

Jan. 14, 1930.

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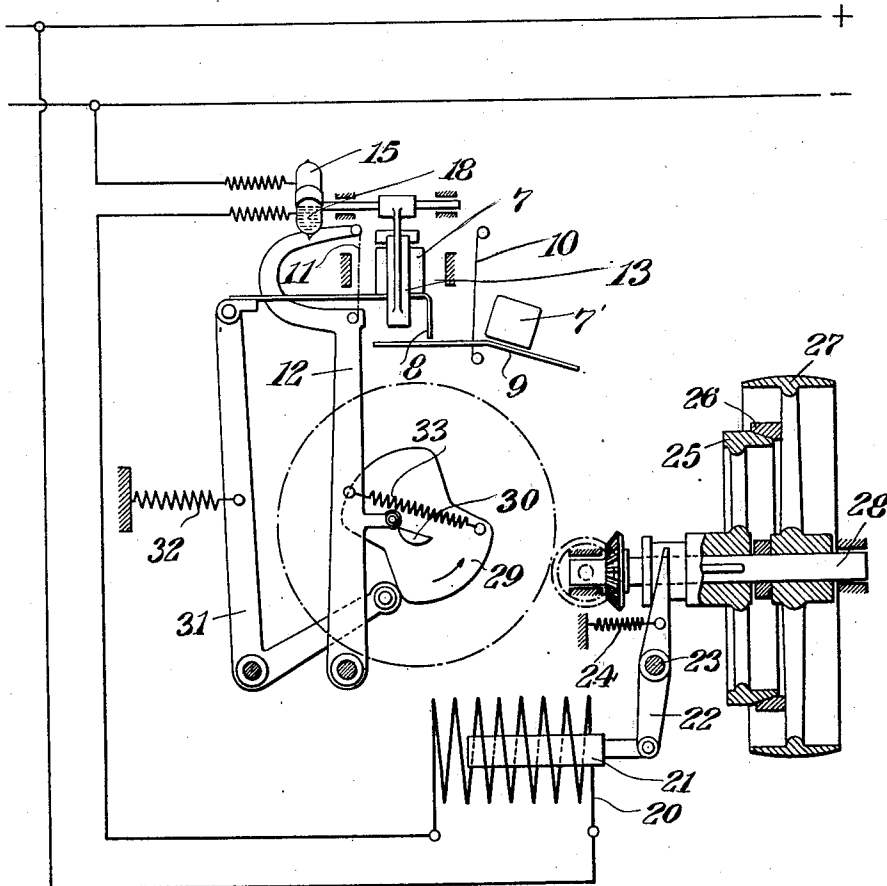
1,743,299

CUTTING MACHINE

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3 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

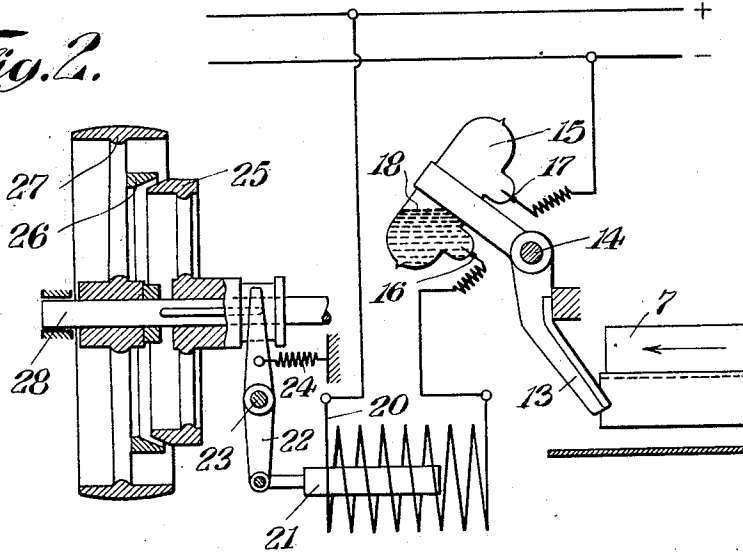
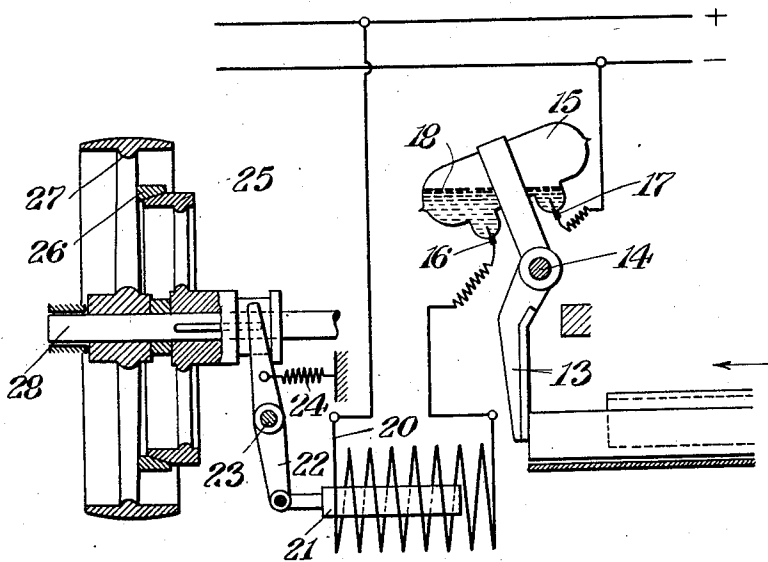


