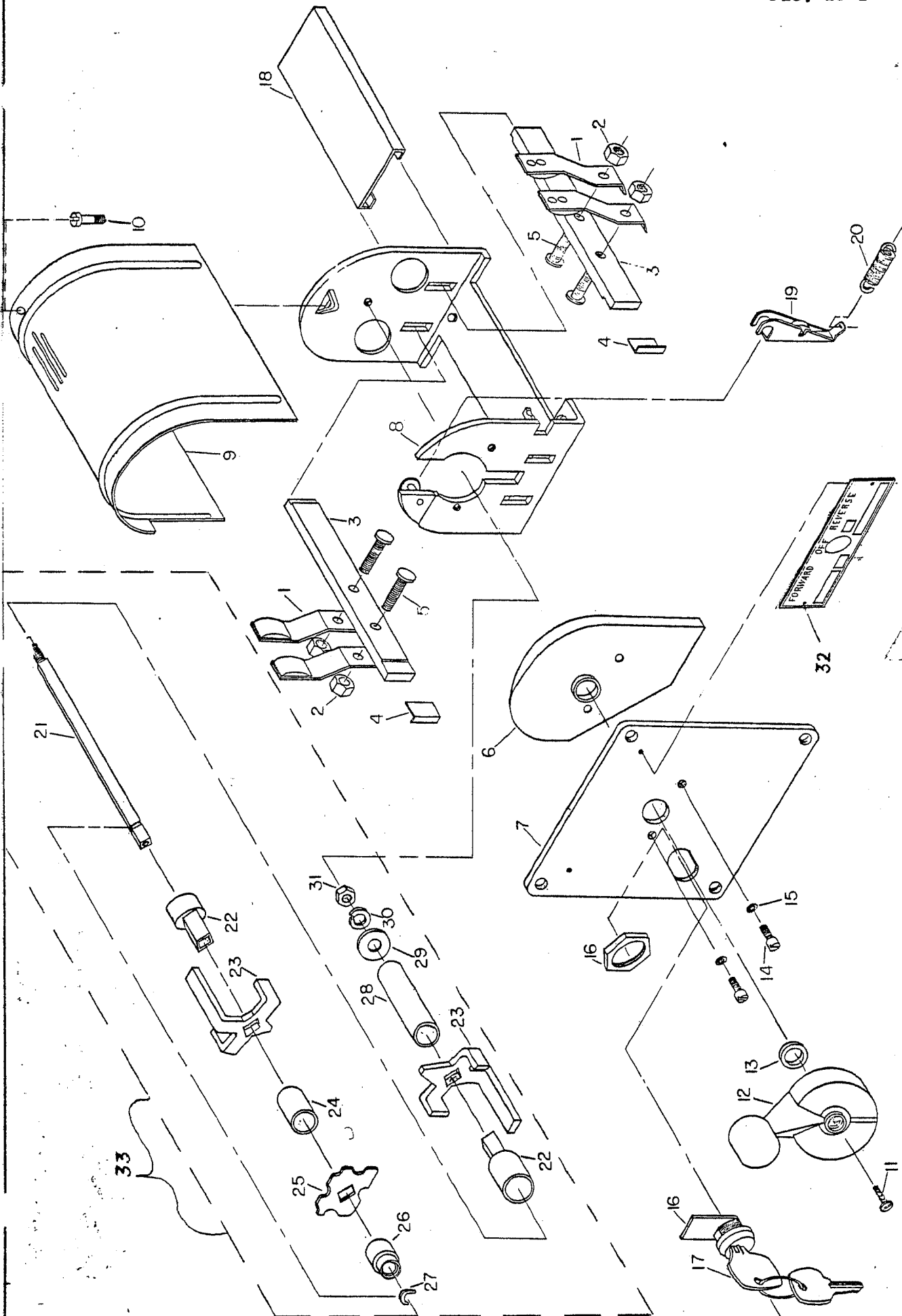


FIG. 10-1

TAYLOR DUNN MFG. CO  
2114 West Ball Rd.  
Anaheim, Calif.

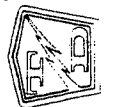


FIGURE  
10

FORWARD - REVERSE SWITCH  
PART NO. 71-040-00

TOL. FRAC. ± DEC. ± PART NO. 71-040-00

SCALE NONE REVISED DATE

DRAWN BY *D.H.*

DATE MAY 21, 1967

FIGURE 3  
CHAIN AND BELT DRIVE  
REAR AXLE  
1965 to 1970 MODELS

FIGURE	PART NO.	DESCRIPTION	QUANTITY
3-2	10250	Tire, solid cushion smooth, 16 x 4 x 12 1/8	2
3-2	12050	Wheel for 16 x 4 x 12 1/8 solid cushion tire, five 1/2" holes on 4 1/2" bolt circle	2
3-2	13861	Tire and demountable cast iron wheel 16 x 4 x 12 1/8 solid cushion smooth tire and five 1/2" holes on 4 1/2" bolt circle on wheel	2
3-2	13956	Tire and demountable cast iron wheel 16 x 4 molded white rubber with five 1/2" holes on 4 1/2" bolt circle on wheel	2
3-3	12011	Wheel for 400 x 8 tire, demountable drop center, five 1/2" holes on 4 1/2" bolt circle	2
3-4	10074	Tire, 400 x 8, 4 ply, super rib	2
3-4	11030	Tube, 400 x 8	2
3-4	13737	Tire, tube and demountable wheel, 400 x 8, 4 ply, super rib tread tire with five 1/2" holes on 4 1/2" bolt circle on wheel	2
3-5	-----	1/8 x 1 1/2 Steel cotter pin	2
3-6	-----	3/4" NF Castle nut	3
3-7	-----	3/4" SAE Washer	3
3-8	80120	Tapered bearing race for axle bearing	2
3-9	80500	Tapered roller bearing for rear axle	2
3-10	45323	Oil seal, rear axle, inner	2
3-11	97052	5/16" Square key for axle, (2 1/4" long)	2
3-12	41100A	Axle, rear, 14 1/2" overall length 10 teeth on spline (right and left side)	1
3-12	41100B	Axle, rear, 14 1/2" overall length 16 teeth on spline (right and left side)	1
3-13	41970	Bearing adjuster	2
3-14	80123	Tapered bearing race for carrier bearing	2
3-15	80510	Tapered roller bearing, carrier	2
3-16	41971	Bearing adjuster lock	2
3-17	-----	5/16" x 3/4" NC Hex head cap screw	2
3-18	41990	Axle gear bolt	10
3-19	41991	Axle gear bolt lock nut	10
3-20	41980	Differential case	1
3-21	31245	Ring and pinion gear set 6.17 ratio	1



FIGURE 3

FIGURE	PART NO.	DESCRIPTION	QUANTITY
3-21	32146	Ring and pinion gear set 4.10 ratio	1
3-21	31247	Ring and pinion gear set 3.90 ratio	1
3-21	31248	Ring and pinion gear set 3.73 ratio	1
3-21	31249	Ring and pinion gear set 3.54 ratio	1
3-22	41910	Pinion shaft, differential	1
3-23	41900	Pinion shaft lock pin	1
3-24	41923	Differential pinion gear washer	2
3-25	41950	Pinion gear differential	2
3-26	41921A	Differential gear thrust (10 spline)	2
3-26	41921B	Differential gear thrust (16 spline)	2
3-27	-----	Same as figure 2-26	-
3-28	41920	Axle thrust block	2
3-29	41922	Axle thrust block spacer	2
3-30	41950	Pinion gear differential	2
3-32	12205N	Rear hub, five $\frac{1}{2}$ " holes on $4\frac{1}{2}$ " bolt circle narrow width (1 $\frac{3}{8}$ " face to outside hub end) requires 96320 lug bolts	2
3-32	12205W	Rear hub, five $\frac{1}{2}$ " holes on $4\frac{1}{2}$ " bolt circle, wide width (1" face to outside hub end) requires 96320 lug bolts	2
3-40	41992	Rear wheel support bolt	10
3-41	80790	Dust washer for outer axle	2
3-42	32510	Retainer, rear axle, wheel bearing	2
3-43	41961	Axle bearing shim	0-8
3-44	41280	Housing differential, no springs	1
3-46	41100A	Axle rear, $14\frac{1}{2}$ " overall length, 10 teeth on spline (right and left side)	1
3-46	41100B	Axle rear, $14\frac{1}{2}$ " overall length, 16 teeth on spline (right and left side)	1
3-47	45040	Gasket, ring and pinion gear housing to differential housing	1
3-48	44325	Differential ring and pinion gear housing	1
3-49	-----	$\frac{3}{8}$ NF Nut and lock washer	11
3-50	30707	Chain guard band	1
3-51	30704	Chain guard front cover	1
3-52	30705	Chain guard rear cover	1
3-52	30708	Chain guard support bracket set	1 set
3-53	30105	Pulley, 4 belt, 3V section with hub and brake drum 9.8" OD	1

