Dec. 18, 1951 A. J. PARK ET AL 2,578,830

SOLENOID ACTUATED PRINTING PLATEN

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Fig. 1

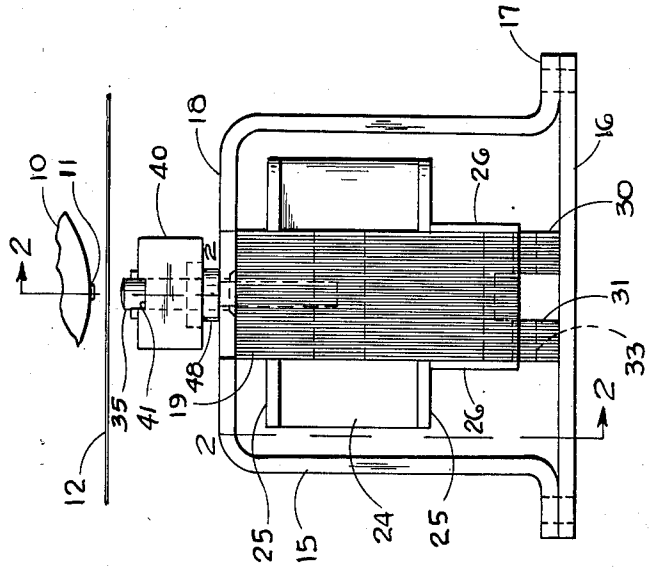
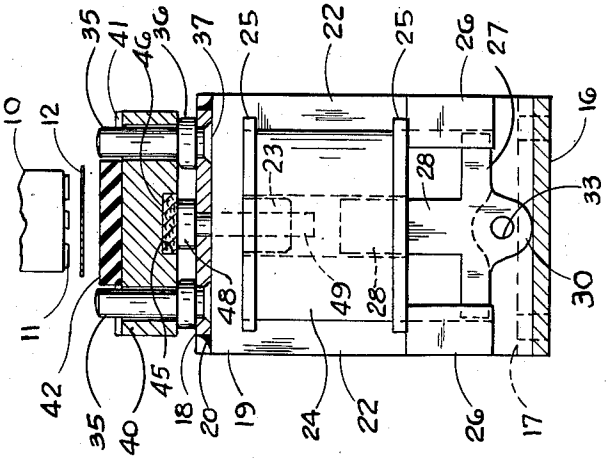


Fig. 2



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SOLENOID ACTUATED PRINTING PLATEN

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6 Claims. (Cl. 101—287)

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This invention relates to electrically operated printing mechanisms and more particularly to a solenoid operated printer useful in conjunction with recorders or counters.

Although electrically operated printing mechanisms are well known in the art, there have been certain disadvantages inherent in the prior devices which the present invention overcomes.

One of the most serious disadvantages of the prior art resided in the fact that the operation was such that should the number wheel turn at the same time that printing was being effected, the numbers printed were smudged and in some instances, the paper was torn.

By our present invention the printing mechanism is operated quickly and even though the printing circuit be held closed, the striker head recedes after effecting the printing operation and does not remain in contact with the number or printing wheel.

Still another advantage resides in the structure which has no levers to require lubrication or which may, in time, become dirty and inoperative.

Another advantage resides in the fact that although the operation is quick in the nature of a hammer blow, the action is cushioned and does not cause disintegration of the device because of excessive shock.

Furthermore, the structure is simple and compact, its simplicity leading to economies in manufacture, and its compactness allowing it to be mounted in places where there are space limitations.

Still other advantages of the invention and the invention itself will become more apparent from the following description of an embodiment thereof, which description is illustrated by the accompanying drawings and forms a part of this specification.

In the drawings:

Fig. 1 is an elevational view of a solenoid operated printing mechanism embodying our invention;

Fig. 2 is a view at right angles thereto, with certain parts shown in section as indicated by the line 2—2 of Fig. 1.

Referring now to the drawings, throughout which like parts are designated by like reference characters, a fragment of a number or indicia wheel is shown at 10 having indicia or numbers 11 extending from the periphery thereof. The printing is effected by engaging the face of a piece of paper 12 and pushing it together with an inked ribbon or carbon paper, not shown, against the indicia of the number wheel.

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It will be appreciated that the number wheel is rotated from time to time, and that particularly where the printing is effected at time intervals, it may be rotated at the same time the printing is effected. This normally causes the number to be smudged or illegible, and such occurrence is eliminated by causing the printing operation to be quick and the instrumentality for effecting the printing to be withdrawn after striking the blow, leaving the number wheel free.

