June 7, 1932. H. P. FORTÉ 1,862,360

SOAP CUTTING MACHINE

Filed Dec. 14, 1929 4 Sheets-Sheet 1

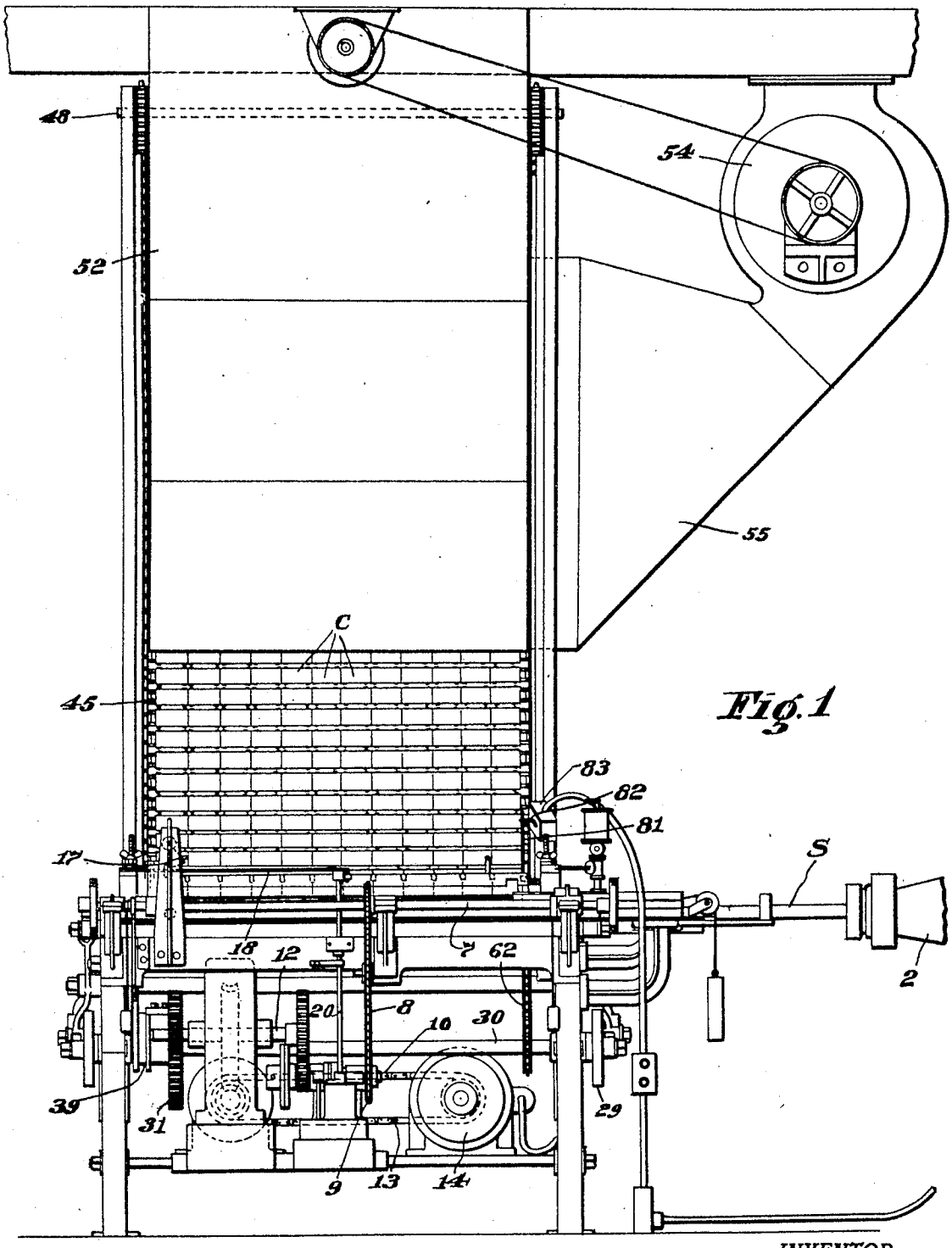


Fig. 1

INVENTOR
Harry P Forté
BY
Munn & Hyde
his ATTORNEY

June 7, 1932. H. P. FORTÉ 1,862,360

SOAP CUTTING MACHINE

