April 21, 1942. J. D. CHANEY 2,280,373

MACHINE FOR CUTTING SOAP

Filed Nov. 4, 1939 4 Sheets-Sheet 1

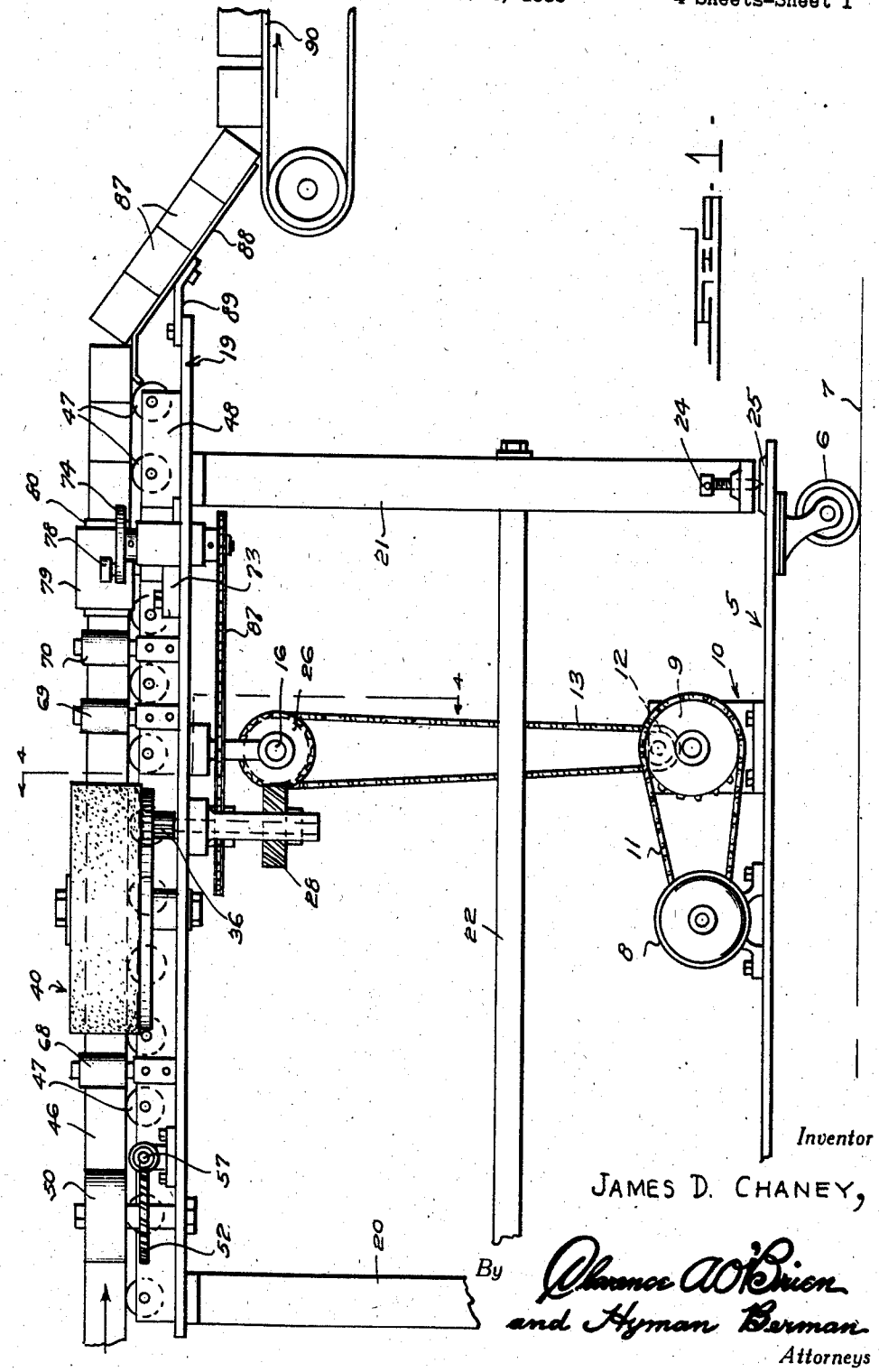


FIG. 1.

