

Waverley

ELECTRIC ...VEHICLES

Complete Information for
INSTALLING,
OPERATING AND
MAINTAINING
WAVERLEY ELECTRIC VEHICLES
MODELS 21-22

ALSO
PRICE LIST OF PARTS

AMERICAN BICYCLE CO.

—Automobile Department—

Park Row Building
New York

New York Branch, 91 Fifth Avenue

DIRECTIONS FOR SETTING UP VEHICLES MODEL 21 OR 22 WHEN RECEIVED.

IN SHIPPING, the battery is removed from the vehicle and placed on the floor of the car between the rear wheels. The two trays are placed on the car floor in the same position they occupy when in the body.

See that the controller lever is in the "off" or upright position.

Handle the trays carefully—a short drop may break a cell.

Slide the trays into the body, keeping them right side up to avoid spilling the solution. Secure the trays in place by means of the rear crossbar provided for that purpose.

Open the controller box under the seat and securely connect the cables to the projecting lugs of the trays according to the reference numbers. There are four of these connections to be made; connect similar numbers together—that is cable No. 1 to lug No. 1, cable No. 2 to lug No. 2, and so on.

The batteries are charged when shipped and the vehicle may be run from the freight terminal with its own power.

If switchboard is sent with vehicle it may be installed and connected to the electric light supply mains by an electrician. Locate the switchboard at least a foot from any combustible material, although it may be placed against a brick or stone wall. Connect the terminals of the fuse-block to the supply mains, taking care that the positive terminal of the block is connected to the positive side of the supply circuit. For these connections use wires not smaller than No. 4 B and S gauge.

This charging outfit is for use with 110 or 120 Volt direct current circuits. For 220 or 500 Volt or alternating current circuits, special arrangements must be provided for transforming the current. (See F.)

DIRECTIONS FOR OPERATING VEHICLES.

Before inserting key be sure that controller handle stands perpendicular or in the "off" position.

The controller lever has notches, corresponding to the forward speeds. In using throw the lever from one notch to another quickly; do not let the lever drag between the notches. Failure to observe this rule may cause an arc to form and burn the controller connections or even spark the battery.

Before starting the vehicle always make sure that the foot brake is not set, but is in the "off" position. Bring the vehicle up to full speed gradually. Never throw controller lever to last notch unless vehicle is under way.

Take ordinary grades and chuck-holes at second speed, but in cases of extreme grade it is necessary to use the last notch.

The vehicle will give its greatest mileage per charge if it is run on the second notch.

TO REVERSE: Press down the reverse lever projecting from the front of the seat on the left side. Then use the controller lever same as

for forward speeds. DO NOT reverse the vehicle while in forward motion — always bring it to a stand-still first.

Always lock the vehicle by removing the small key plug before leaving the seat. Take the key with you when leaving the vehicle unattended. Do not unlock the vehicle until after you have taken your seat.

When climbing grades, do not shift controller more than is necessary. It is always best, if the conditions permit, to set the controller on the last notch when approaching a steep grade, and let it remain there until the summit is reached.

ALWAYS BRING THE VEHICLE TO A FULL STOP BEFORE ATTEMPTING TO REVERSE IT. To reverse while running, causes an abnormal strain on the pinion, gears and motor, and is likely to damage these parts.

Turn corners slowly.

Remember that your vehicle has no eyes.

The operator should note condition of volt-meter when running the vehicle, and a little experience will soon enable him to estimate the amount of charge remaining at any time. Do not discharge the battery below 36 volts. This voltage to be read while the vehicle is running on good, level roads with the controller on the last notch. When the controller is on the first notch, the two halves of the battery are parallel, so that only half of the full voltage is indicated on the volt-meter. The voltage falls very rapidly toward the end of the discharge.

The ammeter furnishes an interesting indication of the amount of power taken by the motor with different conditions of roadway.

This ammeter reading also shows the condition of the running parts of the vehicle. Any marked increase of current that cannot be accounted for by a bad roadway, indicates an unnecessary load on the motor, such as would be caused by an unoiled bearing or unintentional application of the brake.

BATTERIES.

METHOD OF CHARGING BATTERIES.

See that the controller handle of the vehicle is pulled entirely back to the "off" position, and that it is not tampered with during the time of charging. With the knife switch on the switch board open, and the rheostat handle to the left to the position marked "in," place charging plug in sockets under either side of vehicle body. Now close the knife switch, and by turning rheostat handle to the right, adjust current to 16 amperes, as indicated on vehicle ammeter. Continue charging at this rate, until the volt-meter indicates 50 volts, then reduce current to 10 amperes and permit voltage to again rise to 50 volts, after which reduce to 4 amperes, and keep it at this point until the volt-meter indicates 50 volts again, when the battery is fully charged.

Overcharging — Once a week, regardless of the amount the battery has been used, it should receive an "overcharge." This consists in placing the battery on charge at 4 amperes, and keeping it stationary at that point until the volt-meter registers 53 volts. This process will cause the liquid, or electrolyte, in the battery, to boil vigorously. Great care

should be exercised not to allow the voltage to exceed 50 volts whenever the battery is taking more than 4 amperes.

Quick Charging — When a quick charge is required, current can be introduced into the battery at the rate of 50 amperes, but current should be reduced step by step, not allowing the volt-meter to indicate more than 50 volts. When voltage rises to 50 at 10 amperes, the battery is about $\frac{3}{4}$ charged; now reduce to 4 amperes, and when 50 volts is again reached, battery is fully charged.