FIGURE 3

FIGURE	PART NO.	DESCRIPTION	QUANTITY
3-54	30160	Pulley, 4 belt, 3V section, 3.15" OD, 3/4 bore	1
3-55	70043	DC electric traction motor, 1/1.5 HP, 24/36 volt, 1600/2400 RPM, swivel base	1
3-55	70047	DC electric traction motor, 2.5 HP, 36 volt, 2600 RPM, swivel base	1
3-55	70053	DC electric traction motor 3.5 HP, 36 volt, 2600 RPM, swivel base	1
3-56	98604	Grommet plug, rubber for 1 3/8 hole	1
3-57	70100	Motor brushes, GE, 1/2 x 5/8 with one wire and hook (priced per set of 4)	1 set
3-57	70122	Motor brushes, Baldor, 7/8 x 5/16 with one wire and tab (for 1 and 1 1/2 HP, 24/36 volt motor) (priced per set of 4)	1 set
3-57	70124	Motor brushes, Baldor, 7/8 x 3/8 with one wire and tab (for 3 1/2 HP, 36 volt motors) (priced per set of 4)	1 set
3-57	70180	Baldor brush head assembly with 7/8 x 5/16" brushes (for 1 and 1 1/2 HP, 24/36 volt Baldor motor)	1
3-57	70182	Baldor brush head assembly with 7/8 x 3/8" brushes (for 3 1/2 HP, 36 volt motor)	1
3-57	70185	General Electric brush hrad assembly with brushes	1
3-57	70200	Baldor or GE armature (please state make of mo or and specification number) (prices are 65% of current equal motor)	1
3-57	70250	Baldor or GE fields and housing (please state make of motor and specification number) (price is 65% of current equal motor)	1
3-57	70421	Motor mount straps (2 1/2" long, two holes)	2
3-57	70430	Cast swivel motor base for 1 and 1 1/2 HP, 24/36 volt Baldor motors	1
3-57	70431	Cast swivel motor base for 3 1/2 HP, 36 volt Baldor motor	1
3-57	70432	Cast swivel motor base for GE motor	1
3-57	80200	Ball bearing front for 1 or 1 1/2 HP, 24/36 volt Baldor motor	1
3-57	80201	Ball bearing rear for 1 or 1 1/2 HP, 24/36 volt, Baldor motor	1
3-57	80504	Ball bearing front and rear for 2 1/2 HP, 24 volt, Baldor motor	2
3-57	80204	Ball bearing front for GE motor	1
3-57	80205	Ball bearing rear for GE motor	1
3-57	85401	General Electric brush spring, extension 1/2" OD x 1 1/2" 4	4

FIGURE 3

FIGURE	PART NO.	DESCRIPTION	QUANTITY
3-57	85409	Baldor brush torsion spring, painted red for 1 and 1½ HP, 24/36 volt motors	4
3-57	85410	Baldor brush torsion spring, painted white for 3½ HP, 36 volt motor	4
3-58	85060	Compression spring 5/8" OD by 2½" long	1
3-59	41660	Brake band for drive shaft brake	1
3-60	-----	3/8 x 4 NC Hex head cap screw	1
3-61	30080	Sprocket, silent chain, 15 tooth, 3/4 bore	1
3-61	30082	Sprocket, silent chain, 17 tooth, 3/4 bore	1
3-62	30088	Sprocket, silent chain, 67 tooth, 4 hole, demountable	1
3-63	30501	Chain, silent, 45 links (33 3/4" long)	1
3-64	-----	3/4 NF Castle nut	3
3-65	-----	1/8" x 1½ Cotter pin	3
3-66	-----	3/4 SAE washer	3
3-67	80551	Tapered roller bearing front pinion	1
3-68	80122	Tapered bearing race for front and rear pinion	1
3-69	41926	Drive pinion bearing adjustment shim	1
3-70	41925	Drive pinion spacer	1
3-71	80122	Tapered bearing race for front and rear pinion	1
3-72	80553	Tapered roller bearing, rear pinion	1
3-73	41924	Drive pinion rear bearing washer	1
3-74	-----	Pinion gear see item 3-21 for gear set price	1
3-75	45330	Oil seal, pinion	1
3-77	30619	Belt, 3V375 (3V section)	4
3-79	41997	Level plug and drain plug (1/8 pipe)	2
3-80	41995	Filler plug 3/8" with square top	1
3-81	97100	3/16 Woodruff key	1
3-82	41531-10	Brake drum and hub assembly	1
3-83	-----	½" NF lug nut (used on hub with studs)	10
3-83	96320	½" NC lug bot (used on hub without studs)	10

FIGURE 4GEAR DRIVE - REAR AXLE1965 to 1970 MODELS

FIGURE	PART NO.	DESCRIPTION	QUANTITY
4-1	-----	5/8 NF Castle nut	2
4-2	-----	1/8 x 1½ Cotter pin	2
4-3	-----	3/4 SAE washer	2
4-4	41510-10	Brake drum and hub assembly, six 3/8" holes on 5" bolt circle with bearing and seal (used up to early part of 1965 only)	2
4-4	41511-10	Brake drum and hub assembly, five ½" holes on 4½" bolt circle with bearing and seal (used from middle 1965 on)	2
4-5	41220	End bell	1
4-6	41331	Brake backup plate, hydraulic mechanical with cam	2
4-7	-----	3/8 x 5/8 NF Hex head bolt	20
4-8	41020-A	Axle, rear, 15 3/4" overall length, 16 teeth on gear end, short taper, heat treated	2
4-8	41020-B	Axle, rear, 15 3/4" overall length, 18 teeth on gear end, short taper, heat treated	2
4-9	80506	Tapered roller carrier bearing	2
4-10	31240	Ring and pinion gear set 6.17 ratio	1
4-10	31241	Ring and pinion gear set 3.78 ratio	1
4-11	41927-A	Differential gear 11 tooth	4
4-11	41927-B	Differential gear 12 tooth	4
4-12	41912	Differential gear X shaft	1
4-13	41260	Banjo housing	1
4-14	41930	Differential gear cage	1
4-15	80124	Tapered bearing race for carrier bearing	2
4-16	96000	Anchor bolt	2
4-17	41220	End bell	1
4-18	45300	Oil seal, rear hub	2
4-19	80502	Roller bearing	2
4-20	41510-10	Brake drum and hub assembly, six 3/8" holes on 5" bolt circle with bearing and seal (used up to early part of 1965 only)	2
4-20	41511-10	Brake drum and hub assembly, five ½" holes on 4½" bolt circle with bearing and seal (used from middle 1965 on)	2

FIGURE 4

FIGURE	PART NO.	DESCRIPTION	QUANTITY
4-21	85270	Spring, extension 1½" OD x 4 3/8" free length inside loops	2
4-22	41610	Brake shoe, 1½" wide mechanical, set for one wheel	2
4-22	41610E	Brake shoe, 1½" wide mechanical, exchange set for one wheel, credit will be issued only if shoes are relinable	2
4-23	41320-10R	Mechanical brake backup plate with cam (right side)	1
4-23	41320-10L	Mechanical brake backup plate with cam (left side)	1
4-24	85200	Spring extension 7/16" OD by 2 7/16" (brake shoe spring on cam side)	1
4-25	85220	Spring extension 5/8" OD x 2 3/8" (brake shoe anchor bolt side) free length inside loops	1
4-26	80490	Ball bearing for front pinion (6.17 to 1 ratio only)	1
4-27	-----	Pinion gear see figure 4-10	1
4-28	80508	Tapered roller bearing for pinion	2
4-29	80126	Double tapered bearing race for pinion	1
4-30	80508	Tapered roller bearing for pinion	2
4-31	41928	Retainer washer	1
4-32	41993	Pinion bearing nut	1
4-33	41929	Lock washer nut	1
4-34	43200	Gear case	1
4-35	97210	Wing nut	1
4-36	31200	Spur gear, 84 tooth, six spline hub	1
4-36	31201	Spur gear, 84 tooth, ten spline hub	1
4-36	31210	Spur gear, 64 tooth, six spline hub	1
4-36	31211	Spur gear, 64 tooth, ten spline hub	1
4-37	45000	Gear case gasket	1
4-38	44350	Gear case cover	1
4-39	45010	Motor gasket	1
4-40	31230	Spur gear, 17 tooth, 3/4 bore	1
4-40	31233	Spur gear, 20 tooth, 3/4 bore	1
4-41	41997	Fill plug (1/8 pipe)	1
4-42	41999	Drain plug ½" with recessed top	1
4-43	41999	Level plug ½" with recessed top	1
4-44	45030	Gasket, end bell	2
4-45	45020	Gasket, gear case to differential	1

