April 24, 1934. R. A. JONES 1,956,532

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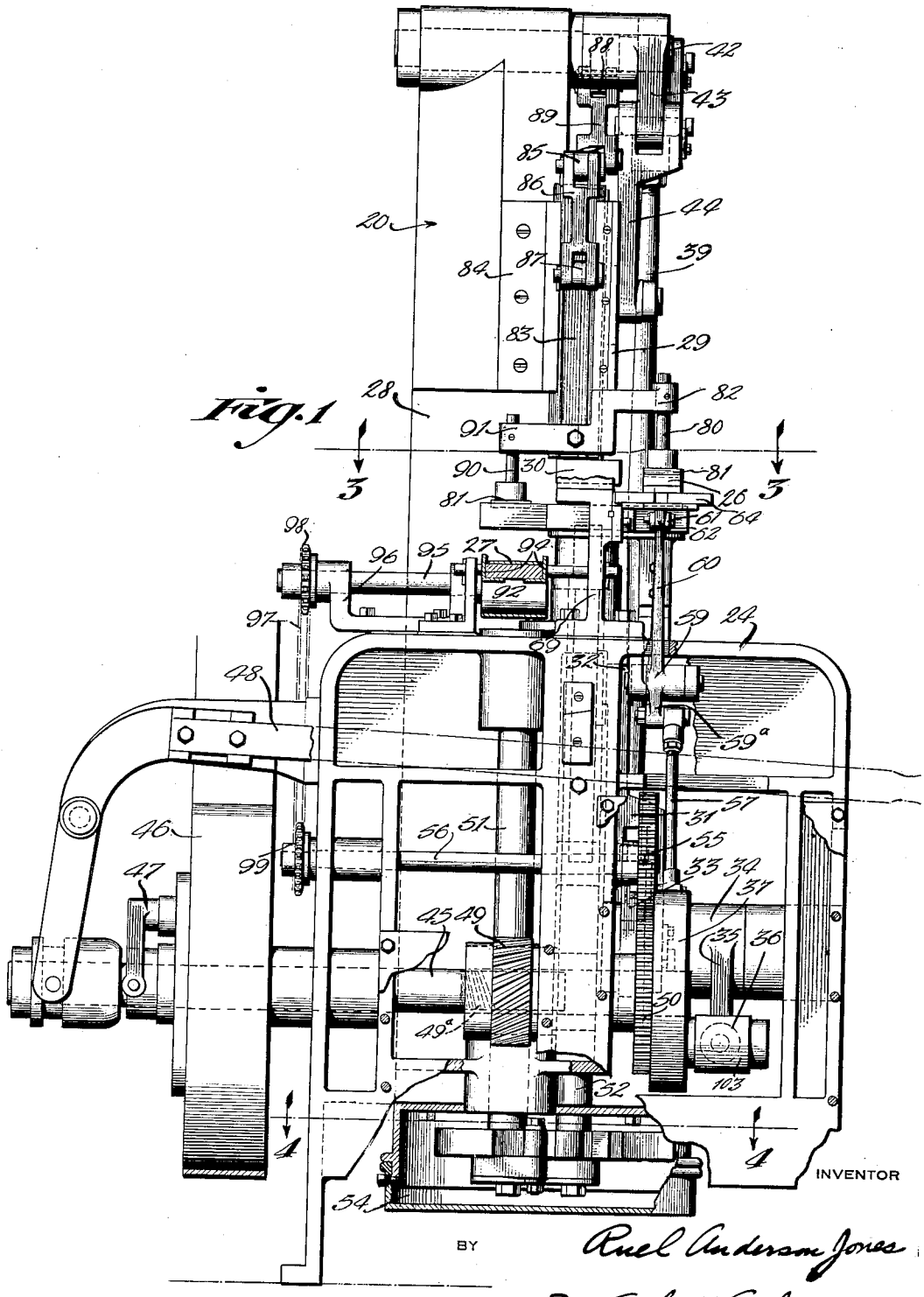


