Sept. 15, 1931. A. J. CAGLIOSTRO 1,823,853

CUTTING-OFF DEVICE

Original Filed Aug. 31, 1929 2 Sheets-Sheet 1

Fig. 1.

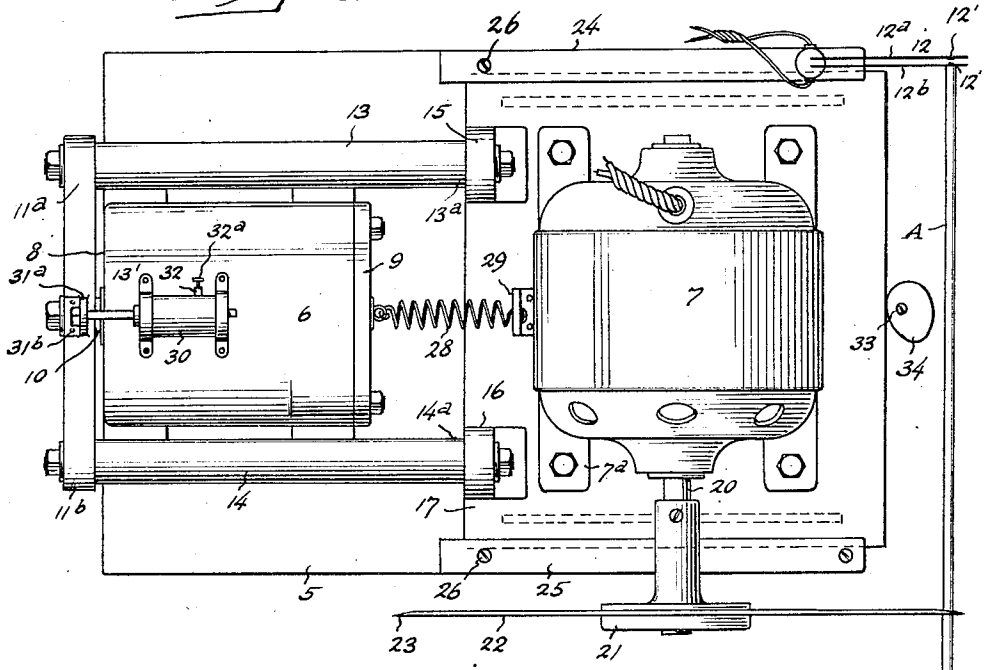


Fig. 6.

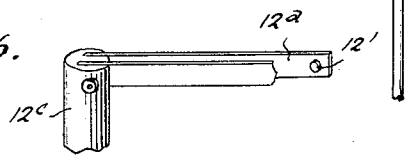


Fig. 4.

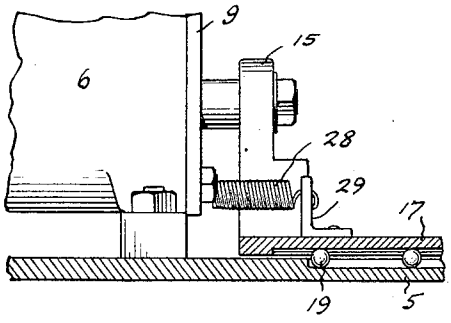
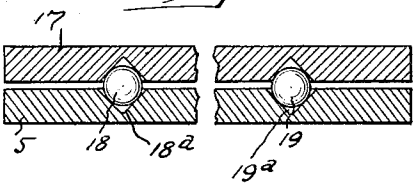


Fig. 5.



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Fig. 2.