FIGURE 4

FIGURE	PART NO.	DESCRIPTION	QUANTITY
4-47	-----	3/8 x 3 NC Hex head bolt	3
4-48	-----	5/16 x 3 NC Hex head bolt	5
4-49	99500	Wheel cylinder	2
4-49	99500K	Wheel cylinder repair kit	2
4-50	-----	1/2 x 3/4 NC Hex head bolt	4
4-51	42002	Cam, hydraulic brake adjustment	4
4-52	85310	Spring, horseshoe shape (1 1/2" wide hydraulic brakes)	2
4-53	41602	Brake shoe, 1 1/2" wide, hydraulic mechanical (set for one wheel)	2
4-53	41602-E	Brake shoe, 1 1/2" wide, hydraulic mechanical (set for one wheel) (credit will be issued only if shoes are relinable)	2
4-54	70053	DC electric traction motor, 3.5 HP, 36 volt, 2600 RPM, NEMA C face and seal	1
4-55	97100	3/16 Woodruff key	1
4-56	45501	Oil seal, Baldor motor with gear case. Flange used after 1962 on 2 HP to 3 1/2 HP motors or with specification numbers starting with 28 (Garlock 63 x 261)	1
4-57	70124	Motor brushes, Baldor, 7/8" x 3/8" with one wire and tab	1
4-57	70182	Baldor brush head assembly with 7/8" x 3/8" brushes	1
4-57	70200	Baldor armature (price is 65% of motor)	1
4-57	70250	Baldor field (price is 65% of motor)	1
4-57	85410	Baldor brush torsion spring painted white for 3 1/2 HP motor	4
4-65	12010	Wheel for 400 x 8 tire, demountable drop center, six 3/8" holes on 5" bolt circle (used up to early 1965 only)	2
4-65	12011	Wheel for 400 x 8 tire, demountable drop center, five 1/2" holes on 4 1/2" bolt circle (used from middle 1965 on)	2
4-65	12052	Wheel for 16 x 4 x 12 1/8 solid cushion tire with five 1/2" holes on 4 1/2" bolt circle	2
4-66	10074	Tire, 400 x 8 4 ply, super rib	2
4-66	10250	Tire, solid cushion, smooth 16 x 12 1/8	2
4-66	11030	Tube, 400 x 8	2
4-66	13737	Tire, tube, and wheel, 400 x 8, 4 ply super rib tire with five 1/2" holes on 4 1/2" bolt circle on wheel	
4-66	13952	Tire and demountable cast iron wheel with 16 x 4 x 12 1/8 solid cushion smooth tire and five 1/2" holes on 4 1/2" bolt circle on wheel	2
4-67	45-320-00	Oil Seal, Rear Axle, Inner	1

FIGURE 5  
FRONT STEERING AND FORK  
1965 TO 1968 MODEL

FIGURE	PART NO.	DESCRIPTION	QUANTITY
5-1	-----	5/8 NF Hex head jam nut	1
5-2	19122	Handle bar steering for standup model	1
5-3	19002-1	Cover steering wheel drilled for horn	1
5-4	19002	Steering wheel, deluxe	1
5-5	20010	Steering shaft	1
5-6	80400	3/4" Ball bearings for steering column shaft	2
5-8	30002	11 Tooth sprocket for #40 chain	1
5-9	-----	3/4" NC Lock nut	3
5-10	96900	Turnbuckle for steering chain	1
5-11	30240	#40 Chain for steering fork, 27½" long	1
5-12	13903	Tire, wheel and hub with 10 x 3.00 solid cushion tire and 3/4" bearing	2
5-12	13905	Tire, wheel and hub with 10 x 3.00 solid molded white rubber and 3/4" bearings	1
5-13	15010	Front axle	1
5-14	80700	Dust ring for #13061 wheel with 3/4" bearings	4
5-15	80800	Dust washer for #13061 wheel with 3/4" bearings	4
5-16	80014	3/4" Tapered roller bearing for #13061 wheel	4
5-17	80104	3/4" Tapered bearing race for #13061 Wheel	4
5-18	13061	Wheel and 3" hub for 300 x 5 tire	2
5-19	10041	300 x 5, 4 ply Super rib tire	2
5-19	11000	300 x 5 Tube	2
5-20	14041	Front fork, dual for two 300 x 5 or 10 x 3 tires and steering wheel steering	1
5-20	14042	Front fork, dual or single for two 300 x 5 or 10 x 300 tires and tiller steering	1
5-21	80704	Dust ring for 1½" bearing	1
5-22	80804	Dust washer for 1½" bearing	1
5-23	80010	1½" Tapered roller bearing	2
5-24	80100	Tapered bearing race for 1½" bearing	2
5-25	-----	3/4" SAE Washer	1
5-26	-----	3/4" NC Lock nut	1
5-27	92100	1½" Dust cap	1

FIGURE 5  
FRONT STEERING AND FORK  
1965 TO 1970 MODEL

FIGURE	PART NO.	DESCRIPTION	QUANTITY
5-28	80-701-00	O Ring 3/4 ID X 1" OD (National 622715)	2
5-29	16-490-00	Spacer (Aerol 10002Y-T9)	2
5-30	80-707-00	O Ring 1" ID X 1 1/4" OD (National 622719)	2
5-31	45-900-00	Oil Seal Holder (Aerol 10002Y-T1)	2
5-32	80-708-00	O Ring 2-5/8" ID X 2-7/8" OD (National 62309)	2
5-33	13-903-00	Tire, Wheel and Hub with 10 X 3.00 Solid Cushion Tire and 3/4" Tapered Roller Bearing.	1



FIGURE 7

CONTROL LINKAGE

1965 TO 1970 MODEL

FIGURE	PART NO.	DESCRIPTION	QUANTITY
7-1	96772	3/8" x 1" Clevice pin	5
7-2	51340	Hand parking brake lever	1
7-3	96818	Brake cable assembly (17 3/4 to 20 3/4 long)	2
7-4	50006	3/8" Master cylinder push rod, 6 1/2" long	1
7-5	96762	3/8" Cast clevice	1
7-6	-----	3/8 x 1 NC Hex head cap screw	1
7-7	-----	3/8 NC Lock nut	1
7-8	98200	Brake pedal pad	1
7-9	98253	Accelerator pedal pad	1
7-10	96773	5/16" Clevice pin	6
7-11	85231	Spring extension 3/4" OD by 6 9/16" length	2
7-12	50011	5/16" Accelerator rod 17 5/8" long	1
7-13	17102	5/16" Shaft collar	1
7-14	50013	5/16" Brake rods 6 1/2" long	2
7-15	96763	5/16" Clevice	6

FIGURE 9

SPEED CONTROL RHEOSTAT

1965 TO 1968 MODELS

9	61830/5CR	Rheostat complete with coils	1
9-1	-----	1/2 x 1 NC Hex head cap screw	18
9-2	61830D	Insulating board	1
9-3	-----	1/2 NC Fastite nut	20
9-4	61830K	Long J-Hook twisted strap	1
9-5	61830B	Sliding J-Hook bar	1
9-6	61830E/5	Neutral bar 5 speed	1
9-7	-----	8-32 x 7/8 Flat head machine screw	2
9-8	-----	1/2 NC Truss head machine screw	1
9-9	78212A	Resistor coil #9 wire, 14 turns	1
9-10	78212B	Resistor coil #6 wire, 9 turns	2
9-11	78212C	Resistor coil #5 wire, 6 turns	1
9-12	-----	1/2 NC x 1 1/2 Silicon bronze bolt	1
9-13	61830F	Pressure bar	1

FIGURE 9

FIGURE	PART NO.	DESCRIPTION	QUANTITY
9-14	61830A	Power bar	5
9-15	-----	3/8 Nut	1
9-16	61830G	Mounting board	1
9-17	85034	Compression spring 7/16" OD by 2" long	1
9-18	-----	1/2 NC Lock nut	1
9-19	-----	1/2 NC Hex head nut	1
9-20	-----	8-32 Flex lock nut	1
9-21	-----	1/2 NC x 3 1/2 Hex head cap screw	1