Fig. 1

3 3

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Wood & Wood

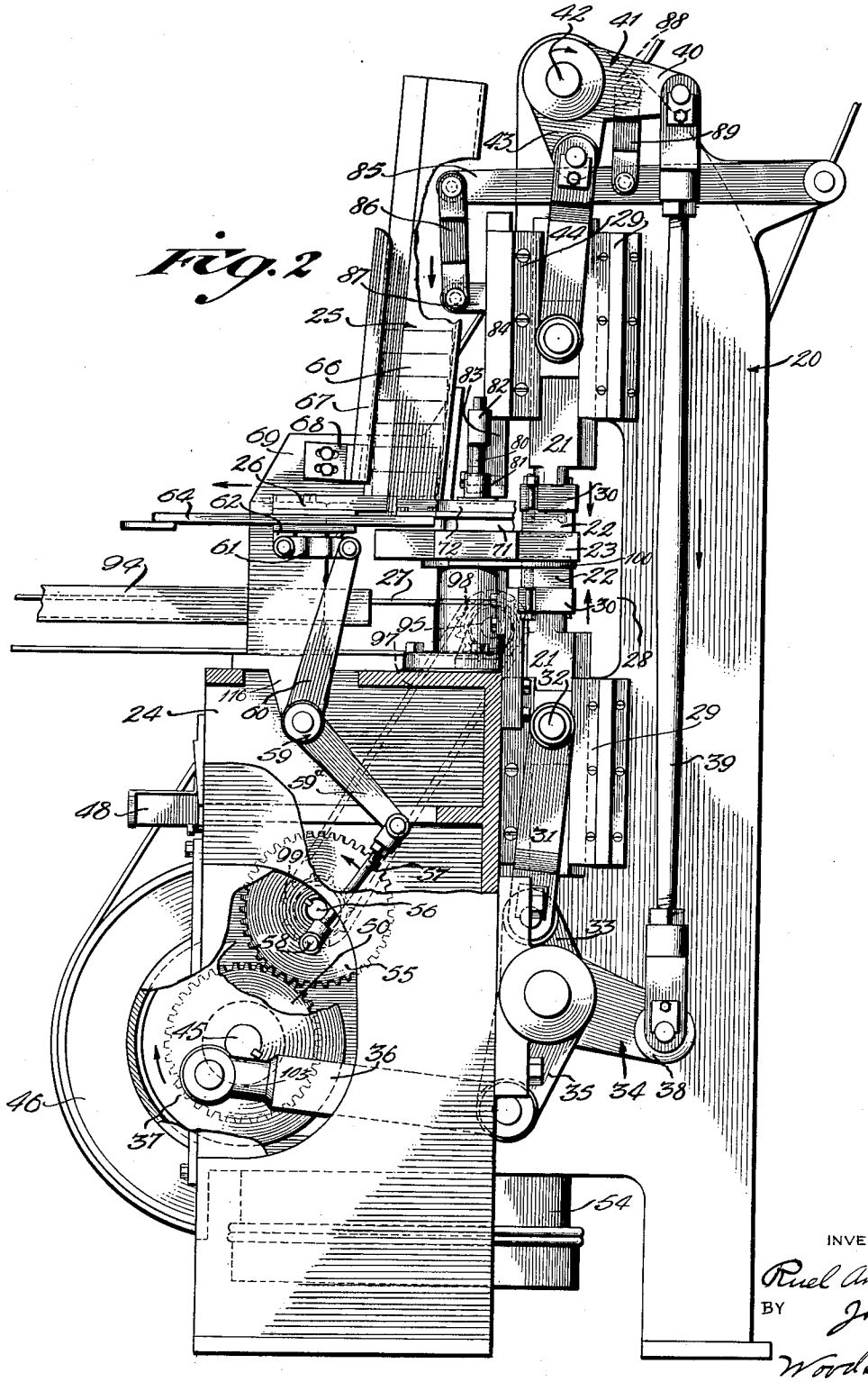
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Fig. 2