Care and Maintenance of the Battery — Our experience has been that owners of vehicles are inclined to assume that the battery needs no attention. We beg to impress upon you the necessity of giving the battery the care that it needs and we assure you that you will thus obtain the most satisfactory service.

The batteries are shipped with the solution already in the cells. We take every precaution to have the batteries reach their destination in perfect condition. Yet, with all this, occasionally a tray may be turned on its side and the solution allowed to escape. It is therefore necessary, on receipt of a vehicle or battery, to examine each tray, and see that each of the cells is properly filled. Any empty or low cells should be filled at once, and the battery then charged at the 4 ampere rate, until the voltage reads 53. In any event the battery should be given this charge immediately upon receipt.

The solution added to replace that lost by spilling, should consist of chemically pure sulphuric acid and distilled or filtered rain water — one part of acid to four parts of water, by bulk. The hydrometer should be used, and the solution should show a specific gravity of 30° Beaume when cool. Note that this solution is to be used only to replace that lost by spilling. A much weaker solution is used to replace that lost by evaporation. **THE SOLUTION SHOULD AT ALL TIMES EXTEND ABOVE THE PLATES, AND THE CELLS SHOULD BE EXAMINED ONCE A WEEK TO SEE THAT IT HAS NOT EVAPORATED BELOW THE TOPS OF THE PLATES.** To prepare the battery solution which is to be used to replace the loss caused by evaporation, mix one part of sulphuric acid (oil of Vitriol) into ten parts of water. The acid should be chemically pure, and the water either distilled or rain water. Hard water, containing any mineral substance should not be used. Mix in an earthenware crock, and stir with a glass rod or stick. **ALWAYS POUR THE ACID INTO THE WATER — NOT THE WATER INTO THE ACID.** Let the mixture cool thoroughly before putting it into the cells. There is one inch of space between the tops of the battery plates and the jar lids. Always fill the jars to within a quarter of an inch of the lids and do not let the solution fall by evaporation more than half an inch, thus always keeping at least a quarter of an inch of solution above the tops of the plates. The use of the rubber bulb will greatly facilitate the filling of the jars to the proper height. The solution in the cells should be tested for specific gravity once a week, by means of the hydrometer and test tube. After the battery has been fully charged **ELECTRICALLY**, transfer by means of the bulb, some of the solution from one of the cells to the test tube. Use enough to float the hydrometer in

the test tube. Repeat this process with every cell in the battery. The specific Gravity as shown on the hydrometer, should be thirty degrees. If it is found to be more than thirty degrees, or less than twenty-eight degrees, it should be corrected by varying the amount of acid in the solution that replaces the evaporation loss.

This test should be made when the battery is charged, as the Specific Gravity falls during the discharge. Never, under any circumstances, pour acids directly into the cells.

Consistent with these instructions, we furnish with every vehicle, a rubber bulb for replenishing the solution in the jars, a test tube and hydrometer with Beaume scale.

The battery should not be discharged below 36 volts; Volt-meter readings should be taken when the vehicle is at full speed, on a good level road. To be more specific, if the ammeter is reading 18 and the volt-meter is down to 36, or 35 volts with 22 amperes, the battery is discharged and the operator should arrange to terminate his trip before these conditions exist. Always recharge the battery until it is fully charged, immediately after using the vehicle.

The motor is bolted to the gear case by means of four cap-screws that pass through slots in a flange. This flange is eccentric with the motor shaft, so that the mesh of the driving pinion and gear may be adjusted by loosening the four cap screws and turning the motor slightly on its eccentric support. When properly meshed, the gear and pinion run without noise.

If any squaking noise develops in the springs of the vehicle after several weeks use, it may be remedied by oiling. This may be easily done by inserting a cold chisel between the leaves and injecting a little oil from a squirt can.

All parts of the steering gear and brake ought to be inspected occasionally as the failure of any of these parts on the road might result in a serious accident.

Keep at least a pint of graphite grease in the gear case; an opening is provided for this purpose.

Examine the controller occasionally, and if the knives are found to be cutting the fingers, rub the knives with an oily cloth or stick. The amount of oil used should be merely enough to prevent cutting. Do not, under any circumstances, use oil on the knives in any quantity.

The journals of the controller should be oiled occasionally; oil-holes are provided for this purpose.

Keep the controller box clean and free from dust.

The steering heads should be oiled every two weeks. Access to the oil hole is had by unscrewing the nickle plug in center of steering pivot. The oil will flow through this hole to the journal and then on down to the balls.

SPEED SHUNT.

The normal speed of the vehicle running on the fifth notch on good level roads under favorable conditions is $12\frac{1}{2}$ miles per hour. This may be increased to 17 miles per hour by use of the speed shunt. The shunt is operated by pressure of the right foot on a small lever projecting from

the floor of wagon adjacent to the meter light foot push. This operation has the effect of "Cutting Out" a portion of the motor field resistance, thus allowing a greater current to flow through the armature.

THIS SHUNT MUST BE USED ONLY IN CASES OF EMERGENCY AND NEVER WHEN GOING UP HILLS OR IN STARTING.

Continued use of the shunt reduces the mileage each discharge and the repeated use of the same has a tendency to rapidly deteriorate the battery owing to the heavy current taken from the same.