FIGURE 10FORWARD AND REVERSE SWITCH

10	71040	Forward and reverse switch complete	1
10-1	71040J	Switch finger silver plated with 1/2" mounting hole	4
10-2	-----	1/2 NF Hex head nut	4
10-3	71040K	Finger board with 1/2" mounting holes	2
10-4	71040U	Finger board wedge	2
10-5	71040W	Finger mounting bolt	4
10-6	71040P	Switch housing (set of four pieces)	1
10-7	-----	See 10-6	-
10-8	-----	See 10-6	-
10-9	-----	See 10-6	-
10-10	71040Y	Cover bolt	1
10-11	-----	8-32 x 1/2 Filster head bolt	1
10-12	71040L	Metal switch handle (red)	1
10-13	71040I	Spacer washer	1
10-14	71040X	Face stop bolt	2
10-15	-----	10-32 Washer	2
1016	71040E	Lock assembly with two keys	1
10-17	71040Z	Key only (give # of lock or truck serial #)	2
10-18	71040V	Rubber insulation strip	1
10-19	71040C	Cam	1
10-20	71040D	Cam spring	1
10-21	71040N	Rotor shaft only	1
10-22	71040R	Plastic spacer set (set of 4)	1
10-23	71040H	Rotor contacts (set of two-one right and one left)	1
10-24	-----	See 10-22	-
10-25	71040S	Cam index	1

FIGURE 10

FIGURE	PART NO.	DESCRIPTION	QUANTITY
10-26	71040T	Bushing	1
10-27	-----	½" Snap ring	1
10-28	-----	See 10-22	-
10-29	-----	½" SAE Washer	1
10-30	-----	½" Lock washer	1
10-31	-----	½" NF Hex head nut	1
10-32	94305	Forward-reverse switch nameplate	1
10-33	71040B	Rotor assembly	1

FIGURE 11HYDRAULIC SYSTEM

11-1	99565	Y fitting with hole for bolt (Wagner 5727) (4 wheel brakes)	1
11-2	99566	Straight fitting with hole for bolt (Wagner 5733) (2 wheel brakes)	
11-3	99579	Bolt (Wagner FC 673)	1
11-4	99572	Washer (Wagner FC 603)	2
11-5	99510	Master cylinder	1
11-6	71110	Switch brake light	1
11-7	99562	Coupling (B-103)	1
11-8	99560	3/16 Tubing end (Wagner FC 5555)	12
11-9	-----	Tubing tee end (part of 99561)	2
11-10	99561	3/16 Tubing tee (B-72)	1
11-11	99501	Wheel cylinder (Dico)	4
11-12	99570	Washer (Wagner FC 1511)	3
11-13	99580	Hydraulic hose (Wagner FC 11191)	3
11-14	99564	T fitting (Wagner 5728)	1
11-15	99576	Clip (Wagner 3052)	3
11-16	99551	3/16" Copper tubing (state length) per ft.	16
11-17	99563	T fitting with mounting hole (Wagner FC 5772)	1

ELECTRICAL PARTS

PART	DESCRIPTION	QUANTITY
71100	Light switch	1
71110	Brake light switch (hydraulic operated)	1
71111	Brake light switch (mechanical operated)	1
71130	Micro switch	1
71141	Turn indicator switch, 7 wire	1
71502	Horn button	1
71900	Flasher (12 volt)	1
72005	Chrome headlight fixture with 4" sealed beam bulb	1
72022	Stop and taillight fixture, 4" rubber mount (12 volt)	2
72051	Turn light fixture, (12 volt) amber, 4" rubber mount	2
72072	4" Sealed beam headlight bulb	1
73000	Horn, 12 volt	1
74000	Hour meter	1
74015	Plug in charge indicator	1
75080	Wiring harness for power circuit including light and horn	1
75231	Battery jumper #4 wire, 8" long	5
76001	Charging plug (T plug) (20 amp) 2 prong	1
76002	Charging plug, 30 amp. 3 prong	1
76011	Charging receptacle (T plug) 20 amp., 2 prong	1
76012	Charging receptacle, 3 amp. 3 prong	1
77010	6 volt 170 or 180 A.H. battery	6
77031	6 volt 190 A.H. battery	6
77042	6 volt 217 A.H. battery	6
77200	Hydrometer	1
77201	Battery filler	1
77202	Battery breakdown meter	1
78010	Secondary fuse and holder inline type	1
79720	Diode for charger (35 amp or less)	2
79801	Timer 24 hour electric	1
79811	Transistor pack, 36 volt charger	1
79823	Fuse, buss type 20 amp (for inline fuse holder)	1
79820	Fuse, screw type 30 amp (for charger)	1

BODY AND TRIM PARTS

PART NO.	DESCRIPTION	QUANTITY
50232	½" Battery rod 11 3/8" plus washer for head	4
50233	½" Battery rod 12½" plus washer for head	2
90000B	Seat backrest (blk)	1
90000C	Seat cushion (black)	1
90100	Jump seat frame	1
90100-1	Support rods	2
92000	Chrome wheel cover 8" for 400 x 8 and 500 x 8 wheel	2 or 4
92201	4 x 8 mirror	1
92202	Mirror bracket	1
94201	Taylor-Dunn emblem	1
94301	Taylor-Dunn decal	1
94305	Forward/reverse switch plate	1
94371	Serial number plate (please state serial number)	1
94420	Chesterton spray flex for timing chain (14 oz. can)	-
98253	Rubber accelerator pedal pad	1

## MAINTENANCE PROCEDURES

### BATTERIES

WARNING: Lead acid batteries continuously emit highly explosive gases. Flame or sparks must be kept away from the batteries at all times.

This emission is greatly increased during the charging process. Any area in which charging batteries are confined must be well ventilated, and flame or sparks must be kept out of the charging area and away from ventilator openings. DO NOT disturb battery connections while batteries are being charged.

The lead acid battery (or batteries) will furnish all power required by your vehicle. Two types are generally employed. The electric vehicle type battery pack, commonly used, can be expected to have a life of approximately 2 years, or 350 to 400 cycles. One cycle is the discharging and charging of the battery within proper limits. The heavy duty industrial type of battery has a life of approximately 7-1/2 years, or 1800 cycles, in appropriate use and with proper care.

It can not be over emphasized how important good maintenance procedures and careful care of your batteries will affect their useful life. It is therefore recommended that a comprehensive maintenance program be established and adhered to throughout the life of your vehicle. A 5 point program is outlined below to assist you in understanding and establishing good battery care.

#### 1. CORRECT CHARGING

Poor charging practices are responsible for more short battery life than any one other item. The charging equipment must be properly maintained and adjusted to give a charge which the battery will accept with maximum efficiency. Two things are involved in correct charging. These are the charging rate in amperes and the termination of the charge at the correct time. No amount of overcharging will increase the battery capacity or raise the specific gravity above its full charged condition.

Over charging will reduce battery life. Undercharging will cause poor vehicle performance, and shorten the life of all electrical components, including the batteries. Refer to Service and Adjustment, Section J8, for proper methods to determine charge condition.

#### 2. DISCHARGING - CAPACITY

Batteries are commonly rated in ampere hours at the six hour discharge rate to a final voltage of 1.75 per cell. They will deliver additional capacity in an emergency, but should not be required to do so regularly. The best way to avoid over discharging is to prepare a rigid schedule for charging batteries which will insure against their being discharged beyond the limits of their capacity.

#### 3. WATERING

Water must be replaced from time to time. The frequency and quantity depends upon the watering space above the plates and the amount of gassing which the battery does on charge. Only approved or distilled water should be added to the battery. Water should be added after hydrometer or voltmeter readings have been taken. The liquid level within the battery raises as the gassing occurs. Thus filling after charging minimizes over-filling. However, the water level should cover the plates prior to charging.

#### 4. CLEANING

Batteries pick up various kinds of dirt and dust, depending on their surrounding and the type of service they are subject to. This is usually dry dirt, which can readily be blown off with low pressure air or brushed off. However, if cells are overfilled and electrolyte collects on the covers, the top of the battery becomes wet and stays wet, since the acid in the electrolyte does not evaporate. This moist surface in combination with certain kinds of dirt becomes electrically conductive and permits stray currents to flow externally over the top of the battery. These currents cause corrosion of cell posts, nuts, connectors, and steel trays, which eventually become troublesome and expensive to repair.

When wet dirt accumulates on top of the battery, remove it by washing the battery with a strong solution of baking soda and hot water (1 pound of soda to 1/2 gallon of water).

A convenient brush to use is one having flexible bristles like an old paint brush. Continue the application of the soda solution until all fizzing stops, which indicates that the acid has been neutralized. Then rinse thoroughly with clear water.

Wet covers can be an indication of overfilling, leaky seals at posts and covers or of excessive gassing during charge. When observed the cause should be determined and the abusive conditions corrected.

#### 5. RECORDS

A battery record system is recommended for all vehicles. It is considered essential for large operations, and where minimum battery operating cost is desired. A properly supervised record system can be made to detect and call attention to such operating irregularities as:

- A. Overcharging
- B. Undercharging
- C. Overdischarging
- D. Excessive Water Consumption
- E. Cleanliness
- F. Worn Out Batteries
- G. Excessive Current Consumption On Trucks

It is not advisable to allow a battery to stand for a long period of time in a low state of charge. Doing so subjects the battery to excessive plate erosion and in cold climate conditions the electrolyte will freeze at a much higher temperature. For example, a fully charged battery will not freeze at temperatures near 60° below zero. Yet a battery in a very low state of charge may freeze at temperatures around 10° to 15° above zero.