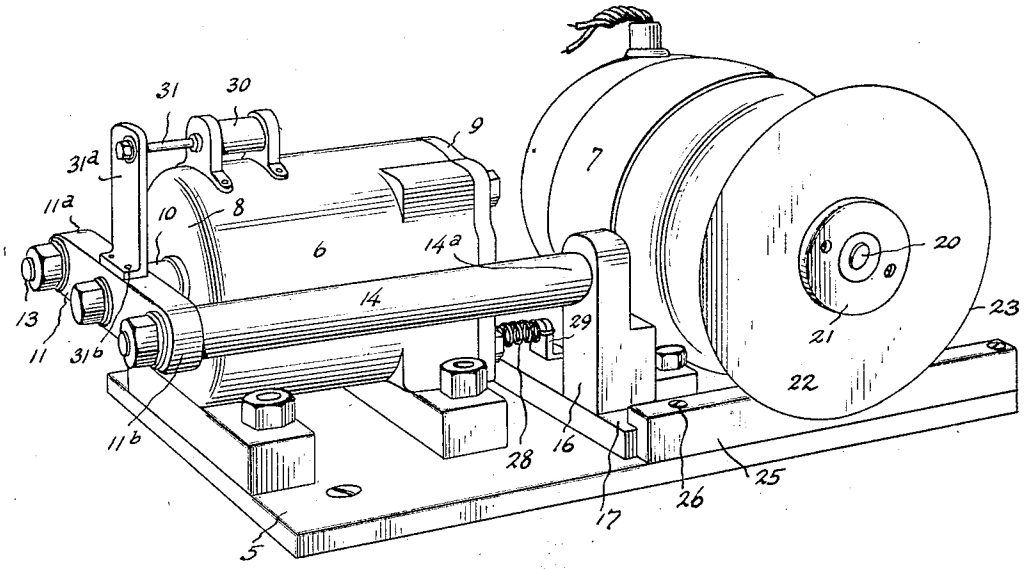
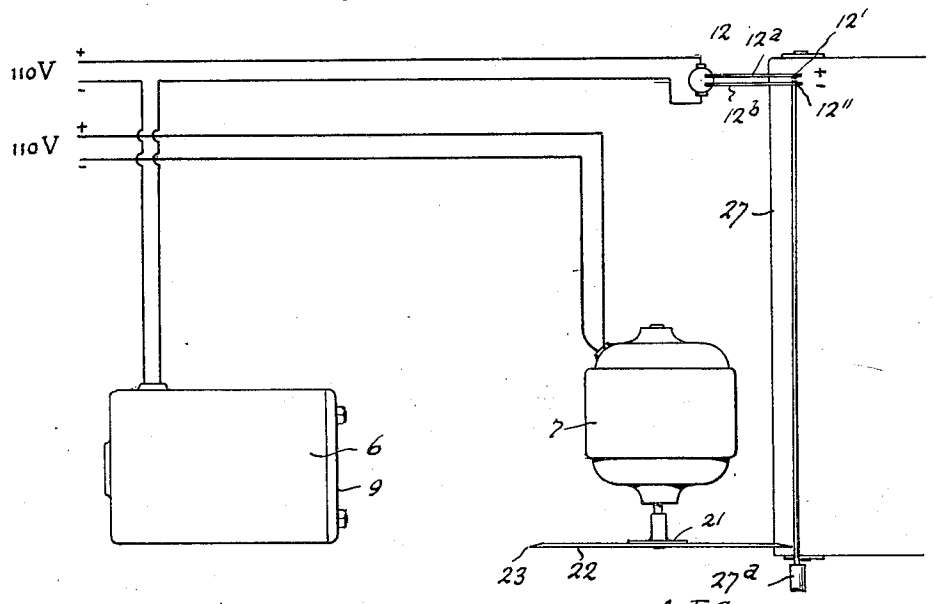


Fig. 3.



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UNITED STATES PATENT OFFICE

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CUTTING-OFF DEVICE

Application filed August 31, 1929, Serial No. 389,797. Renewed August 7, 1931.

This invention relates to improvements in automatic devices for performing predetermined operations upon work fed from a suitable source of supply, and its leading object is to provide a device which will be shifted to produce a predetermined physical effect on the work, which will be responsive to the slightest pressure of work against it.

Another object of the invention is the provision of a device which can be used for rapidly severing lengths of material, which will shift from a non-cutting position to a severing position, in response to material having small structural resistance, and accurately sever predetermined lengths thereof.

A still further object of the invention is the provision of a work engaging tool, such as a work severing rotating knife, with a motor for rotating the tool at high speed, and a solenoid shifting device, responsive to the slightest pressure of the work, to shift the knife and its motor to swiftly sever the work, without producing a crushing pressure against the same.

Other objects and advantages of the invention will be hereinafter specifically pointed out, or will become apparent, as the specification proceeds.

With the above indicated objects in view, the invention resides in certain novel construction and combination and arrangement of parts, clearly described in the following specification and fully illustrated in the accompanying drawings, which latter show an embodiment of the invention as at present preferred.

In the drawings:—

Fig. 1 is a plan view showing the motor driven cut-off tool engaging the work to be severed.