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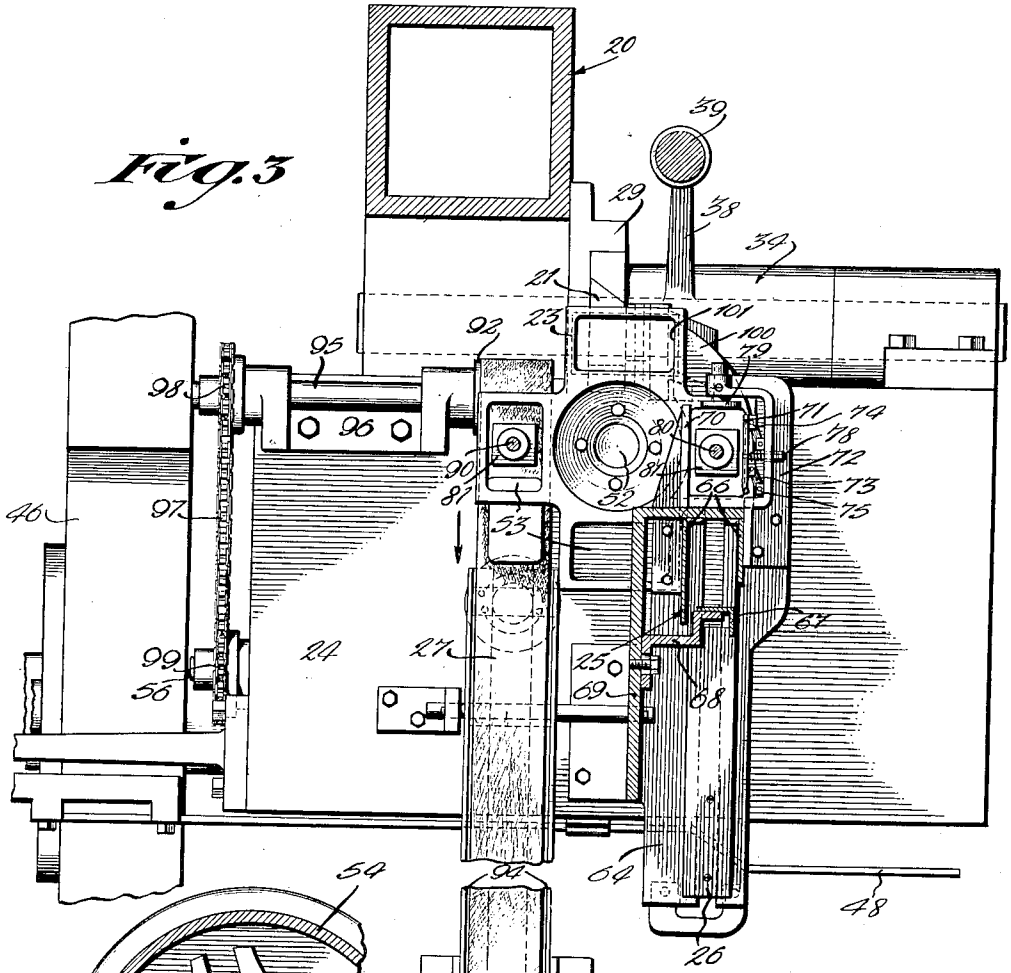
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Fig. 3