A battery not in use maintains small amounts of chemical action which slowly tends to dissipate the charged condition. It is wise to re-charge a battery not in use every 1 to 2 months. If possible store the battery in a cool place, as the self discharge rate is increased with warmer temperatures.

VEHICLE NO.

BATTERY MAINTENANCE RECORD

Battery No.	Cell No.	Date			Date			Date			Date		
		Water OK or Low	Gravity Before Charge	Gravity After Charge	Water OK or Low	Gravity Before Charge	Gravity After Charge	Water OK or Low	Gravity Before Charge	Gravity After Charge	Water OK or Low	Gravity Before Charge	Gravity After Charge
1	1												
	2												
	3												
2	1												
	2												
	3												
3	1												
	2												
	3												
4	1												
	2												
	3												
5	1												
	2												
	3												
6	1												
	2												
	3												

- CAUTION:** Batteries emit explosive gases. During normal operation the concentration of these gases is rarely sufficient to be considered dangerous unless flame or sparks occur in the battery compartment close to the vent holes in the battery caps. It is important that this not be allowed to occur at any time. Lighted cigarettes must not be brought close to the battery compartment.  
During the charging process, emissions are greatly increased. Any area in which charging batteries are confined must be well ventilated, and flame, sparks, or lighted cigarettes must be kept out of the charging area and away from ventilator openings associated with the charging area. Battery connections must not be disturbed while batteries are being charged.
- Do not fill an uncharged battery. Bring water level up to just cover the plates, and complete filling after battery is fully charged. Use distilled water. Fill only to level indicated on battery.
- Batteries which require unusually frequent watering may indicate overcharging. Review charging practices and/or adjustment of transformer taps in charger.
- Gravity should be kept between 1175 (30% charged) and 1260 (100% charged), and gravity readings of all cells should be within a 10 point range. When they are not, an equalizing charge should be applied. Refer to information under "Charging Time Chart".
- Periodically check for loose terminal posts or loose connections to terminal posts, but not while batteries are being charged.
- Keep tops of batteries clean, and free of moisture, grease, and acid films. Any of these can cause current leakage.
- Keep weekly (or oftener) record as shown in above sample chart, for a new vehicle or when charging results seem unsatisfactory, until satisfactory charging continues for a four week period, then keep record on a monthly basis.



SERVICE AND ADJUSTMENTS  
BATTERY CHARGER

INTRODUCTION

This Section describes the operation, trouble-shooting and repair of the CHRISTIE Series A and T Battery Chargers. They are designed for safe and efficient daily charging of batteries. Chargers may be furnished in a portable cabinet or of a type built-into the vehicle.

SPECIFICATIONS

		<u>"A" SERIES</u>					
<u>MODEL</u>							
Portable	Built-In	A-C Volts	A-C Amps	Batt Amp Hrs*	D-C Volts	D-C Amps	
2420A	2420A-C/2420A-SS/2420AB	115	5	130/170	24	20	
3620A	3620A-C/3620AB	115	9	130/170	36	20	
	2410A	115	2.5	90	24	10	
		<u>"T" SERIES</u>					
2420T	2420T-C	115	5	130/220	24	20	
2430T	2430T-C/2430TB	115	7	170/250	24	30	
3620T/T3620T	T3620TG/T3620T-C T3620TB	115	9	130/220	36	20	
3630T/T3630T	T3630TG/T3630T-C T3630TB	115	10	170/250	36	30	
4820T		115	10	130/220	48	20	

\* Higher capacity batteries may be charged if longer than 12 hours recharge time is available.

CHARGING CHARACTERISTICS

Series A - This charger uses a constant potential method of recharging. This means the charger output voltage is held relatively constant through the charge cycle. Since the rate of charge is a function of the difference between charger output voltage and battery voltage, the charger output current is reduced by the increased voltage of the battery as it recharges. On a discharged battery the charger should start charging at near it's rated output and as the battery recharges the charge rate will be reduced until it reaches a final charge rate of approximately 2 to 3 amps on a fully charged battery. The charging time is controlled by a timer which terminates the charge at the end of a preset time. Recommended minimum charging times are shown on the CHARGING TIME CHART.

Series T - This charger also uses a constant potential method for recharging, however, it is equipped with a voltage sensing device that activates the timer when the battery reaches 80% of full charge. The timer then times out the balance of the charge, normally 4 hours. The time required for the battery to reach the 80% level will vary with the capacity and state of charge of the battery. On a discharged battery, the charger will start charging at near it's rated output and it will reduce it's charging rate as the battery is recharged. The final charge rate on a charged battery will be approximately 6 to 10 amperes depending on the rating of the charger. A shorter recharge time is achieved by using this method. Protection from overcharging is provided by the voltage sensing device.

### INSTALLATION

Portable models may be set on any suitable working surface so that there is access to the control panel. There should be at least six inches of clearance on each side and two inches on the top to allow free flow of air for cooling. Do not expose charger to rain or other adverse weather conditions. The charger may be suspended overhead by placing the handle in a suitable support. There must be a separately fused, three-wire, single phase, 115 volt, 15 ampere power receptacle within reach of the A-C input cord of the charger. If the A-C input voltage at your location varies from the nominal 115 volts, it will be necessary to adjust the charger for proper operation. Inside the charger there is a terminal board with input tap settings for 105 v, 110 v, 115 v, 120 v, and 125 v. The charger should be set on the input tap nearest your voltage. This terminal board is normally reached through an access panel in the back or top of the charger. On some built-in models it is necessary to remove the cabinet cover. On chargers with a "T" prefix in the model number, an external "HI, MED, LO" switch is provided to make these adjustments. The "HI" setting is for 105 v, "MED" for 115 v, and "LO" is for 125 v. The output voltage of the charger will vary with the input tap setting. A plate on the charger has "General Instructions" showing an "open" circuit output voltage (not connected to the battery) for that particular model. When connected to the correct a-c tap, the "open" circuit output voltage should measure approximately that value shown. Once properly installed and adjusted, the charger needs no further adjustment.

### OPERATING INSTRUCTIONS

1. Verify that the output fuses are fully tightened.
2. Connect the D-C plug to the battery receptacle. Portable chargers are furnished with a polarized D-C plug that mates with a corresponding polarized receptacle in the vehicle to prevent improper connections to the battery. Built-in models are permanently connected to the batteries.
3. Connect the A-C plug to a suitable, grounded receptacle.
4. A Series - Determine the minimum charging time (see CHARGING TIME CHART). Turn the charger on by setting the timer knob to the desired charging time.  
T Series - Turn the charger on by setting the timer knob to the "START" position (4 hours). The voltage sensing unit will automatically start the timer when the battery reaches 80% of full charge.
5. Verify that the output meter indicates a charging current. If there is no charging current, see TROUBLE SHOOTING section. Never let the charger charge higher than it's rated output. If the charger is charging too high, check the batteries to be sure there are no defective cells or short circuits. See the instructions concerning input tap setting under INSTALLATION section.

6. The timer control will turn off the charger (positive turn off feature) at the completion of the charge.
7. Disconnect the battery from the charger. On built-in models, disconnect the A-C cord.
8. Using a hydrometer, verify that the battery is properly charged.

#### CHARGING TIME CHART (A Series)

The following chart provides useful information for determining the minimum charging time needed to restore a battery to a full charge condition. In addition to normal charging, the cells of the batteries should be equalized twice each month. This is done by charging the batteries an additional seven (7) hours after a normal charge cycle. The current indications of the ammeter must be low during cell equalization.

<u>Specific Gravity Reading</u>	<u>Condition of Battery</u>	<u>Hours Needed to Charge</u>
1100	fully discharged	12
1125	10% charged	10
1150	20% charged	8
1175	30% charged	7
1200	60% charged	4
1225	75% charged	2
1250	95% charged	1/2
1260	fully charged	0

#### TROUBLE SHOOTING & REPAIR INSTRUCTIONS

##### LOW OR NO CHARGING CURRENT

1. Using a voltmeter, verify that the battery being charged has no open or dead cells. Check jumper cables between batteries for tight and clean connections, and also verify that the battery is not already fully charged.
2. Check the output fuses of the charger to make sure they are not loose or "blown."
3. Verify that the A-C receptacle has power by plugging in an electrical appliance. Using a voltmeter, check A-C input voltage at the receptacle. Taps are provided inside back panel of charger to adjust for input voltages from 105 to 125. Verify that charger is connected for correct voltage.
4. Turn the charger ON and verify that the transformer hums. If no hum is heard, proceed with step 4.1. If a hum exists, go to step 5.
  - 4.1 Remove A-C plug from power source.
  - 4.2 Remove the cabinet cover (1) to gain access to the interior of the charger.
  - 4.3 With the timer switch OFF, check for continuity between the two primary input leads of the transformer. If no continuity is found, replace the transformer. If continuity is found, proceed as follows:
  - 4.4 With the timer switch ON, check for continuity across the switch. On "T" Series chargers there are two switches - check both. If switch is open with the timer ON, replace the timer assembly.
  - 4.5 If all of the above checks indicate continuity, but the transformer does not hum, check for loose or broken leads between the A-C plug, the timer assembly and the terminal board.