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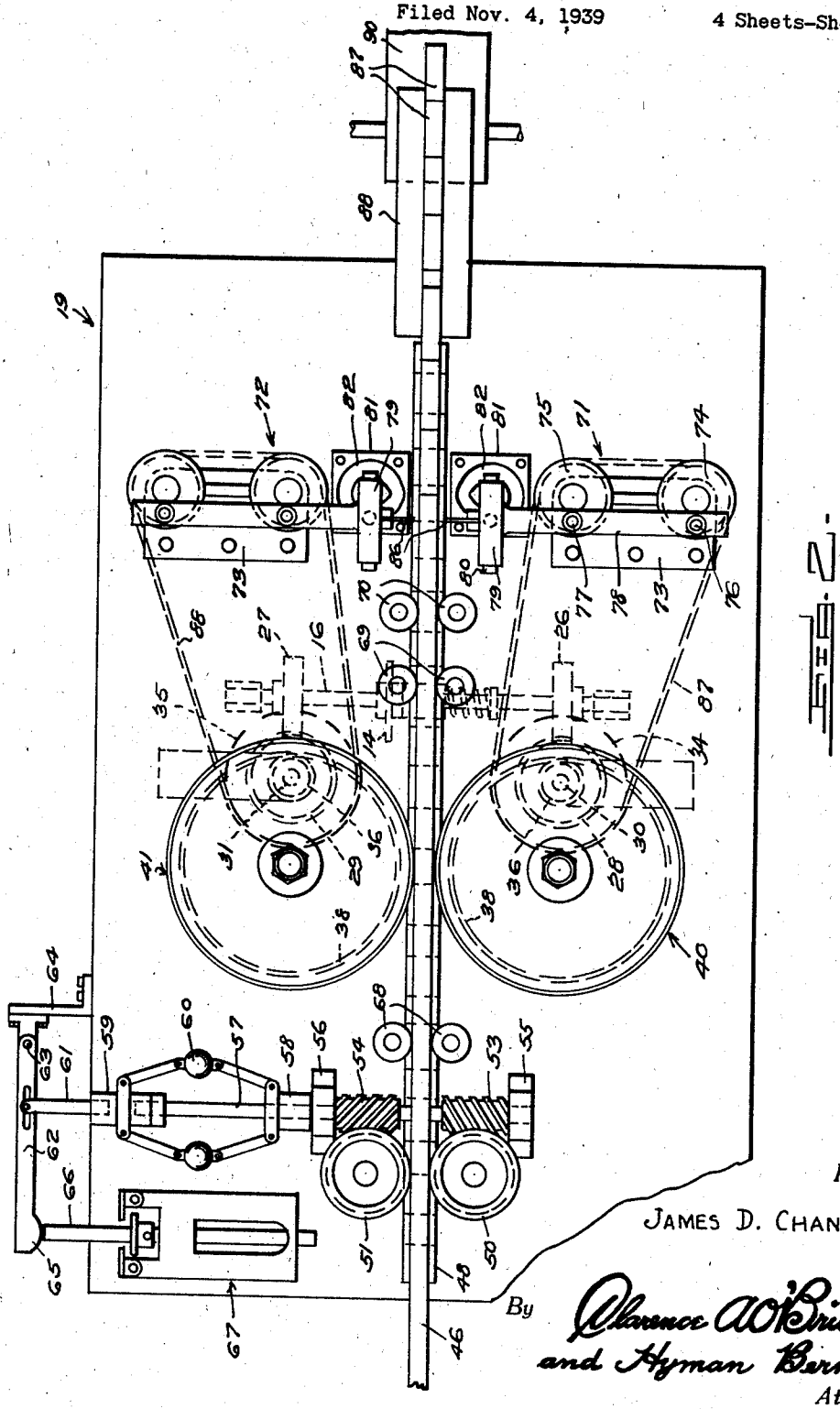


FIG. 2.