The foot push operating the shunt can be readily removed and it is advisable that this be done when loaning the vehicle or leaving it in charge of persons inexperienced in these details.

VOLT-AMMETER LIGHT.

In order to ascertain the reading of the meter by night, it has been equipped with a small electric light. With left foot, push down the button found in floor of vehicle on left side. This operates the light.

POINTS TO BE REMEMBERED.

On receipt of vehicle charge battery to 53 volts at the four ampere rate.

Before connecting charging plugs, be sure that the controller is pulled back to the "off" or upright position, and that is not touched while the charging current is on.

Be sure that the electrolyte solution covers the plates at all times and in all cells.

Always open carriage body while charging the battery by removing the deck back of seat.

Never light a match near the battery while charging.

Never spark the battery while charging it.

Always re-charge promptly after using the carriage.

AVOID HEATING THE CELLS IN CHARGING.

DO NOT CHARGE BEYOND 53 VOLTS AT THE FOUR AMPERE RATE AND ONLY ONCE EACH WEEK AT THAT RATE.

WHEN RUNNING THE VEHICLE DO NOT DISCHARGE THE BATTERIES BELOW 36 VOLTS.

Replenish the electrolyte for loss in ordinary use ten parts water and one part sulphuric acid. When loss is due to spilling in shipment use four parts water and one part sulphuric acid.

SPECIAL CHARGING FACILITIES.

Where it is necessary to charge with alternating currents, we can furnish a reliable transforming outfit for \$250.00 net cash, F. O. B. Indianapolis, Ind. This machine will transform alternating currents of any commercial frequency into direct currents of 110 volts. It has an out-put of about 15 amperes.

DYNAMO ONLY.

Where power is available, we can furnish dynamo only, of 15 ampere capacity, for \$100.00 net cash, F. O. B. Indianapolis.

NOTICE.

In order to facilitate the replacement of parts claimed defective, or the shipment of new pieces, we request that the instructions given below be complied with.

In ordering parts, order by number and give catalogue name.

If part is wanted for a Motor, give number of the motor as stamped on motor name plate.

ALWAYS MENTION MODEL NUMBER AND NAME OF VEHICLE.

INSTRUCTIONS.

Defective parts must invariably be sent to Factory, transportation charges prepaid, for examination, before claim will be allowed. Unless this is done, new parts ordered will be charged for.

When returning parts, address Waverley Factory, Indianapolis, Ind.

Write your name and address plainly on the package, so that it can be identified when received, and write to the Waverley Factory at the same time stating briefly and explicitly what you are sending and the purpose for which it is sent, regardless of any previous correspondence you may have had on the subject. Our Repair Department is instructed to hold all goods until a letter of advice is received.

Never refer to any other matter in a letter on the subject of part replacement.

Parts returned for credit under the terms of our guaranty, will, when found defective, be replaced by new parts. Under NO CIRCUMSTANCES WILL WE CREDIT PARTS ON ACCOUNT.

Cash must positively accompany all orders for parts, as we do not open accounts except with our regular agents. Orders not accompanied with cash will be held subject to remittance. Agents are requested to remit cash with all orders amounting to less than five dollars, so as to avoid small charges.

The cause of nine-tenths of the delay and consequent annoyance to customers dealing with our Repair Department is due to their failure to follow these instructions.

AMERICAN BICYCLE COMPANY,

AUTOMOBILE DEPARTMENT

Park Row Bldg.,

New York City.

ITEMIZED PRICE LIST.

Motor.

| | | |
|----|--|----------|
| 1 | Motor complete..... | \$150.00 |
| 2 | Armature complete..... | 100.00 |
| 3 | Armature core shaft..... | 5.00 |
| 4 | Armature core plates, each..... | .02 |
| 5 | Armature core end plates, each..... | .50 |
| 6 | Armature core end washer, each..... | 1.50 |
| 7 | Armature core end washer nut, each..... | .10 |
| 8 | Armature core shaft oil rings, each..... | .05 |
| 9 | Armature coils with insulation and tape..... | .75 |
| 10 | Armature insulation fibre piece..... | .05 |
| 11 | Armature copper piece..... | .05 |
| 12 | Commutator complete..... | 25.00 |
| 13 | Commutator core clamping ring..... | 1.00 |
| 14 | Commutator clamping ring nut..... | .25 |
| 15 | Commutator core mica ring..... | .50 |
| 16 | Commutator core mica strips, each..... | .50 |
| 17 | Commutator core segments—copper, each..... | .50 |
| 18 | Commutator core..... | 10.00 |
| 19 | Mica, $\frac{3}{8}$ x $8\frac{1}{2}$ | .35 |
| 20 | Field shell..... | 10.00 |
| 21 | Field pole piece..... | 2.00 |
| 22 | Field coils, each..... | 3.50 |
| 23 | Field mica, 3 inch diameter..... | .10 |
| 24 | Field rubber tubes, each..... | .50 |
| 25 | Field pole piece set screw..... | .05 |
| 26 | Field shell cap screw, $\frac{3}{8}$ x 1..... | .05 |
| 27 | Field shell cap screw, $\frac{3}{4}$ x $\frac{1}{2}$ | .05 |
| 28 | Field shell cap screw washer..... | .05 |
| 29 | Oil plugs $\frac{1}{2}$, each..... | .05 |
| 30 | Oil plugs $\frac{3}{4}$, each..... | .05 |
| 31 | Brush holders, each..... | 1.00 |
| 32 | Brush holder arms, each..... | .10 |
| 33 | Brush holder arm rivets, each..... | .01 |
| 34 | Brush holder spring..... | .05 |
| 35 | Carbon brushes, each..... | .25 |
| 36 | Brush holder insulations, each..... | .05 |
| 37 | Brush holder hard rubber bushings, each..... | .05 |
| 38 | Brush holder cap screw..... | .05 |
| 39 | Brush holder brass washer..... | .02 |
| 40 | Brush holder galvanized iron cover..... | .25 |
| 41 | Brush holder cover lug..... | .10 |
| 42 | Brush holder cover lug threaded..... | .10 |
| 43 | Brush holder cover slotted cap screw..... | .05 |
| 44 | Brush holder cover slotted cap screw nut..... | .05 |
| 45 | Brush holder dust cap..... | .40 |
| 46 | Brush holder 2 inch bronze bushing..... | .75 |
| 47 | Brush holder $2\frac{1}{8}$ inch bronze bushing..... | 1.00 |
| 48 | Journal oil chains..... | .05 |
| 49 | Field bracket end bearing, right..... | 3.00 |
| 50 | Field bracket end bearing, left..... | 4.00 |