Filed Dec. 14, 1929 4 Sheets-Sheet 2

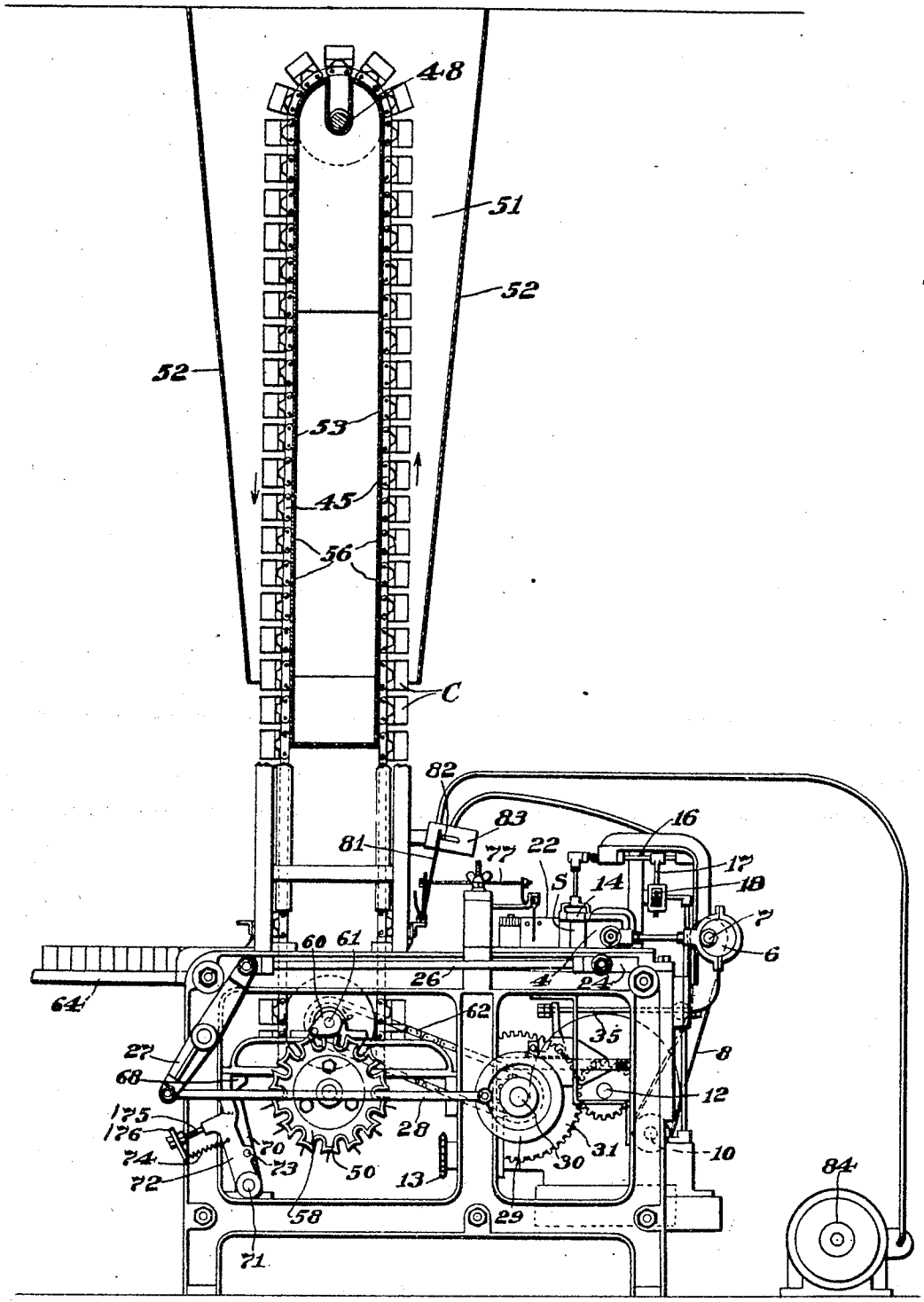


Fig. 2

INVENTOR
Harry P. Forté
BY Thurston & Hyde
ATTORNEY

June 7, 1932. H. P. FORTÉ 1,862,360

SOAP CUTTING MACHINE

Filed Dec. 14, 1929 4 Sheets-Sheet 3

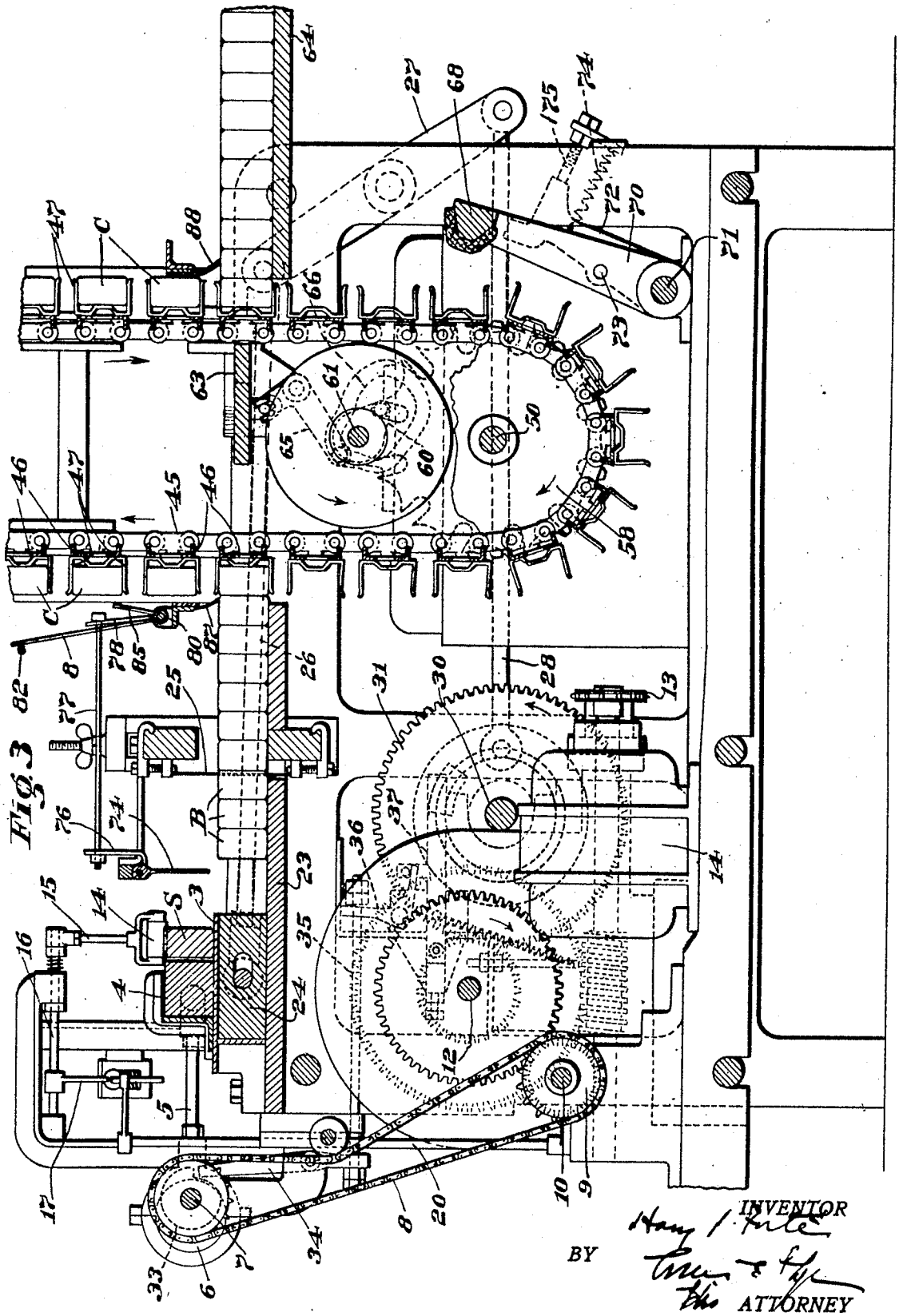