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MACHINE FOR CUTTING SOAP

Filed Nov. 4, 1939 4 Sheets-Sheet 3

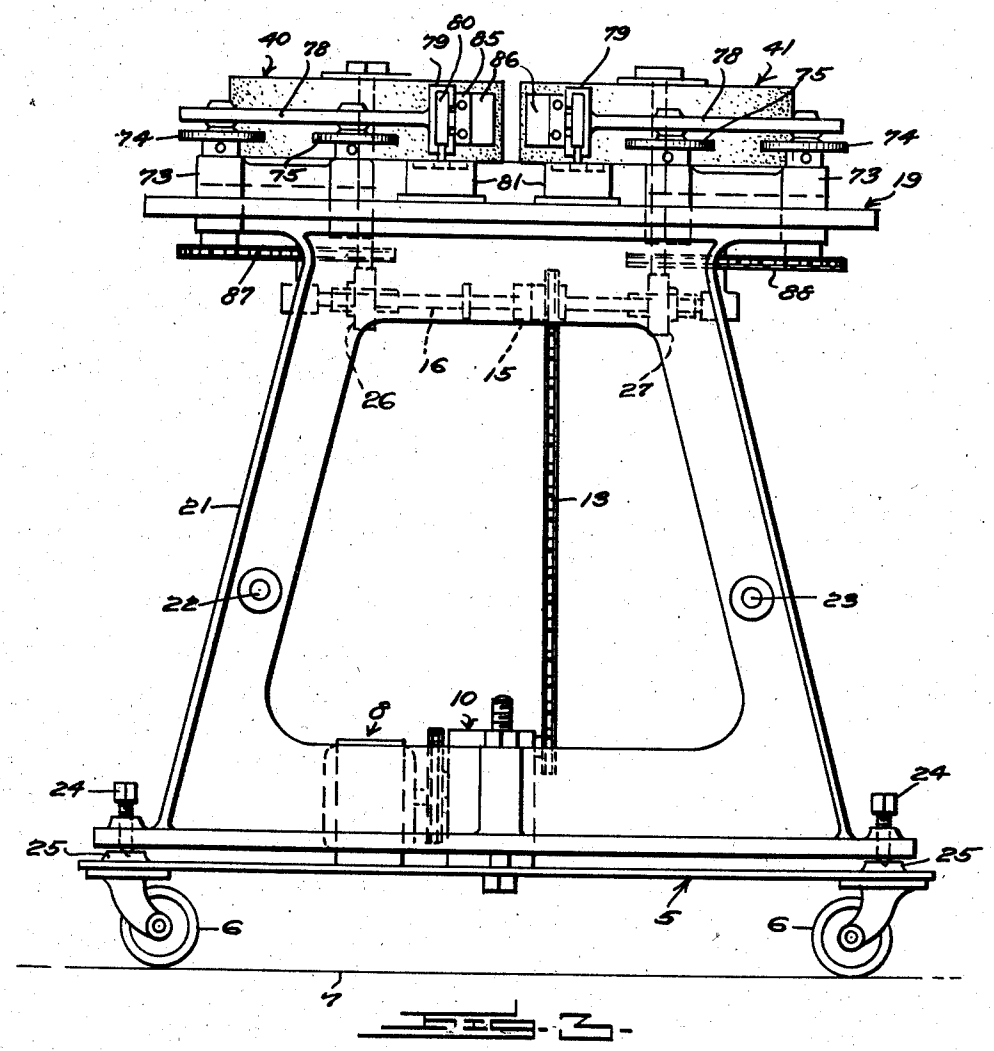


FIG. 2

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MACHINE FOR CUTTING SOAP

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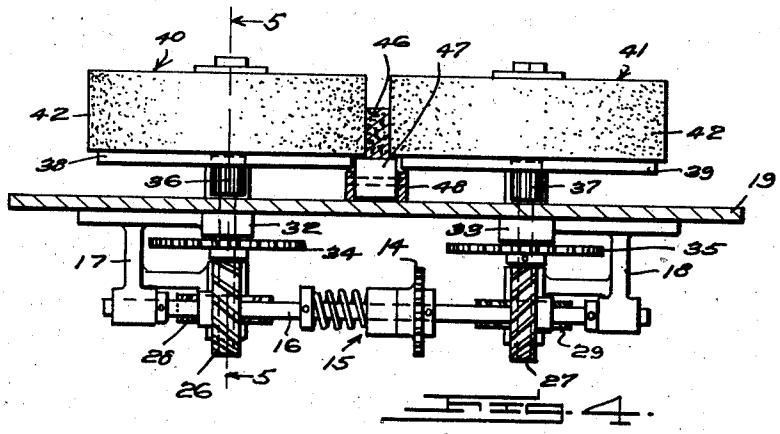


Fig. 4.

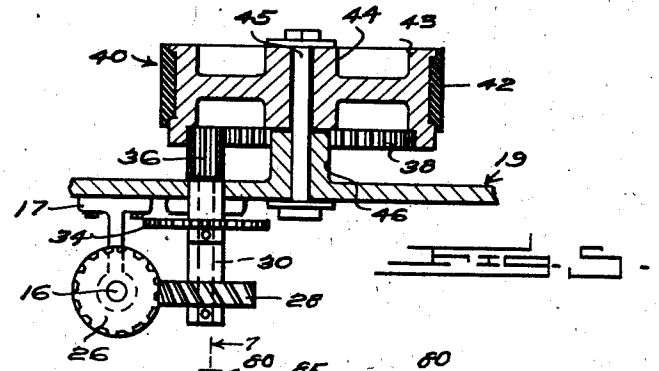


Fig. 5.

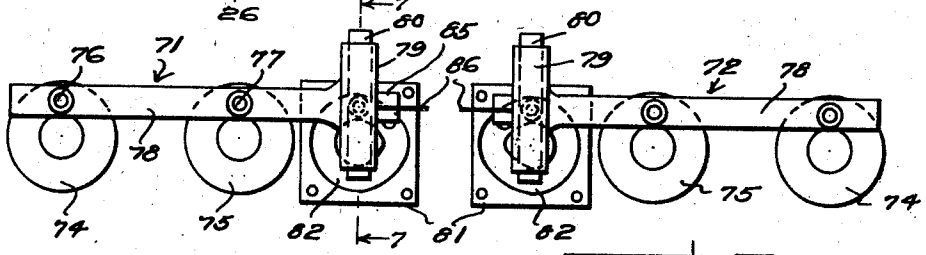


Fig. 6.

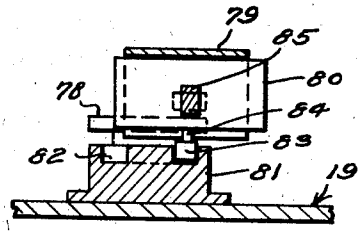


Fig. 7.

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Patented Apr. 21, 1942 2,280,373

UNITED STATES PATENT OFFICE

2,280,373

MACHINE FOR CUTTING SOAP

James D. Chaney, Jersey City, N. J.

Application November 4, 1939, Serial No. 302,932

10 Claims. (Cl. 25—106)

The present invention relates to apparatus for cutting a continuously moving body of material, and particularly to a machine for cutting soap in the course of soap manufacture.

The primary object of the invention is to reduce the amount of handling and labor cost in the cutting of bars of soap into blanks for forming into cakes, and to greatly eliminate or reduce the waste ordinarily incident thereto.

Other important objects and advantages of my invention will be apparent from a reading of the following description taken in connection with the drawings, wherein a preferred embodiment of the invention is shown for illustrative purposes.