Fig. 3.



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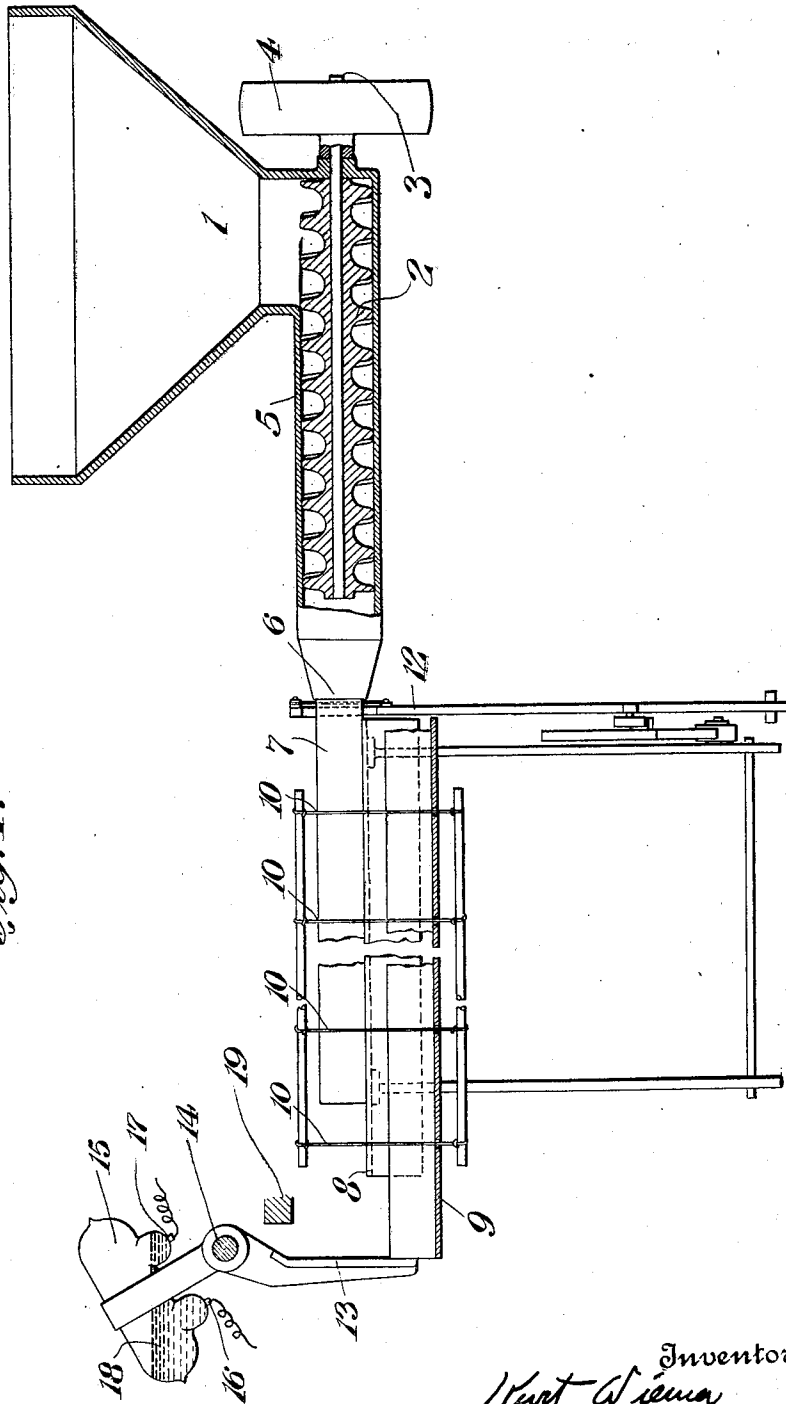
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CUTTING MACHINE

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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CUTTING MACHINE

Application filed January 6, 1927, Serial No. 159,487, and in Germany July 23, 1926.