5. If the transformer hums, proceed as follows:
  - 5.1 Remove AC plug from power source.
  - 5.2 Check the two output fuses to insure they are good. Inspect the fuse holders for damage or a blackened appearance. (If the fuse holder is blackened, it indicates oxidation and should be replaced).
  - 5.3 Remove both output fuses. Check for continuity from the output side of both fuse holders to the positive side of the DC plug, connecting continuity indicator first in one direction and then the other of each. The indicator should show an open in one direction and continuity in the other. Continuity in both directions or no continuity in either direction indicates a bad diode. Replace the diode connected to that fuse holder.
  - 5.4 Check for continuity between the input side of one fuse holder and the input side of the other. If no continuity exists, the transformer secondary is open. Replace the transformer.
  - 5.5 Check for continuity across the two terminals of the meter. If no continuity exists, the meter is open. Replace the meter.
  - 5.6 If all indications to this point are normal, test the entire DC output circuitry for continuity by progressing from the DC output prong to the negative DC output prong in incremental test sections, checking each connection for open circuits and poor connections.

#### AC-LINE FUSES BLOW

6. With unit unplugged and timer turned on, check for continuity between each input prong of the AC plug and the ground prong. If continuity is found between either input prong and ground, a short circuit exists and must be found and removed. If all indications are open and the AC fuses are of sufficient rating for the charger, a shorted transformer is the most probable cause of this problem. Replace transformer.

#### OUTPUT FUSES BLOW

7. Verify that the circuit under charge is not shorted by disconnecting the charger and operating it disconnected.
8. If output fuses continue to blow, test the charger as per steps 5.1 through 5.6.

#### TIMER DOES NOT TURN UNIT OFF

9. Unplug charger. Check continuity of timer motor. If open, replace timer. If not, check timer switch contacts. If timer assembly is not defective, adjust Voltage Sensing Unit as per instructions in next paragraph ("T Series only).

#### VOLTAGE SENSING UNIT ADJUSTMENT PROCEDURE ("T SERIES)

NOTE: A DC voltmeter with the appropriate voltage range is required to perform the following adjustment.

10. The unit is assembled on a small panel inside the charger cabinet (see item 23, exploded diagram). Each unit has been carefully adjusted at the factory to actuate at the proper voltage; however, if it is desired to change the actuation voltage point, the following procedure should be followed:
  - 10.1 Connect the charger to a battery which is known to be fully charged.
  - 10.2 Observing polarity, connect the voltmeter across the battery terms.
  - 10.3 Turn the charger on. The voltage across the battery, as indicated by the voltmeter, will rise slowly. When the proper voltage (dependent upon the number of cells) is reached, the small relay in the voltage sensing unit will actuate. This can be detected since it generates an audible click.

- NOTE: The Voltage Sensing Unit should be set for 2.37 volts per cell. On a 24 volt system, the Voltage Sensing Unit should actuate at 28.4 volts. On a 36 volt system, the unit should actuate at 42.7 volts.
- 10.4 Turn the adjustment shaft on the Voltage Sensing Unit clockwise to raise the actuating voltage and counter-clockwise to lower voltage.
- 10.5 Turn the ON and OFF, as necessary, to raise and lower battery voltage, while repeating steps 10.3 and 10.4 until the desired actuation point is achieved.

#### IMPORTANT FACTS ON BATTERIES AND CHARGERS

To determine whether or not a battery is properly charged, a measuring device known as a hydrometer is used. A hydrometer measures the specific gravity of a liquid and is graduated to measure the specific gravity of battery electrolyte. The electrolyte in your battery becomes heavier as it is charged, therefore, a higher specific gravity reading indicates a higher charge condition of your battery. The specific gravity reading will range from 1100 for a completely discharged battery to 1260 for a fully charged battery. No amount of overcharging will raise the specific gravity above 1260 on the electric vehicle type battery. Overcharging and undercharging can cause premature failure of a battery. Overcharging destroys the positive plates. Consistent undercharging causes a buckling of the plates.

Do not discard a good battery as being defective because its specific gravity does not show an increase immediately upon applying a charge. Many good batteries require a charging period as long as three hours before they show any increase in specific gravity. Do not charge a battery if the electrolyte temperature could rise above 120 degrees F. This could damage both battery and charger. As a rule of thumb, the electrolyte temperature during normal charging will rise about 25 degrees above the temperature in the charging area.

Failure to keep the battery electrolyte up to the proper level will result in a crumbling (abnormal sulfation) of the plates and cause failure of the batt. Distilled water must be added to the battery regularly to make up for the loss due to evaporation. Prior to charging, the electrolyte level should cover the battery plates. Fill the battery to the proper level only after it has been fully charged.

#### WARNING - HAZARD OF EXPLOSIVE GAS MIXTURE

Batteries being charged or discharged will give off hydrogen gas. If this gas is concentrated, it can cause an explosion. Concentrations of gas may remain for several hours if ventilation is not provided. Do not have any fire in the vicinity and do not tamper with circuits that might cause sparking while charging or discharging batteries.

WARNING - HAZARD OF EXPLOSIVE GAS MIXTURE

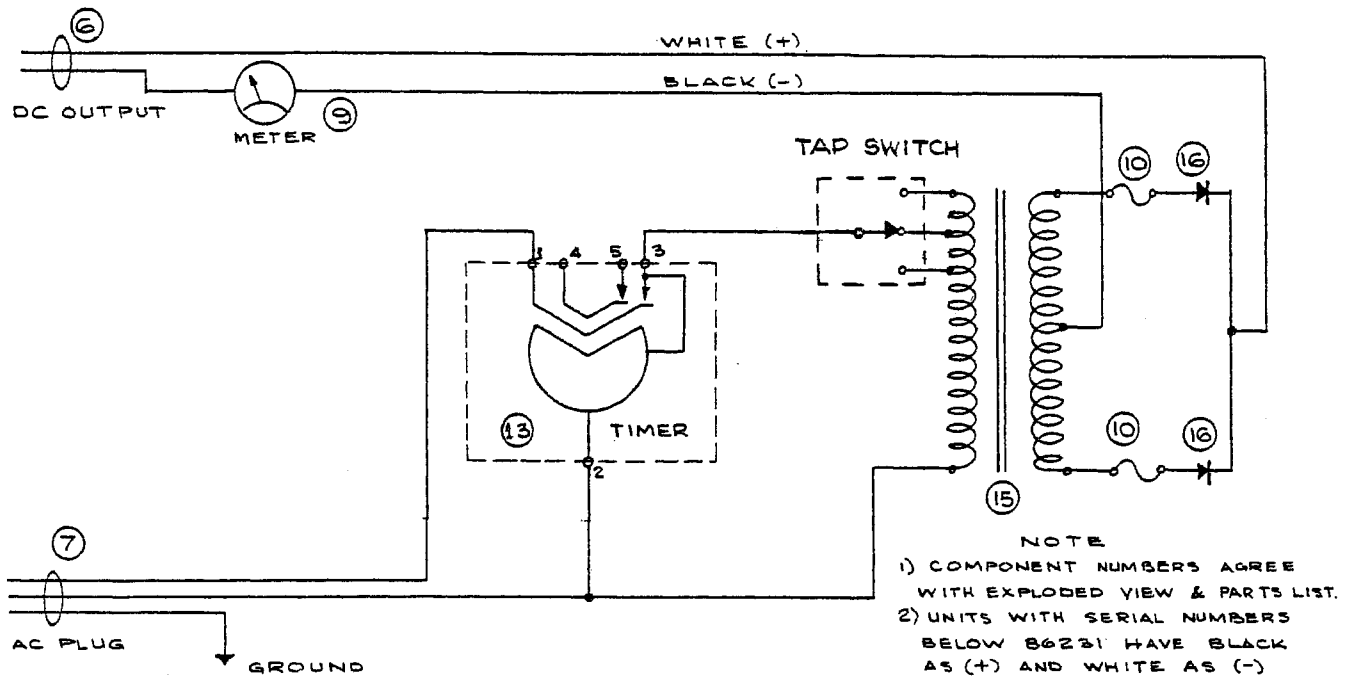
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INSPECTION OF BATTERIES AND ASSOCIATED CIRCUITS