Controller.

| | | |
|----|---------------------------------|--------------|
| 51 | Controller complete..... | each \$25.00 |
| 52 | Controller frame bracket R..... | .35 |
| 53 | Controller frame bracket L..... | “ 1.15 |

| | | | |
|-----|--|------|------|
| 54 | Controller frame tube..... | each | .20 |
| 55 | Controller frame brace rod..... | " | .20 |
| 56 | Controller frame brace rod nuts (4)..... | " | .05 |
| 57 | Controller lever stop case..... | " | 1.00 |
| 58 | Controller lever stop case screws (2)..... | " | .05 |
| 59 | Controller lever stop case screw nuts (2)..... | " | .05 |
| 60 | Controller lever..... | " | 2.25 |
| 61 | Controller lever grip..... | " | .75 |
| 62 | Controller lever grip button..... | " | .10 |
| 63 | Controller lever grip button screw..... | " | .05 |
| 64 | Controller lever shaft..... | " | .50 |
| 65 | Controller lever shaft 14 T sector gear..... | " | .35 |
| 66 | Controller lever shaft 14 T sector gear key..... | " | .05 |
| 67 | Controller star wheel springs..... | " | .20 |
| 68 | Controller star wheel spring pin..... | " | .05 |
| 69 | Controller star wheel spring roller..... | " | .05 |
| 70 | Controller star wheel spring roller rivet..... | " | .05 |
| 71 | Controller star wheel..... | " | .20 |
| 72 | Controller star wheel pin..... | " | .05 |
| 73 | Controller core shaft journal box (2)..... | " | .10 |
| 74 | Controller core shaft journal box screws (4)..... | " | .05 |
| 75 | Controller core shaft..... | " | .60 |
| 76 | Controller core shaft washer..... | " | .15 |
| 77 | Controller core shaft washer nut..... | " | .05 |
| 78 | Controller core shaft sector pinion 13 T..... | " | .35 |
| 79 | Controller core shaft sector pinion pins (2), each..... | " | .05 |
| 80 | Controller wood core..... | " | .15 |
| 81 | Controller core fibre washers (9), each..... | " | .02 |
| 82 | Controller core brass ring $\frac{1}{2}$ inch (4), each..... | " | .05 |
| 83 | Controller core brass ring $\frac{1}{2}$ inch..... | " | .05 |
| 84 | Controller core brass ring $\frac{1}{2}$ inch..... | " | .10 |
| 85 | Controller core fibre ring..... | " | .05 |
| 86 | Controller core blade 11/16 plain..... | " | .30 |
| 87 | Controller core blade 11/16 plain with lug..... | " | .30 |
| 88 | Controller core blade 11/16 formed with lug R..... | " | .30 |
| 89 | Controller core blade 11/16 formed with lug L..... | " | .30 |
| 90 | Controller core blade $2\frac{1}{8}$ plain drilled (2)..... | " | .30 |
| 91 | Controller core blade $2\frac{1}{8}$ plain not drilled..... | " | .30 |
| 92 | Controller core blade $2\frac{1}{8}$ formed..... | " | .30 |
| 93 | Controller core blade $3\frac{1}{8}$ plain..... | " | .30 |
| 94 | Controller core blade $3\frac{1}{8}$ formed (3), each..... | " | .30 |
| 95 | Controller core blade copper wire connector 15/16 inch..... | " | .05 |
| 96 | Controller core blade copper wire connector $1\frac{1}{8}$ inch..... | " | .05 |
| 97 | Controller core blade copper wire connector $1\frac{1}{8}$ inch..... | " | .05 |
| 98 | Controller finger wood block..... | " | .30 |
| 99 | Controller finger wood block screw $1\frac{3}{8}$ | " | .05 |
| 100 | Controller finger wood block screw $1\frac{1}{2}$ | " | .05 |
| 101 | Controller finger wood block screw nuts (3) each..... | " | .05 |
| 102 | Controller contact spring blades—R. & L.—each..... | " | .05 |
| 103 | Controller contact spring blade blocks..... | " | .30 |
| 104 | Controller contact spring blade block rivets (2)..... | " | .03 |
| 105 | Controller contact finger blades and block complete (7) each..... | " | .40 |
| 106 | Controller contact block bolts (7), each..... | " | .05 |
| 107 | Controller contact block bolts nuts each..... | " | .01 |
| 108 | Controller contact block bolts nuts, washers..... | " | .01 |
| 109 | Controller contact spring terminal screws, $\frac{3}{8}$ | " | .01 |
| 110 | Controller contact spring terminal screws, $\frac{1}{2}$ | " | .01 |