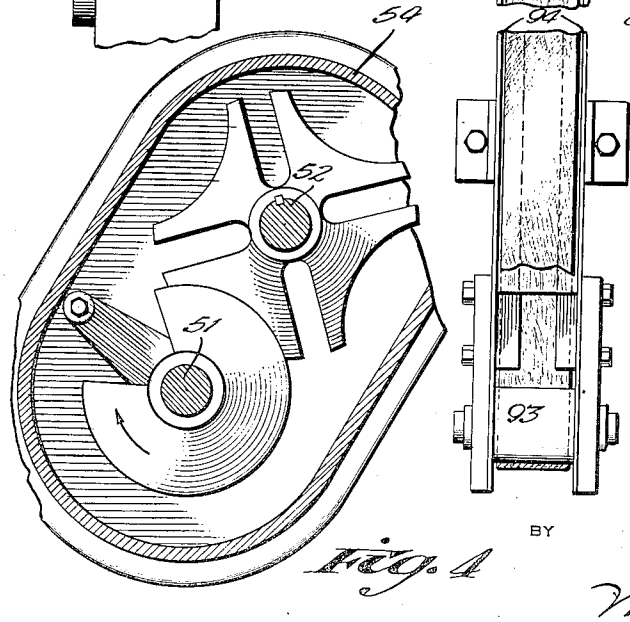


Fig. 4

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Fig. 5

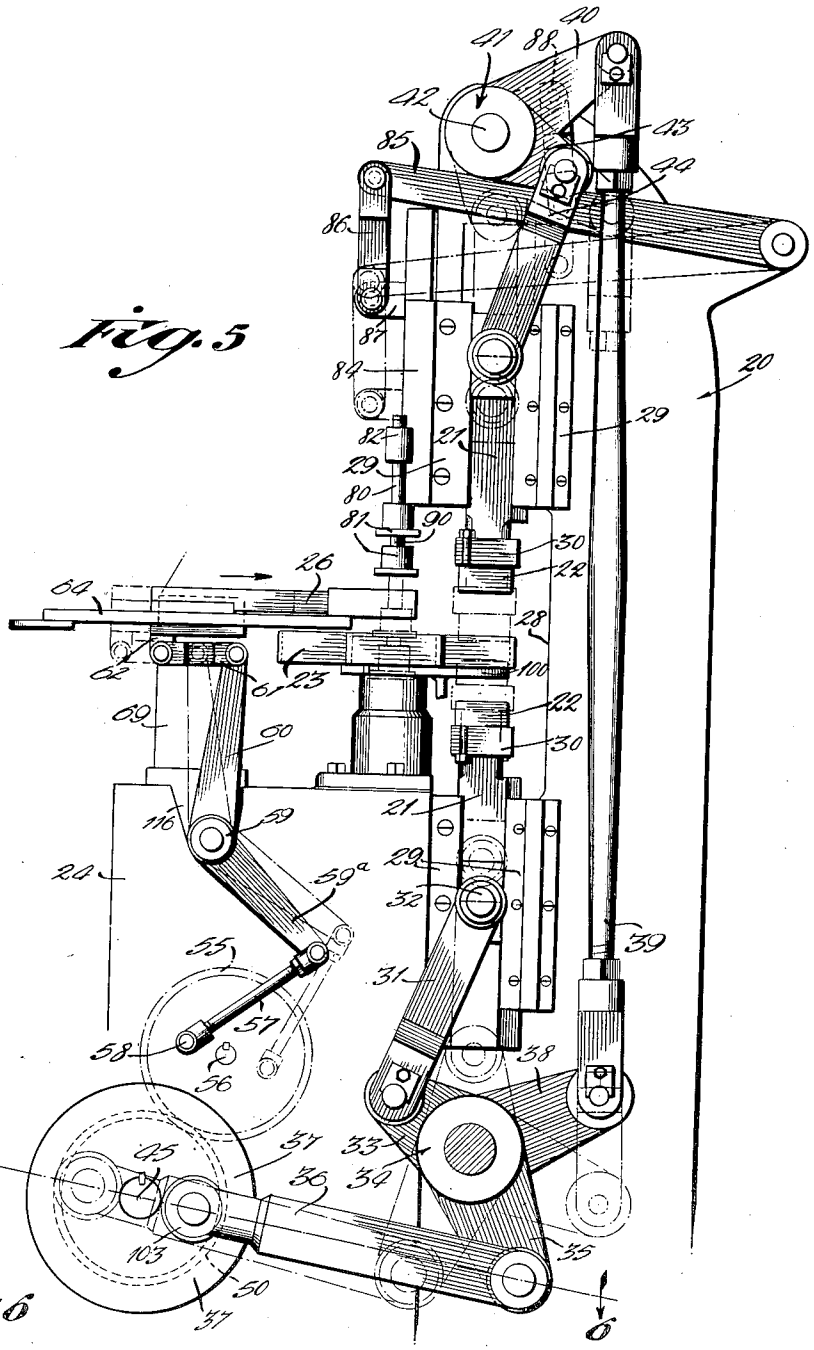
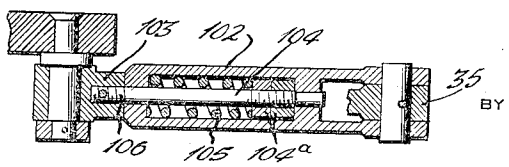