In the drawings:

Figure 1 is a general side elevational view of the embodiment showing the same in the act of discharging cut blanks of soap onto a conveyor leading to a cake forming machine or to storage.

Figure 2 is a top plan view of Figure 1.

Figure 3 is a right hand end elevational view of Figure 1.

Figure 4 is a vertical transverse sectional view taken through Figure 1 approximately on the line 4—4 and looking toward the left in the direction of the arrows.

Figure 5 is a transverse vertical sectional view taken through Figure 4 approximately on the line 5—5.

Figure 6 is a slightly enlarged top plan view of the dual cutter mechanism.

Figure 7 is a transverse vertical sectional view taken through Figure 6 approximately on the line 7—7 and looking toward the left in the direction of the arrows.

Referring in detail to the drawings, the numeral 5 generally designates a base equipped at its corners with casters 6 to support the base on a surface 7, the base carrying an electric motor 8 whose shaft is operatively connected to a sprocket 9 on an adjustable friction clutch unit 10 by a sprocket chain 11. The friction clutch unit 10 is of a conventional adjustable type and has a sprocket 12 connected by means of a sprocket chain 13 with the sprocket 14 of a conventional type of friction clutch 15 such as a "Pullmore" clutch driving a horizontal shaft 16 which is journaled in depending brackets 17 and 18 attached to the table 19 which is supported on upwardly tapering end members 20 and 21 which are spaced and connected by a pair of horizontal bars 22 and 23 and have their upper ends connected to the table 19 and their lower ends provided at opposite sides with vertically adjustable pins 24 which have pointed lower ends received in sockets 25 on the top of the base 5, whereby the table 19 may be accurately leveled on the base 5 despite inequalities in the supporting surface 7. The horizontal shaft 16 is, as shown in Figure 1, preferably located between the middle of the table 19 and the right hand end thereof and the said shaft has adjacent the opposite ends thereof respective miter gears 26 and 27 which are in mesh with respective worm gears 28 and 29 which are mounted on respective vertical shafts 30 and 31 which are supported in bearings 32 and 33 located below the table 19. Below the bearings 32 and 33 the said shafts have sprocket wheels 34 and 35 secured thereto. The shafts 30 and 31 project through the table 19 immediately above which they are provided with straight toothed pinions 36 and 37, respectively, which are in mesh with ring gears 38 and 39 on the lower ends of the friction rollers 40 and 41 which have rubber or other friction material peripheries 42 mounted on annuli 43 supported from a hub 44 through which passes a vertical axle 45 in a boss 46 on the table 19 as shown in detail in Figure 5. The friction rollers 40 and 41 are arranged transversely of the table 19 and have their friction peripheries sufficiently closely spaced to engage the opposite sides of the soap bar with slightly more friction than that exerted by the clutch 15, the soap bar being extruded from the plodder at a speed slightly less than that of the machine so that the wheels 40 and 41 exert a pull on the soap such that the friction clutch 15 will slip before there is any substantial slippage between the wheels and the soap. The soap rides on rollers 47 which are horizontally mounted in a channel 48 mounted on the table 19 between the friction rollers and terminating adjacent the right hand end of the table 19.

Adjacent the left hand end of the machine is a pair of feed rollers 50, 51 which engage the opposite sides of the soap bar and are turned by the movement of the soap therebetween as it is extruded from the plodder. These rollers are revolubly supported on the table as shown, and the shafts thereof are equipped with wide angle miter gears 52 which are in mesh with respective wide angle worms 53, 54, which are supported on opposite sides of the soap bar in respective bearings 55 and 56, the elements 53 and 54 being mounted on a shaft 57 located on a level below the tops of the soap bar supporting rollers 47 as indicated in Figure 1. The upper end of the shaft 57 apparent in Figure 2 of the drawings