Fig. 3

INVENTOR
Henry P. Forté

BY
Cushman & Fyke
his ATTORNEY

June 7, 1932. H. P. FORTÉ 1,862,360

SOAP CUTTING MACHINE

Filed Dec. 14, 1929 4 Sheets-Sheet 4

Fig. 4

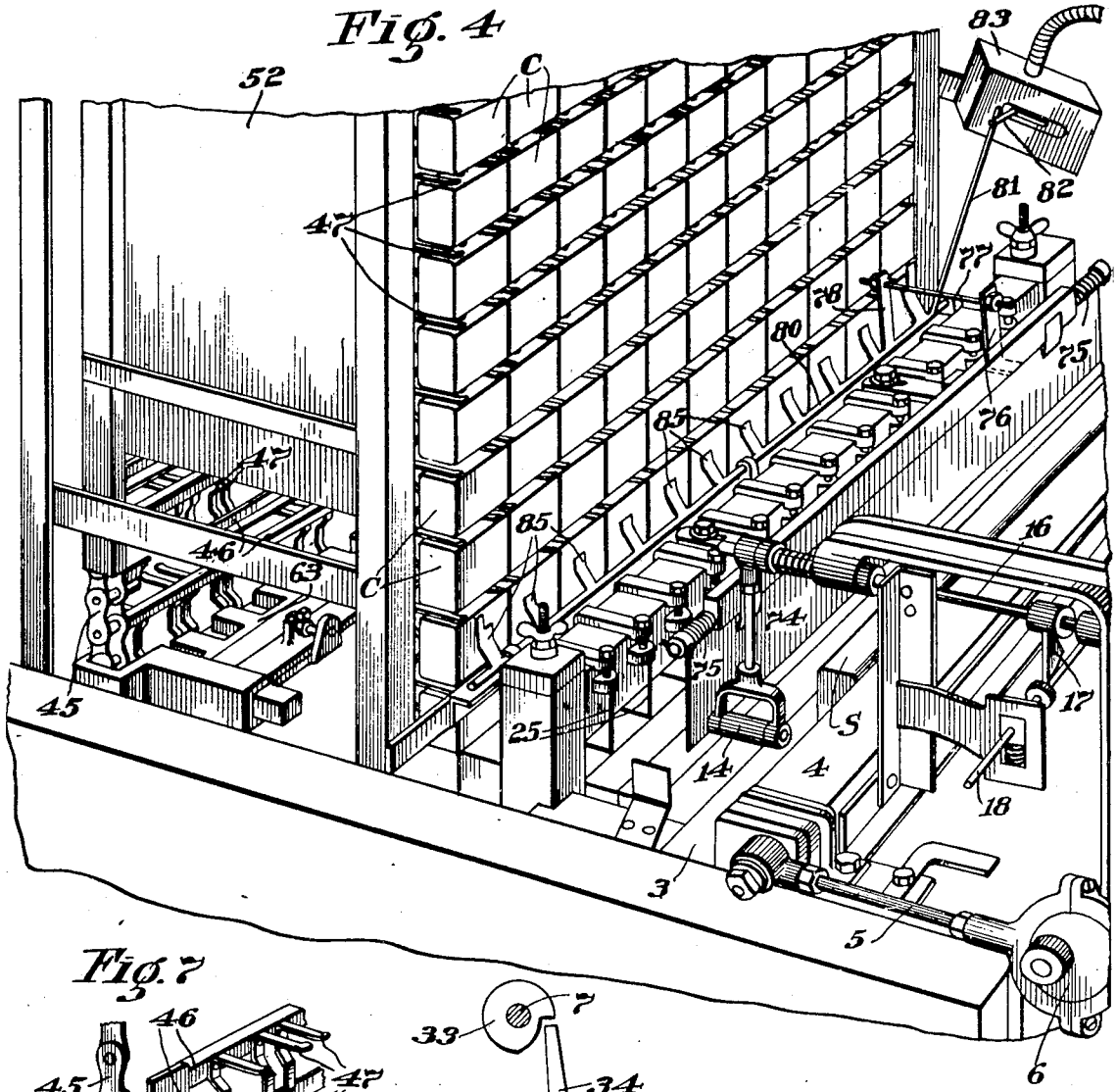
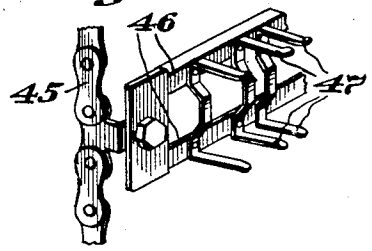