Fig. 6



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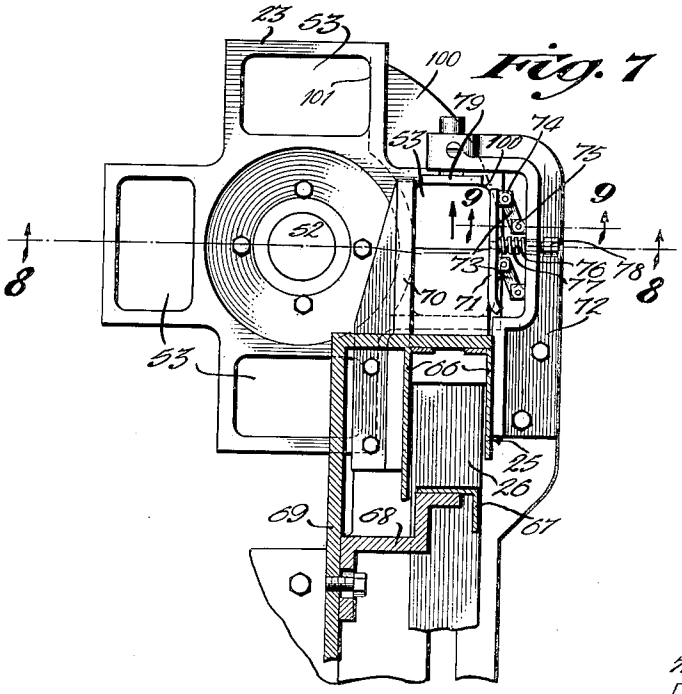