has mounted thereon a governor which consists in a member 58 fixed to the shaft 57 and a member 59 slidable on the shaft 57, the members 58 and 59 being connected by ball equipped linkages 60 in a conventional arrangement to operate slidable element 59 which is connected by a link 61 to a pivoted arm 62 which is supported as indicated by the numeral 63 on a bracket 64 attached to the table 19 with its free end provided with a cam surface 65 operatively related to the free end of a plunger 66 which is the operative element of a variable rheostat 67 which is conveniently mounted on the table 19 adjacent the governor mechanism and is electrically connected in a suitable manner to the electric motor 8 so that the current supplied to the motor 8 is appropriately affected by the introduction of resistance by the rheostat so that the rate of operation of the machine is automatically slowed down to the required means. Pairs of small guide rollers 68, 69, 70 are distributed along the path of travel of the soap bar 46 and are mounted on the table 19 as shown in Figure 2. Two of these pairs of guide rollers are located close to the soap cutting mechanisms 71 and 72, respectively, which are transversely aligned and are located on opposite sides of the path of the soap bar adjacent the right hand end of the table 19, this location of the pairs of rollers 69 and 70 steadying the soap bar for the operation of the cutting mechanisms.

Since each of the cutting mechanisms is in the same mechanical form and arrangement, the description of one will suffice for the description of the other.

Each of the cutting mechanisms comprises a laterally outlying support 73 which is fixed to the top of the table 19 and carries two revoluble wheels 74 and 75 in laterally spaced relation, which wheels have on their respective tops pins 76 and 77 which are rotatably connected to longitudinally spaced points on the cutter carrier bar 78, the laterally inward end of the bar 78 having a transverse tubular head 79 in which works a slide block 80. Under the head 79 is a block 81 having a non-circular cam channel 82 in its top in which works the cylindrical and enlarged lower end of the stub shaft 84 on whose upper end is connected the laterally inwardly projecting cutter knife holder 85 in which is clamped the cutter knife proper 86. The stub shaft 84 projects through an opening in the bottom of the head 79 and the upper part of the stub shaft has pivoted thereto the laterally outward end portion of the blade carrier 85. The cam channel 82 is non-circular and so shaped that the circular motion of the bar 78 imparted thereto by the rotation of the wheels 74 and 75 is translated from circular to tangential motion, with the slide 80 cooperating, in such a way that the alignment of the blades 86 of the opposed cutting mechanisms is maintained constant while the said blades operate toward and away from each other in the operation of the machine for penetrating the opposite sides of the soap bar and cutting the same into blanks 87 which are fed off the end of the rollers 47 onto an incline 88 supported by a bracket 89 attached to the table 19, down which the blanks 87 slide to be delivered onto a conveyor 90 which takes the blanks to the cake forming machine or to storage as the case may be.

The lower ends of the shafts which carry the wheels 74 and 75 of the two cutting mechanisms above the table 19 have secured thereto below the table 19, respective sprocket wheels over which are trained the respective sprocket chains 87 and 88 which are respectively trained over the sprocket wheels 34 and 35 which are on the friction roller driving pinion shafts 30 and 31 already described.

By properly proportioning the various gears and sprocket wheels, perfect synchronization of the action of the knives 86 is achieved with respect to the travel of the soap bar 46 and the action of the governor mechanism on the rheostat 67 automatically operates the electric motor 8 at the required speed for efficient operation of the machine as a whole.

Although I have shown and described herein a preferred embodiment of my invention, it is to be definitely understood that I do not desire to limit the application of the invention thereto except as may be required by the scope of the subjoined claims.

Having described the invention, what is claimed as new is:

1. Apparatus for cutting a bar of soap into blanks of equal length, said apparatus comprising a support including guide means to support the bar for longitudinal movement along said support, friction rollers on said support for engaging opposite sides of said bar, actuating means operating some of said rollers for imparting longitudinal movement to the bar, opposed cutting units located beyond said friction rollers and on opposite sides of said guide means, said cutting units comprising respective blades which are constantly opposed in alignment, operating mechanisms imparting reciprocating motion to the blades, and drive means operatively connected to synchronously operate said actuating means and said operating mechanisms, said drive means comprising an electric motor, a variable rheostat connected between the motor and a source of electric current, governor mechanism operatively connected to said rheostat, said governor mechanism including friction operated rollers engaged with and driven by said bar of soap in its longitudinal movement.