Fig. 7



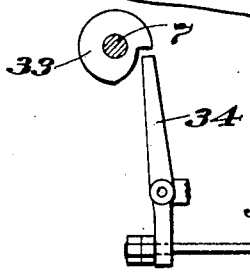


Fig. 5

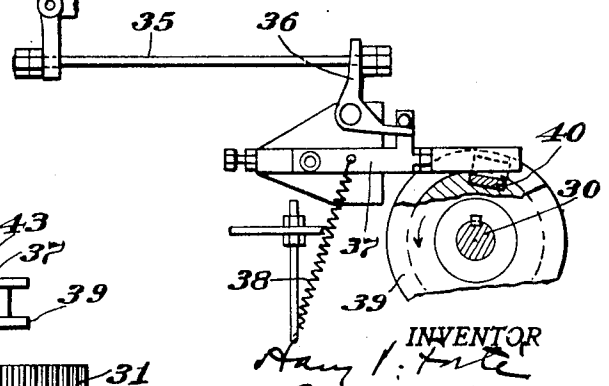
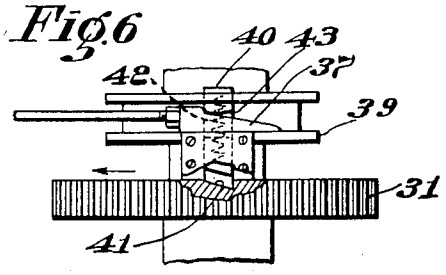


Fig. 6



INVENTOR

Harry P. Forté

BY

ATTORNEY

/86

Patented June 7, 1932 1,862,360

UNITED STATES PATENT OFFICE

HARRY P. FORTÉ, OF NEWTON, MASSACHUSETTS, ASSIGNOR TO LEVER BROTHERS COMPANY, OF CAMBRIDGE, MASSACHUSETTS, A CORPORATION OF MAINE

SOAP CUTTING MACHINE

Application filed December 14, 1929. Serial No. 414,035.

This invention relates to soap cutting machines and will be herein disclosed in connection with a machine of the character shown and decribed in Patent No. 1,591,556, granted July 6, 1926, and assigned to the assignee of the present invention.

While the machine shown in said patent represents a substantial advance in this art, it is, nevertheless, open to certain objections which the present invention aims to overcome. For example, in said machine a plunger is provided to carry the strip of soap extruded from the plodder against a knife to sever the strip and form a long bar which then is delivered to a second plunger, the latter plunger carrying the severed strip or bar against the wires which cut the strip into cakes. The second plunger is operated continuously, and it may happen that when the first plunger pushes the strip into the range of operations of the second plunger the latter will be so positioned that the long bar of soap will be tipped over. It is one of the objects of the invention, therefore, to substantially eliminate any possibility of this action occurring.

Soap cutting machines usually are operated in connection with a plodder from which the soap is extruded in a continuous strip. In order for it to extrude properly it is necessary that the soap have a definite consistency. I have found that the subsequent operations on the soap can be facilitated by drying or cooling the soap, or both. It is therefore a further object of this invention so to combine a drying or cooling apparatus with the cutting mechanism that the condition of the soap may be improved without adding materially to the labor involved in operating the machine.

In addition to the foregoing the invention also aims to improve machines of this character with a view to making them more completely automatic, avoiding the production of misshapen cakes, enabling the machine to take care of itself automatically in emergencies, particularly those which might result in the jamming of the machine for any reason, and generally to improve and perfect apparatus of this character.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawings, and the novel features will be particularly pointed out in the appended claims.