Reversing Switch.

| | | |
|-----|--------------------------------|----------|
| 111 | Reversing switch complete..... | \$14.00 |
| 112 | Frame bracket, right..... | each .35 |
| 113 | Frame bracket, left..... | " .35 |

| | | | |
|-----|---------------------------------------|------|------|
| 114 | Frame brace rod..... | each | .50 |
| 115 | Frame brace rod nuts..... | " | .05 |
| 116 | Frame lever..... | " | 1.00 |
| 117 | Frame lever grip..... | " | .50 |
| 118 | Frame lever grip cap screw..... | " | .05 |
| 119 | Lever shaft..... | " | .50 |
| 120 | Lever shaft nut..... | " | .05 |
| 121 | Lever shaft journal box..... | " | .10 |
| 122 | Lever shaft section gear 11 T..... | " | .35 |
| 123 | Lever shaft section gear key..... | " | .05 |
| 124 | Lever shaft section gear key pin..... | " | .05 |
| 125 | Lever shaft collar..... | " | .05 |
| 126 | Lever shaft collar set screw..... | " | .02 |

STAR WHEEL PARTS SAME AS IN CONTROLLER.

| | | | |
|-----|--|---|-----|
| 127 | Core shaft journal boxes (2)..... | " | .10 |
| 128 | Core shaft journal box screws..... | " | .05 |
| 129 | Core shaft washer..... | " | .05 |
| 130 | Core shaft nut..... | " | .05 |
| 131 | Core shaft sector pinion 13 T..... | " | .35 |
| 132 | Core shaft sector pinion pins (2)..... | " | .05 |
| 133 | Wood core..... | " | .15 |
| 134 | Core shaft..... | " | .50 |
| 135 | Core fibre washers..... | " | .02 |
| 136 | Core brass ring $\frac{1}{2}$ | " | .05 |
| 137 | Core brass ring 23/64..... | " | .10 |
| 138 | Core fibre ring $\frac{1}{2}$ | " | .05 |
| 139 | Core blade 11/16 plain..... | " | .30 |
| 140 | Core blade 11/16 formed..... | " | .30 |
| 141 | Core blade 2 $\frac{1}{8}$ plain drilled one hole (2)..... | " | .30 |
| 142 | Core blade 2 $\frac{1}{8}$ plain drilled two holes..... | " | .30 |
| 143 | Core blade 2 $\frac{1}{8}$ formed drilled two holes..... | " | .30 |
| 144 | Core blade copper wire connection 1 $\frac{3}{4}$ | " | .05 |
| 145 | Core blade insulator sleeve..... | " | .05 |
| 146 | Wood block..... | " | .20 |

CONTACT FINGER BLADES AND BLOCKS SAME AS IN CONTROLLER.

Front Axle.

| | | |
|-----|---|---------|
| 147 | Front axle complete, with steering heads, steering L's, cones, cups and balls for same..... | \$20.00 |
| 148 | Front axle complete with steering head and support painted and finished..... | 8.00 |
| 149 | Front axle tube only..... | 2.50 |
| 150 | Front axle springs support (2) each..... | .75 |
| 151 | Front axle steering head (2)..... | 2.25 |
| 152 | Front axle steering head ball cases (2) each..... | .20 |
| 153 | Front axle steering head ball retainers (2) each..... | .05 |
| 154 | $\frac{1}{2}$ inch balls for steering head bearing (36), per doz 20c., each..... | .02 |
| 155 | Steering L, right..... | 2.75 |
| 156 | Steering L, left..... | 2.75 |
| 157 | Steering L cones $\frac{3}{8}$ bore outside (2) each..... | .25 |
| 158 | Steering L cones $\frac{3}{8}$ bore inside (2) each..... | .25 |
| 159 | Steering L cone nuts $\frac{3}{4}$ outside (4) each..... | .05 |
| 160 | Steering L cone $\frac{3}{4}$ bore for head bearing (2) each..... | .25 |
| 161 | Steering L washers (2)..... | .05 |
| 162 | Steering L nuts $\frac{1}{2}$ x $\frac{3}{4}$ for head (4) each..... | .05 |
| 163 | Steering L nuts $\frac{1}{2}$ x $\frac{1}{2}$ for top end of L (2)..... | .05 |
| 164 | Steering L oil plugs (2) each..... | .05 |

Rear Axle and Connections.