2. Apparatus for cutting a bar of soap into blanks of equal length, said apparatus comprising a support including guide means to support the bar for longitudinal movement along said support, friction rollers on said support for engaging opposite sides of said bar, actuating means operating some of said rollers for imparting longitudinal movement to the bar, opposed cutting units located beyond said friction rollers and on opposite sides of said guide means, said cutting units comprising respective blades which are constantly opposed in alignment, operating mechanisms imparting reciprocating motion to the blades, and drive means operatively connected to synchronously drive said actuating means and said operating mechanisms, each of said cutting units comprising a vertical rotary crank member operatively connected to said drive means, a carrier connected to the crank member and supported for reciprocation by said crank member toward and away from the side of the bar of soap or the like, a head fixed on the laterally inward end of the carrier, a slide on said head working parallel with said bar, a cam on said slide, an element having an irregular cam channel in which said cam works, said cam channel being shaped to translate the regular circular motion of said head into regular tangential motion, a knife support pivoted on a vertical axis on said slide and engageable with spaced portions

of said head on opposite sides of said knife support whereby said knife support is maintained normal to the bar of soap during movement toward and away from the side of the bar, and a knife on said knife support and projecting toward the side of the bar.

3. In a bar soap cutting machine, a substantially horizontal guide adapted to receive the soap bar from a plodder, at least one relatively large diameter feeding wheel supported at a side of said guide, said feeding wheel turning on a vertical axis and having its edge engaged with the side of said soap bar, cutting means comprising a knife supported for horizontal reciprocating movement transversely with respect to said guide for cutting the soap bar, said cutting means further comprising at least one vertical axis rotor having an eccentric operating connection with said knife, proportioned means operatively connecting at least one of said feeding wheels and the vertical axis rotor whereby the rate of feed of the soap bar is coordinated with the cutting action of the knife, and driving means operatively connected to said proportioned means.

4. In a bar soap cutting machine, a substantially horizontal guide adapted to receive the soap bar from a plodder, at least one relatively large diameter feeding wheel supported at a side of said guide, said feeding wheel turning on a vertical axis and having its edge engaged with the side of said soap bar, cutting means comprising a knife supported for horizontal reciprocating movement transversely with respect to said guide for cutting the soap bar, said cutting means further comprising at least one vertical axis rotor having an eccentric operating connection with said knife, proportioned means operatively connecting at least one of said feeding wheels and the vertical axis rotor whereby the rate of feed of the soap bar is coordinated with the cutting action of the knife, and driving means operatively connected to said proportioned means, said driving means having speed control means, governor means effectively connected to said control means, said governor means comprising at least one vertical axis roller frictionally engaging the side of said soap bar at a point between said plodder and said feeding wheel whereby the operation of said driving means, said feeding wheel and said cutting means are controlled in accordance with the rate of movement of the soap bar from the plodder onto said guide.

5. In a bar soap cutting machine, a substantially horizontal guide adapted to receive the soap bar from a plodder, at least one relatively large diameter feeding wheel supported at a side of said guide, said feeding wheel turning on a vertical axis and having its edge engaged with the side of sid soap bar, cutting means comprising a knife supported for horizontal reciprocating movement transversely with respect to said guide for cutting the soap bar, said cutting means further comprising at least one vertical axis rotor having an eccentric operating connection with said knife, proportioned means operatively connecting at least one of said feeding wheels and the vertical axis rotor whereby the rate of feed of the soap bar is coordinated with the cutting action of the knife, and driving means operatively connected to said proportioned means, said driving means having speed control means, governor means effectively connected to said control means, said governor means comprising at least one vertical axis roller frictionally engaging the side of said soap bar at a point between said plodder and said feeding wheel whereby the operation of said driving means, said feeding wheel and said cutting means are controlled in accordance with the rate of movement of the soap bar from the plodder onto said guide, said driving means comprising an electric motor, and said governor means comprising a variable rheostat in circuit with said electric motor.