In the drawings,

Figure 1 is a front elevation of a machine embodying this invention;

Fig. 2 is a side view, partly in section, of the machine shown in Fig. 1;

Fig. 3 is a vertical sectional view illustrating parts of the machine shown in Figs. 1 and 2;

Fig. 4 is a perspective view showing certain features of the machine;

Fig. 5 is a side elevation, partly in section, showing the connections for operating a single revolution clutch which will later be referred to;

Fig. 6 is a plan view of part of the mechanism shown in Fig. 5; and

Fig. 7 is a perspective view illustrating certain details of the conveyor.

As above indicated, the machine is designed more especially for use in connection with a plodder, and the die end or discharge end of the plodder is shown in Fig. 1 at 2. The strip of soap S extruded from the plodder moves across the surface of a supporting plate 3, best shown in Figs. 3 and 4, and immediately in front of a plunger 4 which normally occupies the position in which it is shown in Figs. 3 and 4. The operating mechanism for this plunger comprises two pitman rods, one of which is shown at 5, these rods being connected, respectively, to opposite ends of the plunger and arranged to be operated by eccentrics 6 on a horizontal shaft 7. Normally this shaft is stationary but it is connected by a chain 8 to a sprocket wheel 9 loosely mounted on a shaft 10 geared to a third shaft 12 which is driven through worm gearing and the chain 13 from an electric motor 14.

As the end of the strip of soap S slides across the surface of the supporting plate 3, it strikes a roll 14 carried by an arm 15 which is secured on a rock shaft 16 and swings this rock shaft. This movement is transmitted

through an arm 17 to a rod 18, causing this rod to move longitudinally. At its right-hand end, Fig. 1, this rod is connected with an upright rock shaft 20 which operates a clutch on the shaft 10 causing the sprocket wheel 9, which normally is idle, to make a single revolution. This motion is transmitted through the chain 8 to the shaft 7 and produces one complete reciprocation of the plunger 4. Such a movement of the plunger pushes the strip of soap S forward off the supporting plate 3 and carries it against the edge of a knife 22, Fig. 2, which severs the strip, the long bar or section of the strip so formed dropping on to the upper surface of the table 23.

The construction so far described is like that shown and described in the patent above designated in all essential respects, differing from it only in minor details of construction. This arrangement is old and therefore forms no part of the present invention, but is described here because of its relationship to features of the machine which do form parts of this invention.

The plunger 4 immediately retires to its normal position again, as shown in Fig. 3, where it is out of the way of the strip S of soap being extruded. The bar or strip which has been cut off is now positioned in front of a second plunger 24 mounted to reciprocate on the upper surface of the table 23 and serving to push the severed strips or bars B, Fig. 3, against the series of wires 25 which cut the strip into short bars or cakes of approximately the size commonly used. This cutting operation is performed as the strips B are pushed one ahead of the other across the upper surface of the table 23.

An important feature of this invention resides in the mechanism for operating the lower plunger 24 and the relationship between this mechanism and that for operating the upper plunger 4. Referring more particularly to Figs. 2 and 3 it will be seen that a pitman rod 26 connects one end of the plunger 24 with the upper end of a lever 27, the lower end of which is connected by a link 28 to an eccentric pin projecting from a disk 29, the disk being secured fast on a shaft 30. A gear 31 loose on this shaft is geared to the shaft 12 and revolves continuously, the latter shaft, as above stated, being driven through its connections with the motor 14.

Normally the plunger 24 is held at the forward limit of its stroke, as shown in Fig. 3, but when the upper plunger 4 is brought into operation in the manner above described due to the rotation of the shaft 7, a cam 33, Figs. 3 and 5, fast on this shaft trips a single revolution clutch which connects the shaft 30 to the gear 31 and compels the two to rotate together for one complete revolution. The connections operated by the cam 33 include a lever 34, the upper end of which is arranged to be engaged and moved by the cam, while its lower end is connected by a rod 35 to the trip lever 36 of the clutch. Any suitable form of single revolution clutch may be used. The particular clutch construction shown comprises a latch 37, Fig. 5, normally held down by a spring 38 but arranged to be lifted by the trip lever 36. The rearward end of this latch rides in the channel of a grooved disk 39 secured fast on the shaft 30, and it has a tapered or wedging surface, as best shown in Fig. 6, to engage the shoulder of a sliding dog 40, the forward end of this dog being adapted to enter the notch 41 in the gear 31. When the trip lever 36 is moved in a counter-clockwise direction through the action of the cam 33, it raises the latch 37 and allows a spring 42 to slide the dog 40 forward where it will positively connect the gear 31 with the disk 39 and compel the latter and the shaft 30 to revolve with the gear in the direction indicated by the arrow. Just before the shaft completes one revolution, the thin end of the latch 37 engages the shoulder 43, Fig. 6, of the dog 40 and forces its backward, thus interrupting the driving connection between the gear 31 and disk 39. The dog also strikes a shoulder on the latch 37 and definitely stops the rotation of the shaft so that the movement of the plunger 24 is stopped when it has moved back under the upper support 3. Parts corresponding to those shown at 26, 27, 28 and 29 are mounted at the opposite side of the machine and cooperate with the far end of the plunger 24.