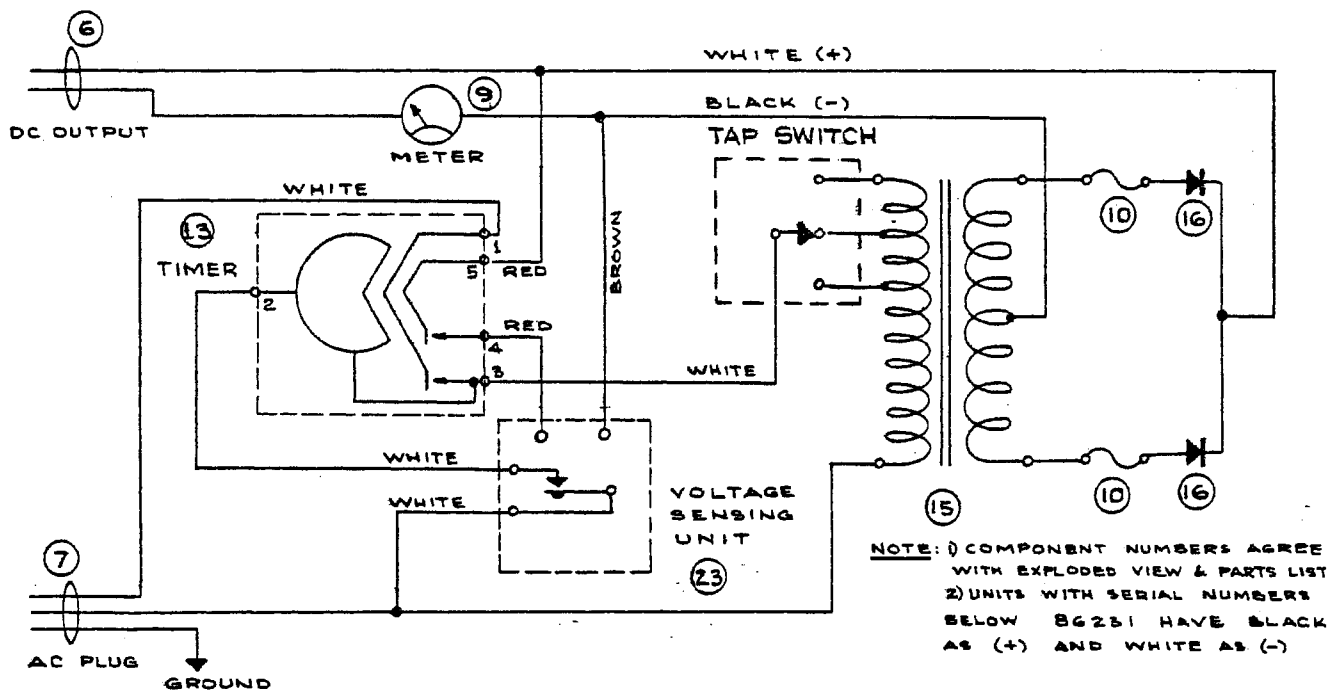
An inspection of batteries and associated circuits is required to assure that the batteries are being properly charged. For this inspection we recommend the use of a hydrometer and a continuity tester.

1. Verify that all connections within the unit to be charged are clean and right.
2. Check each battery for loose terminal posts.
3. Test for continuity between all battery terminals and the charging receptacle.
4. Verify that the top of each battery is free of moisture, grease and acid film, which may cause terminal corrosion and current leakage.
5. After the battery has been recharged, test each individual cell in each battery with the hydrometer to verify that all specific gravity readings are within 10 points of each other.
6. Using the hydrometer, pull out acid from a cell and then vigorously expel the acid back into the cell to cause a violent stirring action. Immediately draw out another sample of acid and visually inspect it to see if it contains a brownish sediment (indicates positive plates are deteriorated).
7. When testing battery condition with hydrometer, always return electrolyte solution to the same cell from which it was removed. DO NOT MIX electrolyte from one cell to another.

CIRCUIT DIAGRAMS  
SERIES "A" & "T" CHARGERS



CHRISTIE SERIES "A" BATTERY CHARGERS

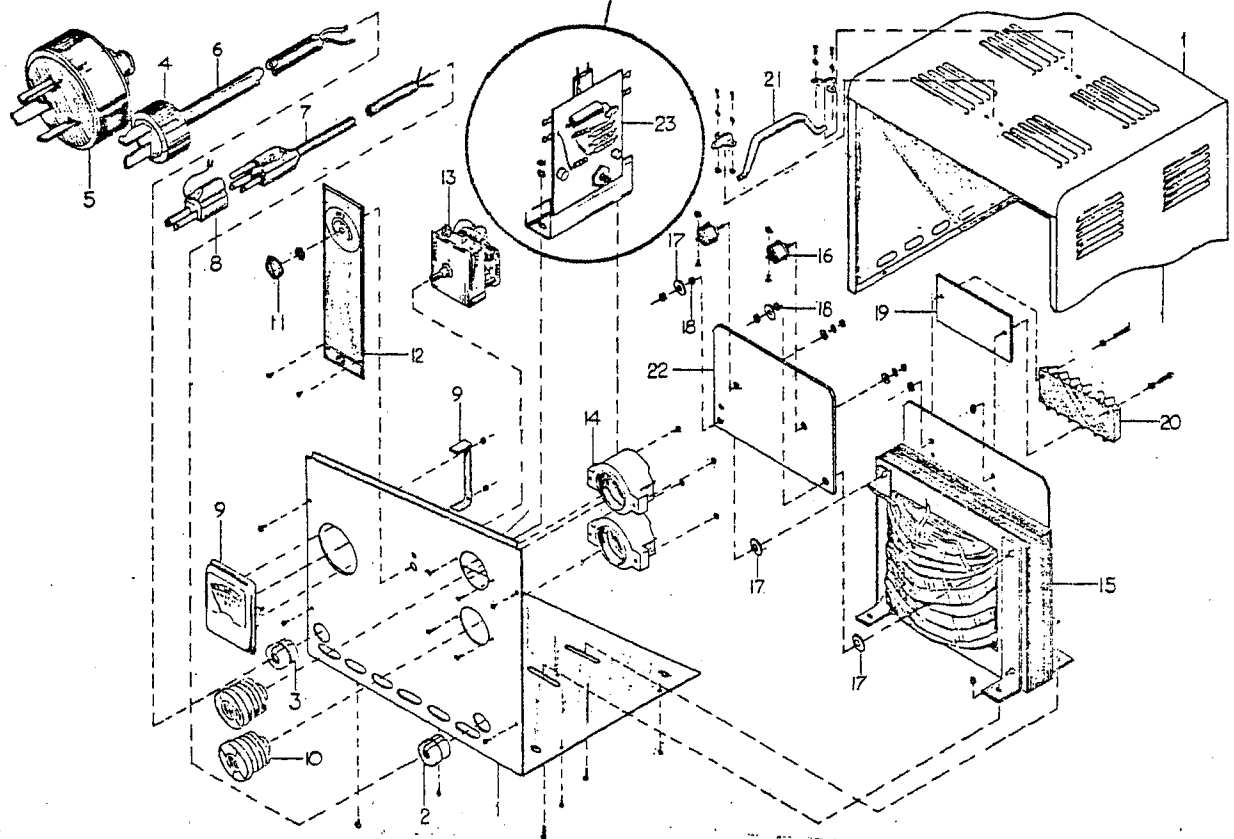


CHRISTIE SERIES "T" BATTERY CHARGERS

PART IDENTIFICATION  
SERIES "A" & "T" CHARGERS

EXPLODED DIAGRAM

T SERIES ONLY



Portable Cabinet Shown.

I.D. Numbers of Internal Components are Identical for Portable and Built In Charger.