The present invention relates generally to cutting machines of a type adapted to sever strands of plastic material into predetermined lengths as, for example, in the manufacture of soap where a strand of soap corresponding approximately in cross section to the cross section of the finished cake is extruded from a machine called a "plodder" and thereafter severed into predetermined lengths. The invention relates more particularly to means for controlling the action of the cutting machine, and the principal object of the invention is to provide a control mechanism which will be simple and efficient in operation and which will insure the cutting of the strand efficiently and uniformly.

In one type of previously known machines of this character the construction is such that the strand issuing from the plodder displaces an abutment when it has attained a certain length, whereby the cutting devices are set into operation through a train of mechanical connections. In another type of construction the cutting device is arranged to operate periodically at uniform intervals, depending upon the speed of the driving shaft. Machines of the first type are unsatisfactory in that the soft plastic strand is apt to twist, become burred or otherwise injured by reason of the power which it must transmit to the abutment for the operation thereof, and the strand may often bend and become displaced so that it is no longer capable of properly actuating the abutment. Machines of the other type are unsatisfactory in that they operate to cut off unequally long pieces, because the speed at which the strand issues from the plodder cannot be maintained constant.

The present invention overcomes these difficulties and enables the strand to be subdivided into pieces of uniform length and provides mechanism which may be actuated by the advancing strand so lightly and with such little application of power that any injury to the strand is effectively prevented.

The accompanying drawings shown semi-diagrammatically a preferred embodiment of the invention which has been selected for pur-

poses of illustration and description herein. Referring to these drawings,

Figure 1 is a diagrammatic end elevation of a machine embodying the present invention,

Figures 2 and 3 are diagrammatic views illustrating the operation thereof, and

Figure 4 is a diagrammatic front elevation thereof.

The plodder or press from which the strand of plastic material is extruded, is illustrated in Figure 4 of the drawing and as there shown consists of a hopper 1, a worm 2 mounted upon a shaft 3 carrying a drive pulley 4 and enclosed within chamber 5. As will be readily understood, the worm acts to mix the plastic mass and to extrude it through an orifice 6.

The cutting machine is located in position to receive the strand 7 of plastic material as it issues from the plodder. This cutting machine may be of any suitable construction, the type illustrated being adapted to receive and sever a long strand from the plodder and thereafter subdivide this strand into a number of smaller pieces of uniform length. The construction illustrated in the drawing comprises a moveable table 8 upon which the strand is received. This table is mounted to reciprocate transversely of the path of the movement of the strand 7, its reciprocation being controlled in a manner hereinafter described. A fixed table 9 is mounted below the level of the movable table 8 and the face of the latter is adapted to act as a plunger to force the long severed strand against cutting wires 10 to subdivide the strand into smaller pieces of uniform length. A suitable cutting device is arranged to sever the strand adjacent the mouth of the plodder when a proper length has been extruded on to the table 8. This cutting device includes a cutting wire 11 carried by an arm 12 which is operated as hereinafter described.

In the path of movement of the strand 7 as it issues from the plodder is an abutment 13 pivoted at 14 and arranged to operate an electrical switch. Herein a mercury tilting switch 15 is mounted upon an extension of abutment 13 beyond its pivot. This switch

contains two contacts 16 and 17 isolated from each other but adapted to be connected by a body of mercury 18 contained within the switch whenever the switch is rotated to such a position that the two contacts are beneath the surface of the mercury. The arrangement is such that in a condition of rest, that is, when the abutment 13 is not moved by the strand 7, it rests against the fixed stop 19 and the contacts 16 and 17 are not connected by the mercury but as soon as the abutment 13 is moved away from the stop 19 by the action of the strand 7 the contacts 16 and 17 will be connected. These contacts form parts of an electrical circuit illustrated in Figures 1, 2 and 3. This circuit also includes a solenoid 20 containing a core 21 connected to a lever 22 pivotally mounted at 23. A spring 24 is provided tending to rotate the lever 22 against the action of the solenoid 20. The free end of lever 22 is adapted to force a friction disc 25 into engagement with a friction disc 26 or to hold the same out of engagement therewith. The friction disc 26 is fixed to a drive pulley 27 which is rotatively mounted upon a shaft 28 while the friction disc 25 is keyed to the shaft 28.

Suitably geared to the drive shaft 28 are two cams 29 and 30. Cam 29 is adapted to actuate the lever 31 which is connected to the reciprocating table 8 and cam 30 is adapted to actuate the lever 12 which carries the cutting wire 11. The end of the lever 31 is held against the cam 29 by a spring 32 and lever 12 is connected with cam 29 by a spring 33.

As shown in Figure 1 the table 8 is substantially in mid-position and is adapted to be reciprocated from this position to the left until the strand 7 drops on to the fixed table 9 and then to be reciprocated to the right so that the severed length of strand 7 will be pressed against the cutting wires 10 by the depending edge of the table 8 while another length of strand is being extruded from the plodder on to the top of the table. The small pieces of the strand 7 as they appear beyond the cutting wires 10 are illustrated by 7'. Cam 29 is so designed that movement through 180° will produce this complete cycle of operation in the table 8.