It will thus be observed that the operating mechanism for the lower plunger 24 is under the control of the operating mechanism for the upper plunger 4, and that the movement of the former plunger takes place in a predetermined time relationship to the operation of the latter. The timing is such that the lower plunger does not begin to move forward until after the strip of soap has been pushed off the supporting plate 3 and has dropped on to the table 23 in front of the lower plunger.

The movement of the lower plunger 24 also is utilized to deliver the cakes of soap to the dryer. This dryer comprises an endless conveyor 45, preferably located in an upright position, and a drying chamber through which the soap is carried by said conveyor. The conveyor includes two endless sprocket chains spaced apart and connected by bars 46, each bar carrying a series of fingers or grippers 47 adapted to carry cakes C of soap. The conveyor is supported by two pairs of sprocket wheels mounted on upper and lower shafts 48 and 50, respectively.

The drying chamber 51, Fig. 2, is in a sheet metal enclosure 52 and partly surrounds an air box or chamber 53 which is located between the two upright runs of the conveyor 45, as best shown in Fig. 2. Air under pres-

sure is forced into the air chamber 53 by a blower 54, Fig. 1, the air being conducted from the blower into one end of the chamber by a funnel 55. The air so entering the chamber is discharged through a multitude of apertures 56, Fig. 2, into the drying chamber 51, and is exhausted at the top of this chamber. Due to this arrangement the air is forced between the top and bottom surfaces of the cakes of soap and also flows upwardly past both the inner and outer surfaces of the cakes. Also, since the soap preferably is cut into cakes before it is delivered to the conveyor, part of the air passes between the end surfaces of adjacent cakes. All of the surfaces of the cakes, therefore, are cooled and dried to a considerable degree since the movement of any individual cake through the drying chamber is relatively slow.

Because of the fact that the plunger 24 is utilized to force the cakes of soap into the conveyor, the movements of the conveyor must be properly timed with reference to those of the plunger. For this purpose the driving mechanism for the conveyor preferably consists of a Geneva wheel 58, Figs. 2 and 3, fast on the shaft 50 and driven by a Geneva driver 60 secured on a shaft 61 which is connected by a chain 62, Fig. 2, with a sprocket wheel fast on the shaft 30. As above stated, this shaft is driven through the single revolution clutch which transmits motion to the lower plunger 24. Consequently, the Geneva driver 60 is given only a single revolution and then stops. Only a small part of each revolution is utilized in rotating the Geneva wheel, the wheel remaining stationary during the greater part of each revolution so that ample time is afforded between the movements of the conveyor for the forcing of the cakes of soap into the pockets or between the grippers of the conveyor.

At approximately the same time that a row of grippers at one side of the conveyor are being loaded with soap, an ejector is forcing the soap out of a corresponding series of grippers at the opposite side of the conveyor. This ejector is shown at 63 in Figs. 3 and 4, and it consists of a bar mounted between the runs of the conveyor and provided with fingers for engaging the individual cakes of soap and forcing them out of the grasp of the grippers and on to a delivery table 64. It is operated by two bell crank levers, one of which is shown at 65, Fig. 3, this lever being operated by a cam 66 fast on the shaft 61. Preferably the shape of this cam is such that it produces a relatively quick motion of the ejector into engagement with the cakes of soap, causes the ejector to pause as it makes said engagement, and then produces a relatively quick ejecting movement of the cakes of soap.

There is some tendency for the soap to stick to the fingers or grippers 47 of the conveyor and a cleaning device, therefore, is provided comprising a bar 68, Fig. 3, the forward surface of which is covered with felt. This bar is supported on arms, one of which is shown at 70, these arms being mounted on a rock shaft 71. An arm 72 also mounted on the rock shaft 71 is connected with one of the arms 70 by a pin 73, and the upper end of this arm 72 is arranged to be struck by the lever 27 during the period when the plunger 24 is moving forward and when the conveyor consequently is stationary. This results in carrying the felt covered face of the bar 68 between a row of pairs of fingers on the conveyor, and the bar then is drawn backwardly by a spring 74 acting on the arm 72. Another arm like the arm 72 is positioned at the opposite end of the bar 68. A stop screw 175 threaded through a stationary bracket 176 limits the backward movement of the arm 72. The bracket also serves to anchor one end of the spring 74. This wiping of the fingers removes a very substantial part of the soap which otherwise would stick to them.

The invention also involves provision for automatically stopping the plodder in the event of a jam occurring in the machine. Such a jam may be caused by a variety of conditions, particularly those having to do with the consistency or physical characteristics of the soap when it is delivered to the cutting mechanism by the plodder. In the event that the strip of soap tips over in front of the upper plunger 4, or a jam occurs at this point for any reason, the plunger will force the misplaced soap against a plate 74, Figs. 3 and 4, which is hinged at its upper edge and normally is held by coiled springs 75—75, Fig. 4, in a substantially upright position. An arm 76 is secured rigidly to this plate, and when it is swung in the manner just described its movement will be transmitted through a rod 77 to an arm 78 of a rock shaft 80 having a rod 81 rigidly secured thereto and arranged to strike and operate the handle 82 of an electric switch enclosed in the case 83. This switch controls the operation of the electric motor 84, indicated diagrammatically in Fig. 2, which drives the plodder. Consequently, a jam created in the manner just described automatically shuts down the plodder. Since the cutting machine is operated only when there is soap in it to be cut, the stopping of the plodder also results in stopping the entire assembly.

