

## Mechanics.

### IMPROVED CAR STARTER.

No subject is more deserving of the attention of inventors than that of starting our heavily laden street cars after they have come to a full stop, and singularly enough no subject has been more bunglingly treated. The two essential qualities of a car starter are simplicity and durability. Complicated and expensive mechanism for this purpose is entirely out of the question, as no class of devices are subjected to greater wear or greater inequalities of strain.

The car starter shown in our engraving happily combines all the essential qualities, and has proved itself by actual and continued use to be adequate to all the requirements of a device of this character. The clutch employed is of novel construction, and the leverage is equal to the radius of the wheels.

In the engraving Fig. 1 is an elevation of a portion of a car, showing the clutch of the starter in section. Fig 2 is an inverted plan view. Fig 3 is a perspective view of the clutch and clutch lever, and Fig. 4 shows the inner end of the clutch lever.

The axle, A, with which the apparatus is connected, has attached to it a sleeve, B, and a clutch, C, which may be rotated around the enlarged central portion of the sleeve.

In connection with this clutch there is a lever, D, the central pivoted end of which is pivoted in a slot in the clutch, C, in such a way as to have freedom of motion to a certain extent up and down. Upon the outside of this central portion are winged flanges which embrace the sides of the clutch, C. A pivotal pin, passing through these wings as well as the central portion, and clutch, C, give steadiness to the lever, D, and prevent it from lateral movements. At the extreme inner end of the lever, D, there is a recess, of a semi-globular form, elongated in the direction of the length of the lever. A ball, *a*, having freedom of movement, is placed between this recess and groove, around the central portion of the sleeve, B. This ball, in the movement of the lever at the proper point, is clamped against the groove, and, having freedom of movement in its own recess, presents continually a new wearing surface, and avoids the inconvenience and bad results which would follow if no such ball were employed.

By reason of the longitudinal form of the recess, the ball, in the upward movement of the lever, is brought into engagement in the upper part of its recess with the groove in the sleeve, and therefore the resistance of the ball, being in a slightly angular direction is increased to such an extent that it never slips.

The outer end of the lever, D, is slotted to receive the link of the chain, E, which is held by a bolt, so that if it is necessary to shorten the chain at any time the bolt may be withdrawn, and then replaced through another link of the same chain. The chain, E, passes over a pulley secured to the bottom of the car, is attached to a rod, F, which, in turn, is attached to the draw bar, G, by a pivotal connection. The inner end of the draw bar connects with one end of the lever, D, pivoted to the bottom of the car, and a spring, with this lever between its pivotal point and its free end, presses it back, and draws back the draw bar, and holds it in this position when no force is applied to it.

It will be seen that with any forward motion of the draw bar the lever, D, will be raised, and the power for the moment will be exerted to great advantage, and the car will be started easily without strains or shocks on the horses, harness or car.

To check any retrograde movement of the car upon up grades, an auxiliary ball, *b* is placed in a cavity in the clutch, C. When the car makes the slightest movement backward the ball, *b*, wedges in the cavity and stops the car.

The starter is not intended to supersede the brakes, but to be used as supplementary to them. The main object is to lessen the labor of overcoming the inertia at the initial of the forward movement, and also to equalize the draught after the loaded car has been put in motion.

There is also an attachment by which the driver is enabled to reverse his car by throwing the lever out of gear—and preventing the locking of the wheel—simply by a pressure of the foot.

If by any neglect on his part he should fail to put it in gear again, it acts automatically as soon as he attaches the horses to the draught bar.

The ball of the checking device is thrown out of position to engage the clutch by means of a rod attached to the yoke, and extending into the ball cavity. This yoke is operated by a pedal, L, through the medium of the angled levers, K, I, the rod, J, and a short section of chain connecting the double arm of the lever I, with the yoke, H. By means of this mechanism

the checking device may at any time be thrown out by the pressure of the foot on the pedal L, and should it be desirable to keep it out of engagement with the clutch, the catch on the pedal is hooked under a plate in the platform.

### NEW LASTING MACHINE.

It would be difficult to name an industry in which mechanical skill and invention have produced such marked effects as in the manufacture of shoes. The cutting of the uppers, soles, and heels, the treeing, pegging, stitching, finishing, and eyeletting, are all done by machinery, and many of the minor operations in the manufacture of shoes are accomplished by improved tools which greatly facilitate the work and cheapen the cost of manufacture. But hitherto lasting has been principally done by hand, making it a comparatively slow operation.

We give an engraving of a machine recently patented by Mr. S. B. Ellithorp, of Rochester, N. Y., for accomplishing this work with rapidity and uniformity. The machine is equally well adapted to boots and shoes, and it is so clearly shown in our engraving that any one familiar with boot and shoe machinery will be able to understand it without reference to the description.

The frame of the machine is made of the base and top pieces, connected by vertical iron rods at the corners. The plates, A, are suspended by connecting rods from levers, B, pivoted at the top of the frame, and the levers are connected with arms or the rockshafts, C, so that when the latter are partly rotated the plates will be raised or lowered more or less.

The plate, A, carries a number of adjustable hooks, E, provided with nippers or clamps, F, which grasp the edges of the uppers surrounding the lasts, G.

The machine shown in the engraving holds two lasts, and is capable of lasting two uppers simultaneously. In the present case the uppers are omitted in the first half of the apparatus to avoid confusion in referring to the different parts. Two levers, H, are provided for each last. They are pivoted to a standard in front, and are elongated at the opposite extremity, forming handles which are brought together and retained by a link after the operation of stretching the uppers has been performed.

The lasts are held down upon their seats by screws, K, passing down through nuts in the top of the frame and bearing upon the center of the lasts.

The standards which support the last seats are made adjustable, so that they may be raised or lowered for different sizes of shoes and for boots.

The devices which hold the last render it adjustable in every direction, so that a last of any size may be used in the machine. The hooks on which the nippers are hung are capable of being adjusted, and the screw that holds the last down may be adjusted so as to press upon any part of the last.

The shafts, C, are provided with hand wheels, J, and with levers, by which they may be turned so as to bring any desired amount of strain upon the leather.

To last a boot or shoe on this machine the upper leather that has been prepared for lasting is turned bottom up and the last inserted therein bottom up, the last having an insole already tacked on the bottom. The last is then placed bottom up in the seat, so that the pin (Fig. 3) enters the corresponding hole in the last, the toe of the last resting in a curved seat, supported by the adjustable standard. The plate, A, is then lowered to the full extent, and the clamps, F, are adjusted so as to grasp the upper leather all around the edge, first grasping at the center at the heel, then at the center at the toe, and then, at proper distances apart, all around the upper. The holding bolt is then forced down upon the last, holding the last firmly down on the seat. The plate, A, is then drawn up by turning the shaft, C, pulling up the clamps, F, and consequently the upper leather, closely to the last at every point alike. The last being firmly held down, all the surplus leather of the upper leather is then above the bottom of the last. The levers, H, are now closed, pressing the upper leather to the shape of the last all around the bottom about the insole.

A gathering cord is then placed about the upper leather and drawn tight. The cord is again pulled and secured, and the boot or shoe is then lasted ready for tacking, which may be done in the machine while the last rests on the seat on opening the levers; or the boot or shoe may be removed and then tacked.

It has been supposed by some that there were mechanical obstacles that rendered it impossible to last boots or shoes by machinery. Such obstacles, if there were any, have been successfully overcome by this invention, by which boots or shoes of