6. In a bar soap cutting machine, a substantially horizontal guide adapted to receive the soap bar from a plodder, a relatively large diameter feeding wheel supported at each side of said guide, said feeding wheels turning on vertical axes and having their edges engaging opposite sides of the soap bar on said guide, cutting means comprising a knife supported at each side of said guide beyond said feeding wheels for horizontal reciprocating movement transversely with respect to said guide, said knives being arranged for similar movement in opposite directions and being further arranged to approach each other through opposite sides of the soap bar in longitudinal alignment toward a substantially meeting relation to cut the soap bar, said cutting means further comprising at least one vertical axis rotor for each knife having eccentric operating connection with the corresponding knife, separate proportioned means connecting the feeding wheels and vertical axis rotors on the same sides of said guide, slip connection means operatively connected between said feeding wheels, whereby the cutting action of each knife is coordinated with the operation of the corresponding feeding wheel, and driving means operatively connected to said slip connection means.

7. In apparatus of the character described, a reciprocating knife comprising a relatively stationary support, a pair of vertical axis rotors mounted on said support, means for rotating said rotors, eccentric pins rising from said rotors, a carrier bar overlying said rotors and having said eccentric pins journalled in longitudinally spaced points thereof, a transverse slide housing at one end of said carrier bar, a slide confined in said slide housing for movement substantially at right angles to said carrier bar, a cam depending from said slide, a mutilated circular cam track on said support with which said cam is operatively engaged, and a blade carried by said slide and projecting in longitudinal extension of said carrier bar, whereby the circular path of motion of said carrier bar is translated into a tangential path of motion of said blade, with respect to said vertical axis rotors.

8. Apparatus for cutting a bar of soap into equal lengths, said apparatus comprising feeding means for continuously feeding and supporting the soap bar, cutting means comprising a pair of knives positioned on opposite sides of the soap bar, said knives being constantly positioned in the same vertical plane substantially at right angles to the soap bar, actuating means for oscillating said knives toward and away from each other to sever the soap bar into lengths, drive means and coordinating means operatively connecting said drive means with said feeding means and with said cutting means, whereby said cutting means is operated at a rate commensurate with the speed at which the soap bar is fed relative to said cutting means, said coordinating means comprising a first driving connection directly connecting said feeding means with said actuating means, a second driving connection

connecting a portion of said feeding means and said drive means, said second driving connection comprising some relative rotatable elements with friction clutch means operatively connecting said relatively rotatable elements.

9. Apparatus for cutting a bar of soap into equal lengths, said apparatus comprising feeding means for continuously feeding and supporting the soap bar, cutting means comprising a pair of knives positioned on opposite sides of the soap bar, said knives being constantly positioned in the same vertical plane substantially at right angles to the soap bar, actuating means for oscillating said knives toward and away from each other to sever the soap bar into lengths, drive means and coordinating means operatively connecting said drive means with said feeding means and with said cutting means, whereby said cutting means is operated at a rate commensurate with the speed at which the soap bar is fed relative to said cutting means, and speed control means connected to a portion of said drive means, said speed control means comprising governor means operatively engaged with the soap bar.

10. An apparatus for cutting a bar of plastic material into equal lengths, said apparatus comprising feeding means for continuously feeding and supporting the bar, a pair of knives positioned on opposite sides of the bar and constantly positioned in the same vertical plane substantially at right angles to the bar, and means for moving the knives toward and away from each other to sever the bar into lengths and to cause the knives to move with the bar and at the same speed while the knives are in engagement with the bar.

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