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ELECTRIC REVERSING DEVICE FOR TAPPING MACHINES

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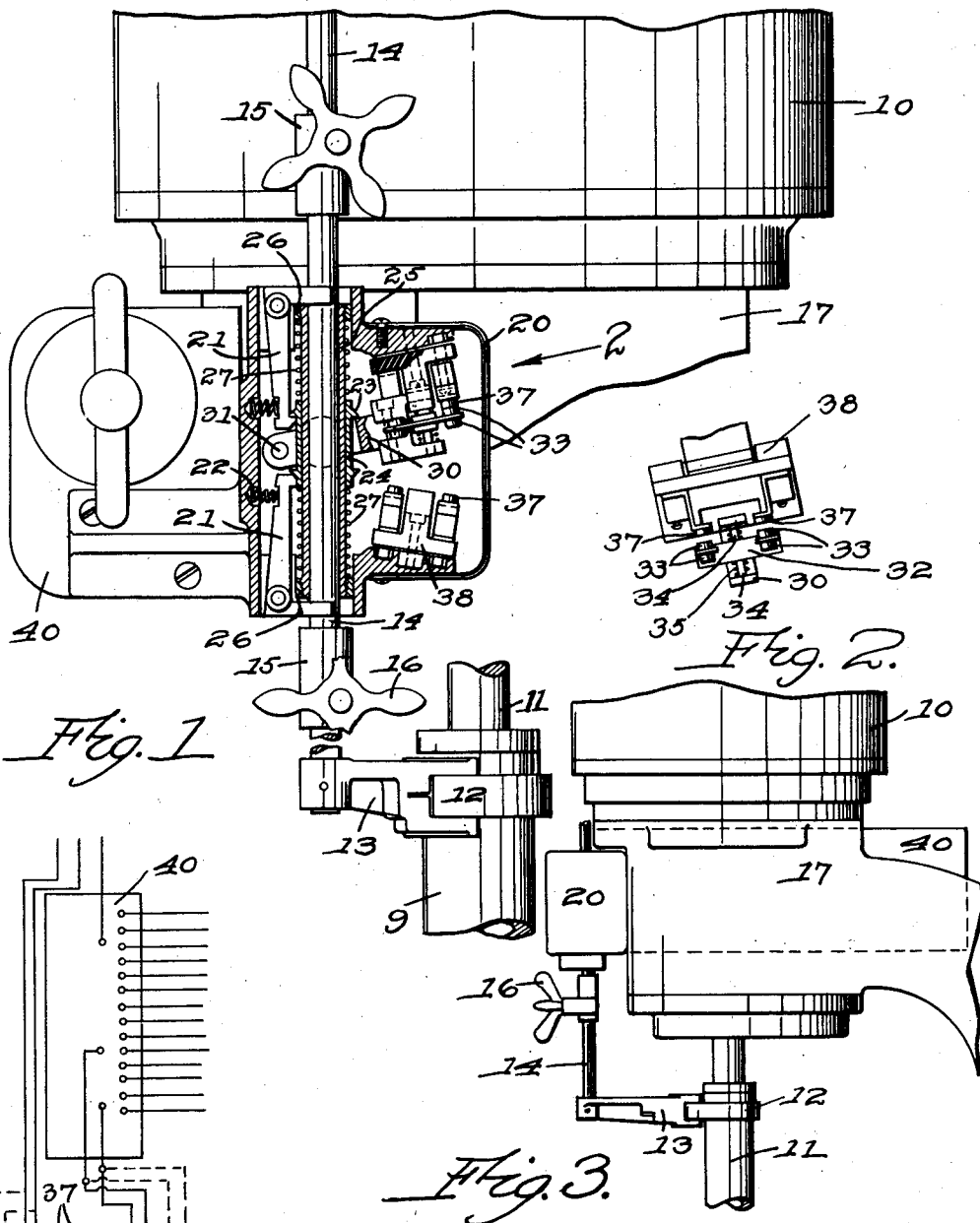


Fig. 1

Fig. 2.

Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE.

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ELECTRIC REVERSING DEVICE FOR TAPPING MACHINES.

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This invention relates to an electric reversing device, for use particularly in a tapping machine, where a spindle has to be rotated and fed in one direction and then fed back, and where it is desired to continue the operation automatically.

The principal objects of the invention are to provide a device of this kind which will consist of few parts and therefore be comparatively inexpensive to manufacture, and which will operate with certainty a large number of times without requiring resetting. Improvements in details of construction and arrangements of parts also constitute a feature of the invention.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is a front view of a part of a tapping machine with a switch constructed in accordance with this invention applied thereto and shown in central section;

Fig. 2 is a front view of one of the switch connections, as indicated by the arrow 2 in Fig. 1, but showing the movable member slightly separated from the stationary member;

Fig. 3 is a general side view of the device, and

Fig. 4 is a diagram of the electrical connections.

The invention is shown as applied to a machine having a motor enclosed in a casing 10 and a spindle 11 concentric therewith, in which spindle a tool, as a drill or tap, can be applied in the usual manner. No tool is shown in the drawings, but this invention is particularly designed for use in tapping where the tap has to be turned into the work in accordance with the thread and then drawn out in the same way, and the electrical connections have to be reversed at each end of the stroke. Therefore, the spindle 11 will travel up and down as it rotates in a non-rotatable quill 9 fixed so as to reciprocate with the spindle. On this is fixed a collar 12 movable with the spindle, and connected with it a bracket 13 on which is mounted the bottom of a vertical rod 14. This vertical rod therefore goes up and down with the spindle. On the rod near the bottom and top are two collars 15 constituting stops. These stops may be adjusted in any desired manner but I have shown them as held by screws and thumb

nuts 16 having four arms. They are shown as of well known construction so that they can be tightened upon the rod to fix the collars for the purpose of controlling the operation of the reversing device which will now be described.