A part of this same stop mechanism also is utilized to shut down the plodder in the event that a cake of soap is misplaced in the conveyor 45. That is, the rock shaft 80, previously referred to, is provided with a series of fingers 85 each positioned slightly in front of the path of travel of the cakes of soap. If any cake is projecting too far

in front of the grippers 47 it will strike one of the fingers 85 and rock the shaft 80, thus throwing the switch in the casing 83 in the manner above described. The series of fingers 85 is located between the point at which the soap is forced into the conveyor and the point at which it enters the drying chamber so that only a very short travel of a misplaced cake is required to shut down the machine.

In delivering the cakes of soap to the conveyor each cake is forced into the grasp of its respective pair of grippers 47 by the cakes behind it, as will be clear from an inspection of Fig. 3, and as the cakes move off the rearward edge of the table 25 there is some tendency for them to tip.

In order to overcome this tendency a fairly firm but resilient strip of rubber 87, Fig. 3, is positioned to engage the upper edges of the cakes and to steady them as they are moved off the table and into the conveyor. A similar strip of rubber 88 is also arranged to engage the upper edges of the cakes as they are discharged from the conveyor by the ejector 63.

It will be clear from the foregoing description that the invention provides a machine which not only is automatic to a much higher degree than prior soap cutting machines, but which also performs functions additional to those of prior machines. Moreover, the liability of interruptions in production have been reduced very materially, and a machine has been provided which is so organized that it will take care of itself under emergency conditions. These factors are important in reducing the labor expense involved in cutting the soap and preparing it for the subsequent pressing or packing operations, as the case may be.

While I have herein shown and described a preferred embodiment of my invention, it will be understood that the invention may be embodied in other forms without departing from the spirit or scope thereof, and that the invention is not limited in its application to a machine of the construction shown in the patent above designated.

Having thus described my invention, what I desire to claim as new is:

1. In a machine cutting soap issuing from a plodder, the combination of a support for receiving a strip of soap as it is extruded from the plodder, means for cutting said strip, a reciprocating plunger for pushing said strip off said support, a second support for receiving said strip, a second plunger for pushing said strip across the surface of said second support, and mechanism for operating said second plunger including means for maintaining said operation in a definite time relationship to the operation of the first plunger.

2. In a machine cutting soap issuing from a plodder, the combination of a support for receiving a strip of soap as it is extruded from the plodder, means for cutting said strip, a reciprocating plunger for pushing said strip off said support, a second support for receiving said strip, a second plunger for pushing said strip across the surface of said second support, and operating mechanisms for said plungers, the operating mechanism for the second plunger being under the control of that for the first plunger.

3. In a machine for cutting soap issuing from a plodder, the combination of a support for receiving a strip of soap as it is extruded from the plodder, a reciprocating plunger for pushing said strip of soap across said support, a second plunger for acting on the strip of soap after it has been released by the first plunger, and operating mechanisms for said plungers, the operating mechanism for the second plunger including a single revolution clutch under the control of the operating mechanism for the first plunger.

4. In a machine cutting soap issuing from a plodder, the combination of a support for receiving a strip of soap as it is extruded from the plodder, means for cutting said strip, a reciprocating plunger for pushing said strip off said support, a second support for receiving said strip, a second plunger for pushing said strip across the surface of said second support, operating mechanism for the first plunger, additional mechanism for operating the second plunger arranged to cause said second plunger normally to occupy substantially a predetermined position, and connections between said operating mechanisms for bringing the second plunger into action in substantially a predetermined relationship to the operation of the first plunger.

5. In a machine for cutting soap issuing from a plodder, the combination of a support for receiving a strip of soap as it is extruded from the plodder, a reciprocating plunger for pushing said strip of soap across said support, and means for automatically stopping the plodder when a jam occurs in front of said plunger.

6. In a machine for cutting soap issuing from a plodder, the combination of a support for receiving a strip of soap as it is extruded from the plodder, a reciprocating plunger for pushing said strip of soap across said support, and electrically actuated means for automatically stopping the plodder when a jam occurs in front of said plunger.

7. In a machine for cutting soap issuing from a plodder, the combination of a support for receiving a strip of soap as it is extruded from the plodder, a reciprocating plunger for pushing said strip of soap across said support, and electrically actuated means for automatically stopping the plodder, said means including a switch arranged to be operated by a jam of soap in front of said plunger.

8. In a machine for cutting soap issuing

from a plodder, the combination of a support for receiving a strip of soap as it is extruded from the plodder, a reciprocating plunger for pushing said strip of soap across said support, a spring pressed plate arranged to be moved by a jam of soap in front of said plunger, and additional means arranged to be actuated by said movement of said plate for stopping the plodder.