| | | |
|-----|--|---------|
| 165 | Rear frame complete with shells and adjusting washer, painted..... | \$35.00 |
| 166 | Rear frame complete with shells and adjusting washer, not painted..... | 32.50 |
| 167 | Rear frame tubes only (4) each..... | 75 |

| | | |
|-----|---|------|
| 168 | Rear frame centre tubes only (2), each..... | .75 |
| 169 | Rear frame cluster, right..... | 2.25 |
| 170 | Rear frame cluster, left..... | 2.25 |
| 171 | Gear case, right..... | 7.00 |
| 172 | Gear case, left..... | 6.00 |
| 173 | Gear case cap screws, $\frac{1}{4}$ x $\frac{7}{8}$ each..... | .05 |
| 174 | Gear case cap screws nuts, each..... | .05 |
| 175 | Gear case set screw..... | .05 |
| 176 | Gear case set screw nut..... | .05 |
| 177 | Gear case adjusting washer..... | .50 |
| 178 | Gear case adjusting shell..... | .50 |
| 179 | Gear case stationary shell (3), each..... | .50 |
| 180 | Gear case ball retainers (4), each..... | .05 |
| 181 | Balls $\frac{1}{2}$, 14 in each bearing, per doz 40c., each..... | .04 |
| 182 | Oilers (2), each..... | .50 |

Differential Gear.

| | | |
|-----|--|--------|
| 183 | Gear and axle shafts (2), each..... | \$2.25 |
| 184 | 36 T bevel gear (2), each..... | 1.50 |
| 185 | Bevel gear key (2), each..... | .05 |
| 186 | 15 T differential gear pinion (4), each..... | .50 |
| 187 | Differential gear shaft cones (4), each..... | .25 |
| 188 | Differential gear shaft cone pins..... | .01 |
| 189 | Differential gear shaft cone adj. nuts (4)..... | .05 |
| 190 | Differential gear shaft hub lock nuts..... | .10 |
| 191 | Differential gear shaft hub lock nuts washers..... | .05 |
| 192 | Differential gear case..... | 1.75 |
| 193 | Differential gear yoke..... | 1.00 |

Driving Gear.

| | | |
|-----|---|---------|
| 194 | Driving gear complete with spider and 2 rims..... | \$20.00 |
| 195 | Driving gear rims (2), each..... | 8.00 |
| | 2 rims required for one driving gear. | |
| 196 | Driving gear spider..... | 4.00 |
| 197 | Driving gear cap screws..... | .05 |
| 198 | Driving gear cap screw nuts..... | .05 |
| 199 | Driving gear pinion 12 T..... | .50 |
| 200 | Driving gear key..... | .05 |

Rear Wheel—Wire.

| | | |
|-----|---|--------------|
| 201 | Rear wheel complete without tires..... | each \$14.00 |
| 202 | Rear wheel steel rim..... | " 3.25 |
| 203 | Rear wheel spokes..... | " .05 |
| 204 | Rear wheel spoke nipples..... | " .10 |
| 205 | Rear hub spoke buttons..... | " .05 |
| 206 | Rear hubs (drilled 40 spokes)..... | " 6.00 |
| 207 | Rear wheel dust caps..... | " 1.25 |
| | Rear wheel hub cones (Same as No. 187). | |
| | Rear wheel hub cone adjusting nuts (Same as No. 191). | |

Front Wheel—Wire.

| | | |
|-----|--|----------|
| 208 | Front wire wheel complete, without tires—(with cups)..... | \$14.00 |
| 209 | Front wheel spokes..... | each .05 |
| 210 | Front wheel nipples..... | " .10 |
| 211 | Front wheel spoke buttons..... | " .05 |
| 212 | Front wheel hubs drilled, 36 spokes..... | " 5.00 |
| 213 | Front wheel hub ball retainers..... | " .05 |
| 214 | Front wheel hub dust caps..... | " 1.25 |
| 215 | $\frac{1}{2}$ inch balls, 18 in each bearing, per doz..... | .20 |
| 216 | Front hub oilers, each..... | .35 |
| | Front hub ball cases (Same as No. 154). | |

Wood Wheels.

| | | |
|--|---|---------|
| 217 | Front wheel complete with hub and channels (painted), each..... | \$17.00 |
| 218 | Rear wheel, with hub and channels..... | 18.00 |
| 219 | Front hub..... | 5.00 |
| 220 | Rear hub..... | 6.00 |
| Cups and cones same as in wire wheels. | | |

Tires.

| | | |
|-----|--|---------|
| 221 | G. & J. 30 x 2½ inches, complete for one wheel,.....each | \$24.00 |
| 222 | G. & J. outer case, 30 x 2½..... | 18.75 |
| 223 | G. & J. inner tube, 30 x 2½..... | 5.25 |
| 224 | G. & J. valve..... | .50 |
| 225 | G. & J. steel rims, 30 inch..... | 3.25 |
| 226 | 2½ inch x 30 Hartford single tube tires..... | 24.00 |

Solid Tires.

| | | |
|---|--|---------|
| 227 | Re-rubbing 1⅝ inch tire, each wheel..... | \$23.00 |
| 228 | Re-rubbing 1⅝ inch tire, each wheel..... | 24.00 |
| Wheels to be sent to factory, transportation prepaid. | | |

Foot Set Brake.