Mounted in stationary position on the frame 17 of the machine is a box 20 through which the rod 14 passes. This box is provided with openings for the rod and, in fact, acts as a guide for it, as the rod is supported only at the bottom. At the top and bottom of this casing 20 are two oppositely arranged bell cranks 21 one arm of each of which is horizontal and is in the form preferably of a yoke partly surrounding the rod 14 and in position to be engaged by the stops 15 when the rod moves up or down to limit the feed of the tap or its withdrawal. Each of these bell cranks is pressed forward by a spring 22 and its end is in the form of a hook which is adapted to engage one of a pair of projecting flanges 23 on a tubular slide 24 which is slidably mounted on a tube 25 that surrounds and fits the rod 14. At each end of this tube 25 it is adapted to engage the other projecting end or yoke of one of the bell cranks 21. It is provided with a screw collar 26 at each end of the same size as the sliding collar 24. There are two springs 27 coiled around the tube 25 each extending from the collar 26 to the slide 24.

The slide 24 has pivoted to it a lever 30. This lever is pivoted at the end on a stud 31 on the box or casing 20. It carries a head 32 having a plurality of electrical contacts 33, four in number as shown in these drawings. The lever 30 has a yoke at its end carrying the head 32 by a spring pin 34 and is yieldingly held in neutral position by springs 35. Therefore, the contacts come into engagement yieldingly with corresponding electrical contacts 37 on one or the other of a pair of heads 38.

The details of this switch need not be described as it is designed to operate in accordance with the diagram shown in Fig. 4 for the purpose of sending the current through the motor from the feed lines, first in one direction and then in the other. Thus the spindle 11 is turned and moved forwardly through the article to be tapped in a helical manner and then withdrawn in

the same manner and the operation repeated automatically over and over. The usual speed control device 40 is shown connected with the box 20, as also indicated in the diagram (Fig. 4), to show the connection of this device with the rest of the machine, but the invention does not involve this feature.

Now while running, the parts are in one extreme position with one set of contacts closed and one spring 27 holding the slide 24. When one of the stops 15 comes, either from above or below, and engages one of the yokes of the bell cranks 21, it will push that yoke inwardly, compress the corresponding spring 22 and draw the hook on the bell crank out away from the flange 23 on the collar 24. At this time the stop which has performed this function will press on the end of the tube 25 through the bell crank end and the spring will force the sliding collar 24 along the tube 25 by yielding pressure. This will force the slide 24 to a position in which the other bell crank will snap over the other flange 23 at the other end of the slide and lock it in its other extreme position, as shown at the top in Fig. 1. As the slide moves, the switch is reversed.

Although we have illustrated and described only a single form of the invention we are aware of the fact that modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore we do not wish to be limited in this respect but what we do claim is:—

1. In an electric current reversing device, the combination with a movable spindle, and a rod connected with the spindle to move with it and located parallel with it, of a pair of stops adjustable along the rod, a double flanged slide slidable along the rod, means in position to be engaged by the stops as the rod moves for holding said flanged slide and adapted when engaged by either stop to release the flanged slide, yielding means on opposite sides of the slide for changing its position when it is thus released, and an electric switch connected with said slide to be operated by its movement for breaking the circuit and connecting it in another way.

2. In an electric current reversing device, the combination with a movable spindle, and a rod connected with the spindle to move with it and located parallel with it, of a tube slidable on the rod, a pair of stops adjustable along the rod at opposite ends of the tube, a double flanged slide slidable along the rod, means at the ends of the tube projecting over the rod and in position to be engaged by the stops as the rod moves for holding said flanged slide and adapted, when engaged by either stop, to release the flanged slide, yielding means on opposite sides of the slide for changing its position when it is thus released, and an electric switch connected with said slide to be operated by its movement for breaking the circuit and connecting it in another way.

3. In an electric current reversing device, the combination with a reciprocable rotatable spindle, of a rod connected with the spindle to reciprocate with it, a pair of stops adjustable along the rod, a flanged tubular slide surrounding the rod, means in position to be engaged by the stops as the rod moves for engaging the flange of said slide and adapted when engaged by either stop to release the flanged slide, and a switch connected with said slide so as to be operated by its movement for breaking and making the circuit.

4. The combination with a tapping machine having a rotatable and reciprocable spindle, of a rod parallel with the spindle and mounted to move longitudinally but not circumferentially with it, a reversing box mounted in stationary position on the machine having a passage through it for the rod, a slide movable along the rod, yielding means for moving the slide in either direction, a pair of latches for engaging the opposite ends of said slide alternately, means whereby when the rod moves to a limiting position, one of the latches will be released to allow the slide to move in the opposite direction, and means connected with the slide for reversing the electric current.

In testimony whereof we have hereunto affixed our signatures.

BENJAMIN S. T. BISHOP.
PERCIVAL E. DOW.

CERTIFICATE OF CORRECTION.**Patent No. 1,640,177.****Granted August 23, 1927, to****BENJAMIN S. T. BISHOP ET AL.**

It is hereby certified that the name of the assignee in the above numbered patent was erroneously written and printed as "Lelland-Gifford Company", whereas said name should have been written and printed as "Leland-Gifford Company", as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 4th day of October, A. D. 1927.

Seal.

M. J. Moore,
Acting Commissioner of Patents.