9. In a machine for cutting soap issuing from a plodder, the combination of a support for receiving a strip of soap as it is extruded from the plodder, a reciprocating plunger for pushing said strip of soap across said support, an electric motor for driving said plodder, a switch controlling said motor, and means arranged to be operated by a jam of soap in front of said plunger for operating said switch to stop the motor.

10. In a machine for cutting soap issuing from a plodder, the combination of a support for receiving a strip of soap as it is extruded from the plodder, a reciprocating plunger for pushing said strip of soap across said support, a spring pressed plate arranged to be moved by a jam of soap in front of said plunger, and electrical means for automatically controlling the operation of said plodder, said means including a switch connected with said plate to be operated by the movement of said plate.

11. In a machine for cutting soap issuing from a plodder, the combination of a dryer, means for cutting a strip of soap as it is extruded from the plodder, and mechanism for delivering the cut strip to said dryer.

12. In a soap cutting machine, the combination of a drying chamber, a conveyor for carrying soap through said chamber, means for cutting a strip of soap, and mechanism for forcing the cut strip into said conveyor.

13. In a machine for cutting soap, the combination of soap cutting means, mechanism for presenting a strip of soap to said means, a conveyor arranged to receive the soap, and means for directing a current of air against the soap while it is on said conveyor.

14. In a machine for cutting soap, the combination of a conveyor, a drying chamber through which the soap is carried by said conveyor, mechanism for delivering the soap to said conveyor, and means for cutting the soap into cakes on its way to said conveyor.

15. In a machine for cutting soap, the combination of soap cutting means, mechanism for presenting a strip of soap to said means, a conveyor arranged to receive the soap, an air chamber having apertures across which the soap is carried by said conveyor, and means for forcing air under pressure through said apertures.

16. In a soap cutting machine, the combination of an upright endless conveyor, mechanism for cutting and delivering soap to said conveyor, an air chamber located between the runs of said conveyor and having apertures for directing air against the soap as it is carried past the opposite sides of said chamber, and means for forcing air under pressure through said apertures.

17. In a soap cutting machine, the combination of an upright endless conveyor, mechanism for cutting and delivering soap to one of the upright runs of said conveyor, an air chamber located between the runs of said conveyor and having apertures for directing air against the soap as it is carried along both of the upright runs thereof, means for forcing air under pressure through said apertures, and mechanism for ejecting the soap from said conveyor at the side thereof opposite to that at which it is delivered to the conveyor.

18. In a soap cutting machine, the combination of an upright endless conveyor having devices for gripping a series of bars or soap, mechanism for cutting and delivering the soap to said conveyor at one of the upright runs of the conveyor, and means for engaging and steadying the bars of soap while they are being delivered to the conveyor.

19. In a machine for cutting soap issuing from a plodder, the combination of an endless conveyor having gripper for holding a multiplicity of cakes of soap, mechanism for cutting soap extruded by the plodder into cakes and forcing the cakes between the grippers of said conveyor, and means arranged to be actuated by a misplaced cake for stopping the plodder.

20. In a machine for cutting soap issuing from a plodder, the combination of an endless conveyor having grippers for holding a multiplicity of cakes of soap, mechanism for cutting soap extruded by the plodder into cakes and forcing the cakes between the grippers of said conveyor, an electric motor for driving said plodder, a switch for controlling said motor, and means arranged to be operated by a misplaced cake of soap on said conveyor for operating said switch.

21. In a soap cutting machine, the combination of a conveyor, means for cutting and delivering soap in bars to said conveyor, said means including a plunger, mechanism for operating said conveyor intermittently, and operating mechanism for said plunger connected with the operating mechanism for said conveyor to maintain a predetermined time relationship between the movements of said plunger and conveyor.

22. In a soap cutting machine, the combination of a conveyor, means for cutting and delivering soap in bars to said conveyor, said means including a reciprocating plunger, operating mechanism for said plunger including a single revolution clutch through which movement is transmitted to the plunger, and mechanism driven through said clutch for

giving said conveyor a step by step movement.

23. In a soap cutting machine, the combination of a conveyor, means for cutting and delivering soap in bars to said conveyor, said means including a reciprocating plunger, operating mechanism for said plunger including a single revolution clutch through which movement is transmitted to the plunger, a Geneva wheel for driving said conveyor, a Geneva driver for operating said wheel, and connections for driving said driver through said clutch.

24. In a soap cutting machine, the combination of a conveyor, means for cutting and delivering soap in bars to said conveyor, said means including a reciprocating plunger, mechanism for operating said plunger, mechanism for giving said conveyor a step by step movement in a predetermined time relationship to the movement of said plunger, and means arranged to be operated by said plunger operating mechanism for ejecting the soap from said conveyor.

25. In a soap cutting machine, the combination of a conveyor, means for cutting and delivering soap in bars to said conveyor, a conveyor to which the soap is delivered by said second plunger, mechanism for operating said second plunger, and additional mechanism connected with said plunger operating mechanism for giving said conveyor a step by step movement in a predetermined time relationship to the movement of said second plunger.

HARRY P. FORTÉ.