| | | |
|-----|---|------|
| 229 | Foot set plate ratchet plate.....each | .50 |
| 230 | Foot set plate ratchet plate screw..... | .05 |
| 231 | Lever..... | .25 |
| 232 | Lever bolt..... | .15 |
| 233 | Lever bolt nut..... | .05 |
| 234 | Lever hanger..... | .20 |
| 235 | Lever hanger plate..... | .20 |
| 236 | Lever hanger plate screws..... | .05 |
| 237 | Brake rod..... | .50 |
| 238 | Brake rod pin..... | .05 |
| 239 | 3/32 x ½ cotterpins..... | .02 |
| 240 | Brake rod coil spring..... | .20 |
| 241 | Brake rod crank..... | .50 |
| 242 | Brake rod crank eccentric..... | 1.25 |
| 243 | Brake rod crank eccentric split ring..... | .20 |
| 244 | Brake rod eccentric pin..... | .05 |
| 245 | Brake steel band..... | .20 |
| 246 | Brake steel band lug (2)..... | .10 |
| 247 | Brake leather bands..... | .20 |
| 248 | Brake leather band rivets..... | .01 |
| 249 | Brake band stud..... | .15 |
| 250 | Brake band stud nut..... | .05 |
| 251 | Brake band centre lug..... | .15 |
| 252 | Brake drum..... | 2.25 |
| 253 | Brake drum key..... | .05 |
| 254 | Brake drum set screw..... | .05 |

Steering Lever and Connections.

| | | |
|-----|---|--------|
| 255 | Steering lever handle complete.....each | \$5.00 |
| 256 | Steering lever tube only..... | 3.50 |
| 257 | Steering lever yoke..... | .40 |
| 258 | Steering lever yoke cap screw..... | .10 |
| 259 | Steering lever yoke cap screw nut..... | .10 |
| 260 | Steering lever grip..... | .75 |
| 261 | Steering lever bell push button contact block..... | .25 |
| 262 | No. 4 flat head wood screws..... | .05 |
| 263 | Steering lever push button, copper terminal..... | .10 |
| 264 | Steering lever push button, brass contact spring..... | .10 |
| 265 | Steering lever push button, brass contact spring union..... | .25 |
| 266 | Steering lever hard rubber push button..... | .05 |

| | | | |
|-----|---|------|------|
| 267 | Steering lever hard rubber push button headless screw..... | each | .05 |
| 268 | Steering lever post..... | " | 3.00 |
| 269 | Steering lever post bolts and nuts..... | " | .05 |
| 270 | Steering lever post shaft..... | " | 1.25 |
| 271 | Steering lever post shaft nut..... | " | .05 |
| 272 | Steering lever post shaft crank..... | " | .75 |
| 273 | Steering ball rod sockets..... | " | .15 |
| 274 | Steering ball rod socket threaded..... | " | .15 |
| 275 | Steering ball rod cap screw 5/16 x 1 $\frac{3}{4}$ | " | .05 |
| 276 | Steering ball rod cap screw nuts 5/16..... | " | .05 |
| 277 | Steering ball rod cap screw $\frac{3}{8}$ x 1 $\frac{1}{2}$ | " | .05 |
| 278 | Steering ball rod cap screw nuts $\frac{3}{8}$ | " | .05 |
| 279 | Steering ball rod socket fibre washer..... | " | .02 |
| 280 | Steering ball rod..... | " | .75 |
| 281 | Steering rod balls..... | " | .05 |
| 282 | Steering reach rod clamp..... | " | .25 |
| 283 | Steering reach rod..... | " | .75 |
| 284 | Steering reach rod bearing, right..... | " | .75 |
| 285 | Steering reach rod bearing, left..... | " | .75 |
| 286 | Steering reach rod bolt..... | " | .10 |
| 287 | Steering reach rod bolt nut R..... | " | .05 |
| 288 | Steering reach rod bolt nut L..... | " | .05 |
| 289 | Steering reach rod turnbuckle..... | " | .30 |
| 290 | Steering L cranks..... | " | .60 |
| 291 | Steering L cranks key..... | " | .12 |
| 292 | Steering L crank studs..... | " | .30 |
| 293 | Steering L crank studs nuts $\frac{1}{2}$ x 20..... | " | .05 |
| 294 | Steering L crank studs nuts 11/16 x 24..... | " | .05 |
| 295 | Steering L crank studs cones..... | " | .05 |

Body and Spring Parts.

| | | | |
|-----|--|----------|----------|
| 296 | Body model 21, specially ironed and fitted, painted and varnished complete..... | | \$100.00 |
| 297 | Body model 21, ironed, fitted, painted, varnished and wired complete..... | | 125.00 |
| 298 | Body model 22, ironed and fitted, painted and varnished complete with top.. | | 175.00 |
| 299 | Body model 22, ironed and fitted, painted and varnished complete with top, wired complete..... | | 200.00 |
| 300 | Elliptic springs front 3 leaf (2)..... | each set | 4.80 |
| 301 | Elliptic springs front 3 leaf painted complete..... | " | 5.00 |
| 302 | Elliptic springs rear 4 leaf (2)..... | " | 7.00 |
| 303 | Elliptic springs rear 4 leaf painted complete..... | " | 8.00 |
| 304 | Cross spring rear 2 leaf..... | " | 2.00 |
| 305 | Cross spring painted..... | | 2.50 |
| 306 | Front spring bar..... | each | .60 |
| 307 | Rear spring bar..... | " | .65 |
| 308 | Rear spring clips lower $\frac{1}{2}$ x 1 $\frac{1}{2}$ | " | .25 |
| 309 | Rear spring clips upper $\frac{1}{2}$ x 1 $\frac{1}{2}$ | " | .25 |
| 310 | Front spring clips $\frac{3}{8}$ x 1 $\frac{1}{4}$ | " | .20 |
| 311 | Cross spring clips $\frac{3}{8}$ x 2..... | " | .20 |
| 312 | Rear spring clip ties..... | " | .10 |
| 313 | Front spring clip ties 1 $\frac{1}{4}$ | " | .05 |
| 314 | Cross spring clip ties..... | " | .10 |
| 315 | Spring shackles..... | " | .15 |
| 316 | Spring shackles links..... | " | .10 |
| 317 | $\frac{3}{8}$ Spring clip nuts..... | " | .05 |
| 318 | Step pads only..... | " | 1.00 |
| 319 | Steps complete..... | " | 7.00 |
| 320 | Name plate..... | | .25 |
| 321 | Barrel bolt for rear block..... | | .25 |