Fig. 2 is a view in perspective of the combined cut-off mechanism and automatic solenoid operated shifting device.

Fig. 3 is a diagrammatic view of the circuits for the motor and solenoid and the work controlled circuit closer therefor.

Fig. 4 is a fragmentary view, partly in elevation, and partly in vertical section, showing the sliding table for the motor.

Fig. 5 is another fragmentary view, in horizontal section, of the sliding table.

Fig. 6 is a detail view of the mounting for the sensitive contact arms of the work operated circuit closer.

Referring to the accompanying drawings in detail 5 designates a base large enough to support the solenoid 6 and the motor 7.

The solenoid 6 is provided with end walls 8 and 9, and is supported a short distance above the base 5. A rod 10 works through the end wall 8 and is bolted to the cross bar 11. The enclosed end of the rod is magnetically shifted by the energization of the solenoid, the coil or winding of which is in circuit with the work engageable circuit closer 12.

The outer ends 11*a* and 11*b* of the cross bar 11 are bolted to the push rods 13 and 14, the forward ends 13*a* and 14*a* of which are bolted to the brackets 15 and 16, respectively, which are themselves bolted to the horizontally shiftable table 17.

This table is slidable on the base 5 upon bearing balls 18 and 19, which work in V-shaped grooves 18*a* and 19*a* formed in the base 5. The grooves are of a length slightly in excess of the maximum travel of the table, so that oil can be retained in the grooves, to insure smooth and responsive sliding of the table on the base.

Upon the table 17 the motor 7 is mounted by its feet 7*a*. This motor is shown positioned upon the table 17 so that its shaft 20 is at approximately right angles to the axis of the solenoid, but this is a matter of detail, and any suitable angular position necessary to the particular operation to be performed, may be used.

The motor shaft 20 is shown to carry a

hub 21 on which a circular disc 22 is mounted, which has a cutting edge 23, designed to offer minimum resistance to the work. This cutting disc rotates at the speed of the motor shaft.

The table 17 is retained against vertical movement upon the base by means of the retaining plates or strips 24 and 25, which are secured in place by means of the screws 26, threaded into the base. These plates are secured so that they will not bind upon the outer edges of the table, but will prevent the table from becoming disengaged with the bearing balls, which operate in the grooves 18*a* and 19*a* formed in the base 5, and also in the grooves 18*b* and 19*b* formed in the table 17, in its underside. The grooves of the table terminate at points spaced from the ends of the table, so that the table will have a limited sliding motion upon the base. The retaining plates also serve to limit the sidewise play of the table upon the base.

The circuit closer 12 consists of two flexible metal strips 12*a* and 12*b*, which are supported upon the post 12*c*, of insulated material. These strips are insulated from each other on the post. The strip 12*a* carries a contact element 12′ and the strip 12*b* carries a contact element 12″; these two elements are designed to contact with each other and close the circuit through the solenoid.

The strips 12*a* and 12*b* are sufficiently long to be extremely sensitive, so that the innermost strip 12*b* can be moved into electrical contact with the strip 12*a* with very little pressure.

The free outer ends of the strips 12*a* and 12*b* are supported in the path of the work A, which, in this case, consists of the spirally wound paper tube, such as is generally used in public fountains for drinking soft beverages. A guide 27*a*, of any construction, directs the work against the circuit closer. The slightest pressure of the end of the paper tube or artificial straw against the strip 12*b* will bend it and bring the two contact elements 12′ and 12″ into contact with each other, thus closing the circuit through the solenoid.

The motor is constantly rotating, and when the solenoid is energized by the closing of its circuit, the motor is propelled by the pulling action of the solenoid upon its pull rod 10, which causes the cross bar 11 to push the rods 13 and 14, thus moving the table 17 and the electric motor mounted thereon. This will move the cutting edge of the rotating disc 22 against the work A, and because the cutting action is extremely rapid and very little pressure applied against the work, other than that due to the pressure of contact of the rapidly rotating cutting edge, the work will be cleanly severed, without the slightest crushing of the rather fragile paper tube or artificial straw.

The length of the portion severed from the work A is governed by the distance between the cutting edge 23 and the circuit closer 12. When the portion has been severed it will drop by gravity out of the path of the work and the next succeeding length of the work will be moved into engagement with the circuit closer.