Disposed in spaced relation from the wheel and paper is the striking mechanism. Briefly, it includes a member for engagement with the paper and tape to move it against the wheel and a solenoid for striking the member to urge it upward. Specifically, it includes a yoke shaped frame 15 secured to a base 16 provided with apertured flanges 17 by which it may be secured to another part of the machine.

Secured to the upper part 18 of the yoke, on the underside thereof are the laminations of a solenoid 19. Preferably, these laminations are welded to the part 18 as indicated at 20, Fig. 2. The laminations are of generally E shape and include the outer legs 22 and a short center leg 23. The winding for the solenoid is conventional and includes a winding 24 carried by a form, the end flanges of which are indicated at 25.

The ends of the legs 22 are provided with guide flanges 26, on opposite sides of each leg, between which is guided a laminated armature comprising a head portion 27 and a stem 28. The stem 28 extends into the open core of the winding 24 and is adapted to be attracted therein upon energization of the winding.

The head 27 is provided with a downwardly extending portion 30, the end of which rests on the plate 16 when the winding is de-energized. A slot 31 is provided, the conformation of which is best shown in Fig. 2, through the center portion of the portion 30, and the laminations are apertured at 33 to provide for a point of connection for a lever not shown, should it be desired.

The upper part 18 of the frame, as best shown in Fig. 2 has secured thereon spaced apart guide posts 35. The guide posts are generally cylindrical and are formed with shoulders 36 disposed in engagement with the top of the frame, and the lower ends of the posts beyond the shoulders extend through and are headed over at 37 to hold the same securely in place.

The shoulders, besides assisting in holding the posts securely in place also act as spacers for a block 40 which is loosely mounted on the posts. The upper face of the block 40 is provided with a

longitudinally extending recess 41 in which is secured a resilient block 42. The block 42 may be of rubber, fabric or other resilient material and may be secured in the recess by a suitable cement.

The underside of the block is provided with a recess 45 in which is secured a pad of fibrous material 46. This material may also be rubber, felt or some similar material.

In line with the pad 46, and extending through the plate 18 is a striker pin which comprises a head 48, disposed above the frame 18 and in engagement with the pad 46, and a stem 49 which extends through the frame and through the laminations 23 into the interior of the solenoid core.

When the winding 24 is energized, the armature stem 28 is attracted violently into the open core toward the center leg 23, which it eventually engages. Prior to striking the leg 23, however, the end of the stem 28 strikes the end of the stem 49 and moves the block 40 upward. The rubber 42 engages the paper and/or tape 12 and forces it against the indicia 12 on the printing wheel.

It will be noted that the armature stem 28 can travel the full distance from the position as shown in Fig. 2, to the end of the leg 23, while the stem 49 of the striker pin only extends beyond the leg 23 approximately one half the distance. Also the distance that stem 49 extends beyond the leg is less than the distance between the block 42 and the printing wheel. Therefore, the armature strikes the striker pin when it has attained a high velocity and knocks it, together with the block 40 and its associated parts upward, it being free to slide on the guide pins 35. Even though the solenoid be energized for a material length of time, and the plunger be retained within the solenoid in engagement with the leg 23, the longitudinal dimension of the striker pin is such that having struck the block and effected the printing, the block then drops free of the number wheel.

Thus the blow is struck quickly and the printing is effected quickly and the number wheel is free to turn at substantially all times, the movement of impact being of very short duration.

The embodiment shown is particularly adapted to operate taking advantage of gravitational forces. For this operation, it is desirable to operate the same in an upright position. It will be appreciated, however, that the same advantage may be retained by supplying return springs for the various parts should it be desired to mount the same in another position, and that the application of such springs would be apparent to those versed in the art. For instance, the armature could be held in the open position by a spring attached in the opening 33, and likewise light weight springs could be used to force the block back toward the frame.

Having thus described our invention in an embodiment thereof, we are aware that numerous and extensive departures may be made therefrom without departing from the spirit or scope of invention.