Circuit Breaking Lock.

| | | | |
|-----|---|------|--------|
| 322 | Lock complete with key plug..... | each | \$1.50 |
| 323 | Lock front plate..... | " | .60 |
| 324 | Lock rear plate..... | " | .25 |
| 325 | Lock key plug..... | " | .30 |
| 326 | Lock fibre block..... | " | .40 |
| 327 | Lock $\frac{3}{8}$, 10/32 screws..... | " | .05 |
| 328 | Lock No. 10— $\frac{3}{8}$ slotted screw..... | " | .05 |

Combination Volt and Ampere Meter.

| | | | |
|-----|--|---|-------|
| 329 | Meter complete with shunt..... | " | 75.00 |
| 330 | Meter light complete with stand and foot push..... | " | 5.00 |
| 331 | Meter bracket support..... | " | .75 |
| 332 | Meter bracket support bolt..... | " | .05 |
| 333 | Meter bracket support bolt nuts..... | " | .05 |
| 334 | Meter light 40 volt lamp..... | " | .75 |
| 335 | Meter light midget socket and guard..... | " | 2.00 |
| 336 | Meter light standard..... | " | .25 |
| 337 | Meter light standard base..... | " | .10 |
| 338 | Meter light standard base screw..... | " | .05 |
| 339 | Meter light reflector..... | " | .20 |
| 340 | Meter light foot push complete..... | " | 1.00 |

Bell.

| | | | |
|-----|----------------------------------|---|------|
| 341 | 22 volt 6 "Recti" bell..... | " | 6.00 |
| 342 | Contact spring with clapper..... | " | .15 |
| 343 | Bell bolts..... | " | .05 |
| 344 | Bell burrs..... | " | .05 |

Lantern.

| | | | |
|-----|---|---|------|
| 345 | Marlborough lantern complete..... | " | 6.00 |
| 346 | 40 volt incandescent lamp..... | " | .50 |
| 347 | Perkins No. 11 snap switch..... | " | .50 |
| 348 | Snap switch screws..... | " | .05 |
| 349 | Snap switch extension rod..... | " | .05 |
| 350 | Snap switch extension rod nut..... | " | .05 |
| 351 | Snap switch extension rod fibre sleeve..... | " | .05 |
| 352 | Snap switch extension bracket..... | " | .05 |
| 353 | Snap switch extension bracket screw..... | " | .02 |
| 354 | Snap switch gromet..... | " | .05 |
| 355 | Snap switch gromet ring..... | " | .05 |

Tool Kit.

| | | | |
|-----|---------------------------------|---|-------|
| | Complete..... | " | 10.00 |
| 356 | 10 inch monkey wrench..... | " | 1.00 |
| 357 | 7 inch screw driver..... | " | .40 |
| 358 | Adjusting wrench..... | " | .25 |
| 359 | Adjusting spanner..... | " | .20 |
| 360 | Side cutting pliers..... | " | 1.00 |
| 361 | Tail gate key..... | " | .50 |
| 362 | Extra carbon brushes..... | " | .25 |
| 363 | Lamp cord, 4 ft., per yard..... | " | .10 |
| 364 | Sandpaper, per sheet..... | " | .02 |
| 365 | Leather case..... | " | 1.50 |
| 366 | Oil can..... | " | 1.25 |
| 367 | Hydrometers..... | " | 1.50 |
| 368 | Test tube..... | " | .10 |
| 369 | Rubber bulb..... | " | .75 |

Miscellaneous Price List.

| | | | |
|-----|---|------|-------|
| 370 | Rheostat complete with cables..... | each | 35.00 |
| 371 | Charging plug complete, with block..... | " | 1.00 |
| 372 | Charging plug cable (10 ft.)..... | " | 1.00 |
| 373 | Copper casting for charging plug, positive large..... | " | .40 |
| 374 | Copper casting for charging plug, negative small..... | " | .40 |
| 375 | Graphite greese, per 5 lb. can..... | " | 1.00 |
| 376 | Lead connectors..... | " | .12 |
| 377 | Tray connecting cables..... | " | .50 |
| 378 | Sealing compound, per lb..... | " | .25 |
| 379 | Extension cord and socket..... | " | 1.00 |
| 380 | Vent knobs..... | " | .07 |
| 381 | No. 17 bare copper wire, per ft..... | | .05 |

No. 5 Batteries. For Models 21-22 Only.

| | |
|---|----------|
| Battery, complete..... | \$210.00 |
| Cell complete—2 Positives, 3 Negatives..... | 10.50 |
| Positive plates, set of 2..... | 3.70 |
| Negative plates, set of 3..... | 4.00 |
| Rubber jars, each..... | 2.50 |
| Rubber jar covers, each..... | .20 |
| Separators, each..... | .25 |
| Pins, per 100..... | 2.25 |
| Set rubber parts complete, one cell..... | 3.85 |