PARTS LIST

Item	Taylor-Dunn Part No.	Item	Taylor-Dunn Part No.
1 Cabinet		15 Transformer, 24V/20A ("T" Series)	79-630-00
2 Bushing (A-C)	79-530-00	Transformer, 24V/20A ("A" Series)	79-606-00
3 Bushing (D-C)	79-531-00	Transformer, 24V/30A ("T" Series)	79-607-00
4 D-C Plug (2 prongs)	76-001-00	Transformer, 36V/20A ("T" Series)	79-613-00
5 D-C Plug (3 prongs)	76-002-00	Transformer, 36V/20A ("A" Series)	79-612-00
6 Output Cord (no plug)	79-560-00	Transformer, 36V/30A ("T" Series)	79-614-00
Output Cord w/molded plug	79-566-00	Transformer, 48V/20A ("T" Series)	79-620-00
7 A-C Cord and Plug (portable model)	79-570-00		
Molded A-C Assembly (built-in model)	79-575-00	16 Diode, 24/36V	79-720-00
Recessed Male Plug (built-in model)	76-251-00	Diode, 48V	79-724-00
8 Adapter	79-580-00	17 Washer Assembly, 3/4"	97-170-00
9 Ammeter (0-30 amp)	79-851-00	18 Washer Assembly, 3/8"	97-171-00
10 Fuse (30 amp)	79-819-00	19 Mounting Plate	94-325-00
11 Control Knob	79-803-00	20 Terminal Board	79-860-00
12 Instruction Plate	94-321-00	21 Handle Assembly	79-509-00
13 Timer Assembly, 12 hr. ("T" Series)	79-800-00	22 Heat Sink	79-742-00
Timer Assembly, 24 hr. ("A" Series)	79-801-00	23 Voltage Sensing Unit, 24V ("T" Series)	79-810-00
14 Fuse Holder	79-830-00	Voltage Sensing Unit, 36V ("T" Series)	79-811-00
		Voltage Sensing Unit, 48V ("T" Series)	79-812-00

When ordering parts, please specify both serial number and model of charger.

MODELS 2445 AND 3645  
OPERATING AND SERVICING DATA SHEET

INSPECTION AND INSTALLATION

Inspect the exterior of the shipping container for signs of rough handling during shipment.

Remove charger from the shipping container and inspect it for damage (cracked knob, etc.). CLAIMS FOR SHIPPING DAMAGE SHOULD IMMEDIATELY BE FILED WITH THE CARRIER.

The charger may be installed on any suitable working surface (bench or floor). Insure that there is clearance above and around the charger so as to allow free flow of air for cooling.

Remove the panel on back of cabinet to gain access to the terminal panel.

WARNING: Voltages hazardous to life exist at terminal panel when charger is turned on. Turn OFF the charger before making any of the following adjustments.

The adjustment for a charging voltage of 2.50 volts per cell should be made at this time. This is done by monitoring the DC output voltage with a voltmeter (0 to 50 volts) and setting the AC tap lead to the transformer terminal which gives the desired DC output voltage as indicated below. Move the tap connection to the right to increase the DC output voltage. Move the tap connection to the left to decrease the DC output voltage.

DC OUTPUT VOLTAGE SETTING CHART

<u>MODEL</u>	<u>DC OUTPUT VOLTS</u>
2445	30.0
3645	45.0

If a DC output plug is not furnished with the charger, attach a suitable polarized plug of adequate current capacity to the DC output leads (See NOTE in Step 2 below).

OPERATING INSTRUCTIONS

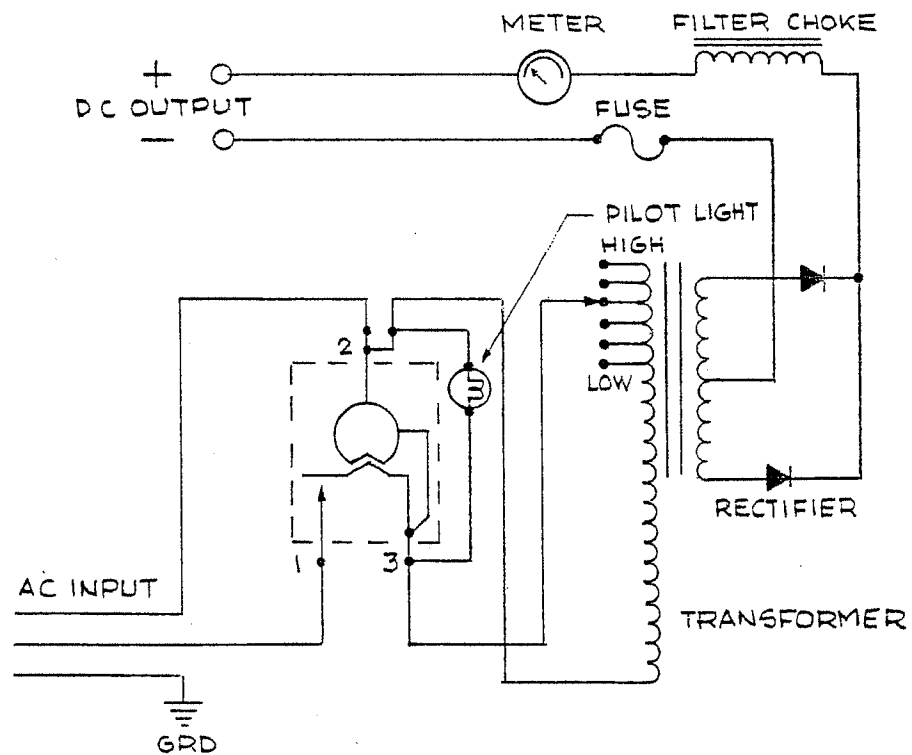
1. Connect the AC input to the proper power source.
2. Connect the DC output plug to the batteries to be charged.  
NOTE: Check the output plug for the correct polarity.
3. Turn on the charger by setting the timer control knob to the desired charging time.
4. Verify that the pilot light illuminates and that the output ammeter indicates a charging current.
5. The timer control will turn off the charger at the completion of the charge cycle.
6. Disconnect the charger DC plug from the batteries after the charger is turned off.
7. Using a hydrometer, verify that the batteries are properly charged.

PARTS LIST

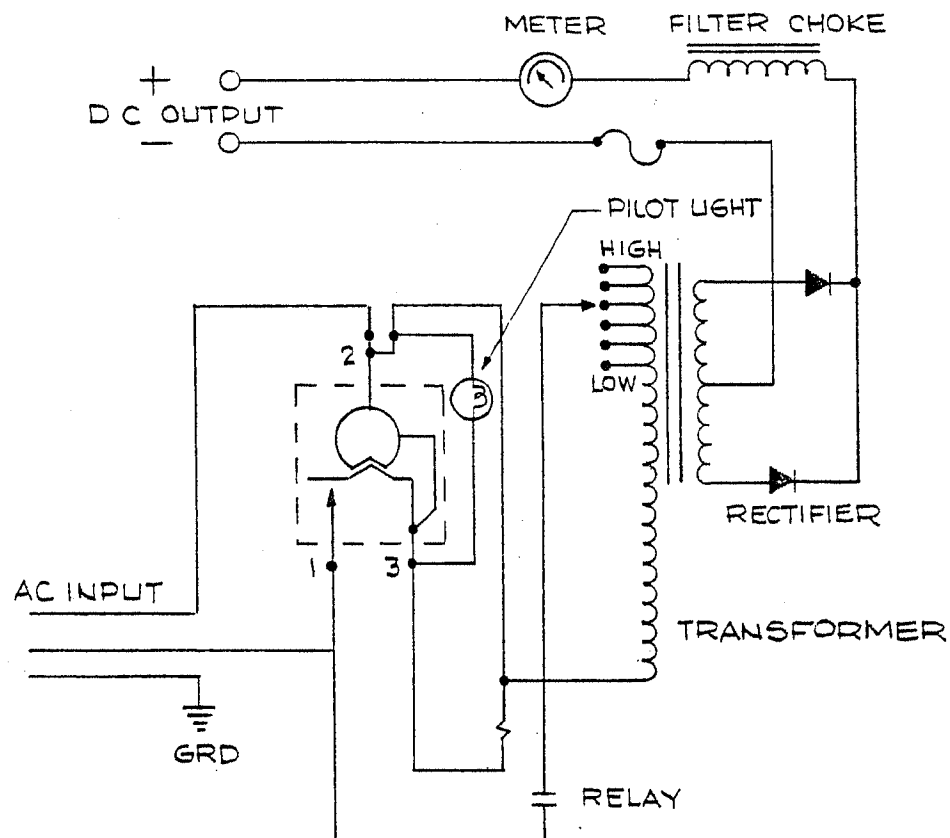
79-531-00 Bushing, AC	94-326-00 Timer Dial	79-714-00 Choke, 36V
79-530-00 Bushing, DC	72-095-00 Pilot Light	79-641-00 Transformer, 24V
79-567-00 Cord, DC	79-720-00 Diode	79-642-00 Transformer, 36V
79-573-00 Cord, AC	79-852-00 Ammeter	79-862-00 Terminal Panel
79-801-00 Timer	97-170-00 Insulator Washer (3/4")	79-826-00 Fuse (Link)
79-803-00 Control Knob	97-171-00 Insulator Washer (3/8")	71-304-00 Relay, 115V
	79-713-00 Choke, 24V	(3645 Only)

When ordering replacement parts, give model and serial number of charger. Specify wire size and number of wires required when ordering cords.

CIRCUIT DIAGRAM  
MODELS 2445 & 3645 CHARGERS



MODEL 2445



MODEL 3645