We claim:

1. In combination with a printing wheel and a strip adapted to have indicia printed thereon, a printing mechanism comprising a frame having a base and a yoke supported by the base, a solenoid disposed in said frame suspended from said yoke, a pair of guide pins on said yoke extending vertically above the yoke in spaced parallel relation to each other, a block slidably disposed on said guide pins, bosses on said pins to hold said block in spaced relation from the top of said frame, a recess formed in the top of said block, a rubber block disposed in said recess adapted for engagement with said paper and to force said paper against said printing wheel when the solenoid is energized, a recess in the bottom of the block, a fibrous pad in the recess, a headed pin having a stem extending through the frame into said solenoid, a head above said frame for engagement with said pad, plunger means disposed for attraction into said winding and to engage with said pin stem, the length of said pin being such that when the plunger is in attracted position in the solenoid the block is out of engagement with the printing wheel.

2. In combination with an indicia wheel and a medium for having indicia from said wheel impressed thereon; means to move said medium into momentary engagement with said wheel comprising a solenoid, a plunger normally withdrawn from said solenoid but adapted to be drawn into said solenoid to an attracted position, a striker pin movably mounted on said solenoid with one end in position to be engaged by said plunger, platen means engaging said striker pin at its other end for movement thereby and adapted to move said medium against said wheel the distance between the plunger and the striker pin in normal position being less than the distance between the platen and the indicia wheel, the combined length of said plunger, pin and platen means being such that said platen is supported in spaced relation to said wheel by said plunger and pin, when said plunger is in its attracted position.

3. Means for forcing a medium against an indicia wheel to print indicia on said medium, comprising a solenoid, a plunger for said solenoid having a normal position withdrawn from said solenoid and an attracted position drawn into said solenoid, a striker pin movably mounted on said solenoid for engagement at one end by said plunger, guide means mounted on said solenoid, a block movably disposed on said guide means in position to be engaged by the other end of said striker pin, said block being adapted to force said medium against said wheel as said plunger engages said pin forcibly driving said pin and said block toward said wheel the distance between the plunger and the striker pin in normal position being less than the distance between the platen and the indicia wheel, the combined length of said plunger, pin and block being such that said block is in spaced relation to said wheel when said plunger is in its attracted position.

4. In combination with an indicia member and a means to have indicia impressed thereon from said member, means to move said means into engagement with said member including a frame having a base and a yoke thereon, a solenoid suspended from said yoke, a plunger having a stem adapted to be attracted into said solenoid upon energization of the solenoid, a striker pin having a head disposed outside said frame and a stem extending through said frame into said solenoid, and normally spaced from and opposite to the plunger and adapted to be struck upwardly by the plunger when the plunger is attracted within the solenoid, a movable block disposed outside of said frame adjacent said head, guide means on the frame for guiding said block, a shock absorbing pad carried by said block normally in engagement with the head of said pin, and resilient pad

means carried by said block for engagement with said means to be moved into engagement with the indicia member, said resilient pad means being disposed at a distance from the printing member greater than the distance between the pin stem and plunger when the flange is in normal unattracted position.

5. In combination with a printing wheel and a strip adapted to have indicia printed thereon, a printing mechanism comprising a frame having a base and a yoke supported by the base, a solenoid disposed in said frame suspended from said yoke, a pair of guide pins on said yoke extending vertically above the yoke in spaced parallel relation to each other, a block slidably disposed on said guide pins, bosses on said pins to hold said block in spaced relation from the top of said frame, a recess formed in the top of said block, a resilient pad member disposed in said recess adapted for engagement with said paper and to force said paper against said printing wheel when the solenoid is energized, a recess in the bottom of the block, a pad in the recess, a headed pin having a stem extended through the frame into said solenoid and normally spaced from and opposite to the plunger and adapted to be struck upwardly by the plunger when the plunger is attracted within the solenoid, the head of said pin being above said frame adjacent said pad, plunger means disposed for attraction into said winding and to engage said pin stem, said resilient pad means being disposed at a distance from the printing wheel greater than the distance between the pin stem and plunger when the plunger is in normal unattracted position.

6. For use in printing mechanism having an indicia member and means to receive indicia printed thereon from said member, a striking mechanism comprising a frame, a solenoid carried by said frame, a plunger having a stem to be attracted into said solenoid upon energization of said solenoid, stop means adapted to stop the travel of said plunger abruptly, a striker pin extending through said frame into said solenoid normally spaced from and opposite to said plunger, a movable block disposed outside of said frame, engaging said striker pin and adapted to be moved thereby, said striker pin and block being disposed at a distance from the indicia member greater than the distance between the ends of the plunger and striker pin in normal unattracted position of the plunger adapted to travel beyond the position to which they are carried by the plunger as it reaches said stop means, said block being thereby effective to print said indicia by reason of the impact of said plunger on said striker pin.

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