The motor is automatically returned to its initial position by the action of the spring 28, one end of which is connected to the bracket 29 on the table 17, and the other end of which is connected to the end plate 9 of the solenoid. This spring exerts a central return pull upon the motor and its sliding table. When the severed portion of the work drops the circuit closer strip 12*b* separates from the closer strip 12*a* and the circuit through the solenoid will be broken, so that the pressure or pull exerted by the spring is fully effective to return the motor to its initial position on the base, and out of the path of the moving work.

The time consumed in the shifting of the solenoid may be controlled by means of the dash pot 30, which is mounted on the top of the solenoid and in which the piston rod 31 works. This rod is connected to the small lug 31*a* on the cross bar 11, by means of screw 31*b*. By removing these nuts the connection between the piston rod of the dash pot and the cross bar 11 will be broken and the dash pot will be cut out.

The dash pot is equipped with an air leak 32, which is regulated by means of the adjustable screw 32*a*. By turning this screw the orifice through which the air passes may be reduced or enlarged, so that the speed of discharge of the air from the dash pot may be controlled. The resistance offered by the dash pot is modified as the speed varies, the faster the discharge of air, the more rapid will be the sliding movement of the table 17 and the motor carried thereby. The dash pot is also provided with an inlet air valve.

By mounting a chuck or tool head upon the motor shaft, metal, wood, or other material may be acted upon and any predetermined forming, facing, cutting or severing action within the possibilities of the tool selected, may be accomplished.

When the material to be acted upon is tenacious the use of the dash pot for regulating the speed of the shifting of the motor, will insure the proper advance of the cutting edge against the work, so that the pressure upon the cutting tool will be best suited for the conditions presented.

The stroke of the sliding table may be varied by means of cam 33, which is secured in adjusted position on the base 5 by means of the screw 34. Another device, as an ad-

justing abutment screw may be employed for this purpose.

The hereinbefore described construction admits of considerable modifications without departing from the invention; therefore, I do not wish to be limited to the precise arrangements shown and described, which are, as aforesaid, by way of illustration merely. In other words, the scope of protection contemplated is to be taken solely from the appended claims, interpreted as broadly as is consistent with the prior art.

I claim as new:—

1. In combination, a motor driven work engaging tool, a slide upon which the tool is moved to and from work engaging position, ball bearings upon which the slide moves, rods connected with the slide, a solenoid, a rod for the solenoid, a cross bar connected to said rod and to the first named rods, a work actuated circuit closer, and a circuit for the solenoid controlled by the circuit closer.

2. In combination, a base, a slide movable on the base, balls between the slide and base upon which the slide moves, a motor mounted on the slide, a shaft for the motor having a work engaging tool, a solenoid, connections between the solenoid and the slide by which the slide is shifted when the solenoid is energized, and means for closing the circuit through the solenoid.

3. In combination, a base provided with ball trackways, bearing balls sliding in said trackways, a slide having similar trackways to receive the bearing balls, a motor mounted upon the slide and having a cutting tool on the shaft thereof, a solenoid having a magnetically shifted rod, a cross bar connected to the rod, rods connecting the cross bar to the slide, and a sensitive work engaging circuit closer controlling the circuit through the solenoid.

4. In combination, a base, a slide, ball bearings between the slide and base upon which the slide rests, a motor mounted upon the slide and having a cutting tool on the shaft thereof, a solenoid, a rod adapted to be shifted when the solenoid is energized, means connecting said rod to the slide, a spring for moving the slide and motor in the opposite direction to that moved by the solenoid, and a circuit closer for controlling the circuit through the solenoid.

5. In combination, a base, a slide, ball bearings between the slide and base, a motor mounted on the slide, a solenoid, a rod shiftable by the energizing of the solenoid, means connecting the rod to the slide, a spring for moving the slide and motor in the opposite direction to that of the solenoid, a circuit closer engageable by work to be acted upon for closing the circuit through the solenoid, and a tool carried by the shaft of the motor for engaging work in engagement with the circuit closer.

6. In combination, a base, a slide movable thereon, a motor on the slide, a work engaging tool mounted on the shaft of the motor, a solenoid, a rod connected with the solenoid and shiftable thereby, means connecting the rod to the slide, a circuit closer for the solenoid, and means for regulating the speed of the shifting.

In testimony whereof I hereby affix my signature.

ANTONY J. CAGLIOSTRO.