The lever 12 is so related to the cams 30 and 29 that when the table 8 is approaching its limit of movement to the left the cutting wire 11 will be rapidly moved across the path of the strand 7 by the spring 33, the cam 30 having released the lever for such movement. Thereafter the spring 33 which is attached to cam 29 at its outer end moves around and is positioned to urge the lever 12 in the opposite direction as soon as it has been released by the cam 30. Thus at the proper time in each cycle of operation of the lever 12 the cutting wire 11 crosses the path of the strand

first toward the right and then during the next cycle of operation toward the left.

Figure 2 shows the switch mechanism in its position of rest just prior to its operation by the advancing strand 7. When the circuit is open the friction discs 25 and 26 are held apart and the cutting mechanism is inactive. In Figure 3 the parts are shown in the position they would assume during the operation of the cutting mechanism with the electrical circuit closed and the friction discs 25 and 26 engaging each other to drive the shaft 28 and cams 29 and 30, while in Figure 1 the parts are shown just after the beginning of the operation of the cutting mechanism and before the strand 7 has dropped from the table 8 on to the table 9, in which latter position it is shown in Figures 3 and 4.

The operation of the machine may be briefly summarized as follows: With the control switch in the position shown in Figure 2 and the strand 7 advancing from the plodder toward the abutment 13 the friction discs 25 and 26 will be out of engagement, the arm 20 with its cutting wire 11 will be approximately in the position shown in Figure 1 and the table 8 will be at the limit of its movement to the right in Figure 1, the arm 31 resting upon the high point of the cam 29. As soon as the strand 7 moves the abutment 13 sufficiently to bring about a connection between the contacts 16 and 17 of the switch 15, the electrical circuit through the solenoid 20 will be closed and move the core 21 inwardly so as to bring the friction discs 25 and 26 into contact with each other. This causes rotation of the drive shaft 28 and the cams connected therewith. As soon as the high point of the cam 29 passes the end of the lever 31, table 8 will start its movement to the left, as shown in Figure 1. As this movement proceeds beyond the point shown in Figure 1, the arm 12 will be released from cam 30 and spring 33 will move the cutting wire 11 to the right to sever the strand 7. Then as the table 8 reaches the limit of its movement to the left in Figure 1, strand 7 will drop on to the table 9 and the outer end will continue to hold the swinging abutment in the position shown in Figure 3. Table 8 now moves to the right in Figure 1, pressing the severed strand 7 against the cutting wires 10 and during this action receiving the next strand upon the top of the table. As soon as the severed strand 7 has been advanced toward the cutting wires and moved out of alignment with the abutment 13 the latter will swing back to the position shown in Figure 2 thus breaking the electrical circuit and disengaging the friction clutch. The cutting mechanism will now remain at rest until the advancing end of the succeeding strand again rotates the abutment 13 and causes the above described cycle of operations to be repeated.

It is to be understood that the abutment 13 and switch 15 shown in the drawing are diagrammatic only and that in actual practice this abutment and switch will be so constructed and balanced that a very slight pressure on abutment 13 will swing the same into position to close the electrical circuit. It will be further understood that the invention may be variously modified and embodied within the scope of the subjoined claims.

I claim as my invention:

1. In a machine for cutting strands of plastic material the combination of strand forming and feeding means, a plurality of independently functioning cutters, and electrical control means including a strand operated abutment and a tiltable fluid contact switch movably connected therewith to cause relative movement of the strand and cutters.
2. In a machine for cutting strands of plastic material the combination of strand forming and feeding means, a plurality of independently functioning cutters, means to move the strand and cutters relatively, and strand actuated electrical control means including a tiltable fluid contact switch for said moving means.
3. In a machine for cutting strands of plastic material the combination of strand forming and feeding means, a plurality of independently functioning cutters, means to cause relative movement of the strand and cutters including an electrically controlled clutch therefor, and a switch in circuit with said clutch mechanism and adapted to be operated and retained in operated condition until said movements have been approximately completed by contact with the strand of plastic material.
4. A machine for cutting strands of plastic material having in combination with means for feeding said strands, a transversely movable table for receiving a length of strand, a cutter for severing said length of strand, a fixed table, a stop arranged adjacent said movable table for pushing said length of strand therefrom and upon said fixed table when the movable table travels in one direction, means on said movable table for pushing said length of strand over said fixed table when the movable table travels in the other direction, and means to cut said length when located upon the fixed table into a plurality of smaller portions and an abutment engaged and moved by the strand when located on the movable table and remaining engaged with the strand when the strand falls upon the fixed table, said abutment comprising part of a control means for said cutter and said movable table.

In testimony whereof, I have signed my name to this specification this 18th day of November, 1926.

KURT WIEMER.