Fig. 7

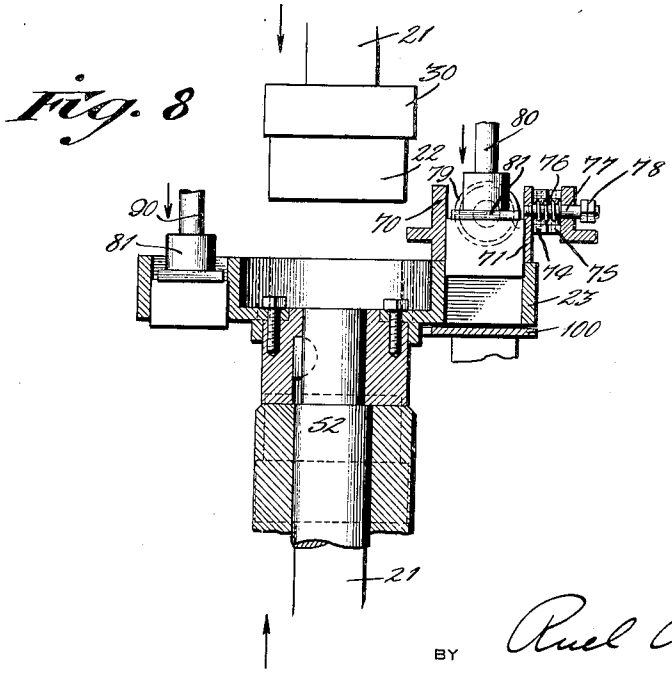


Fig. 8

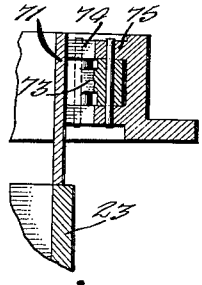


Fig. 9

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Fig. 10

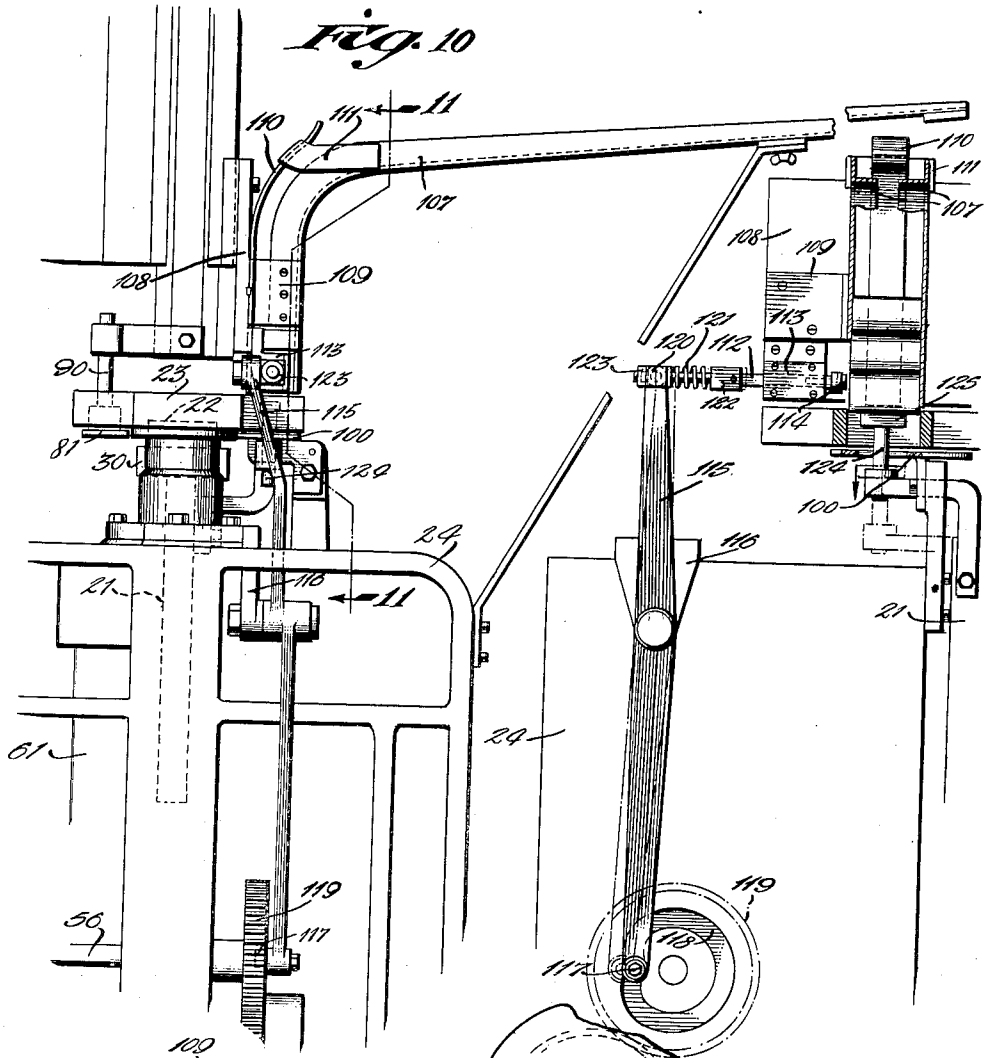


Fig. 11

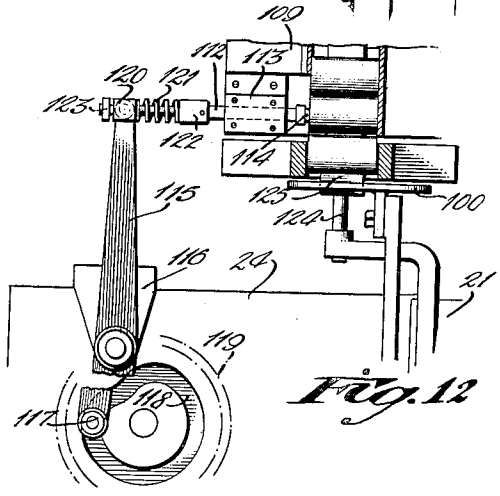


Fig. 12

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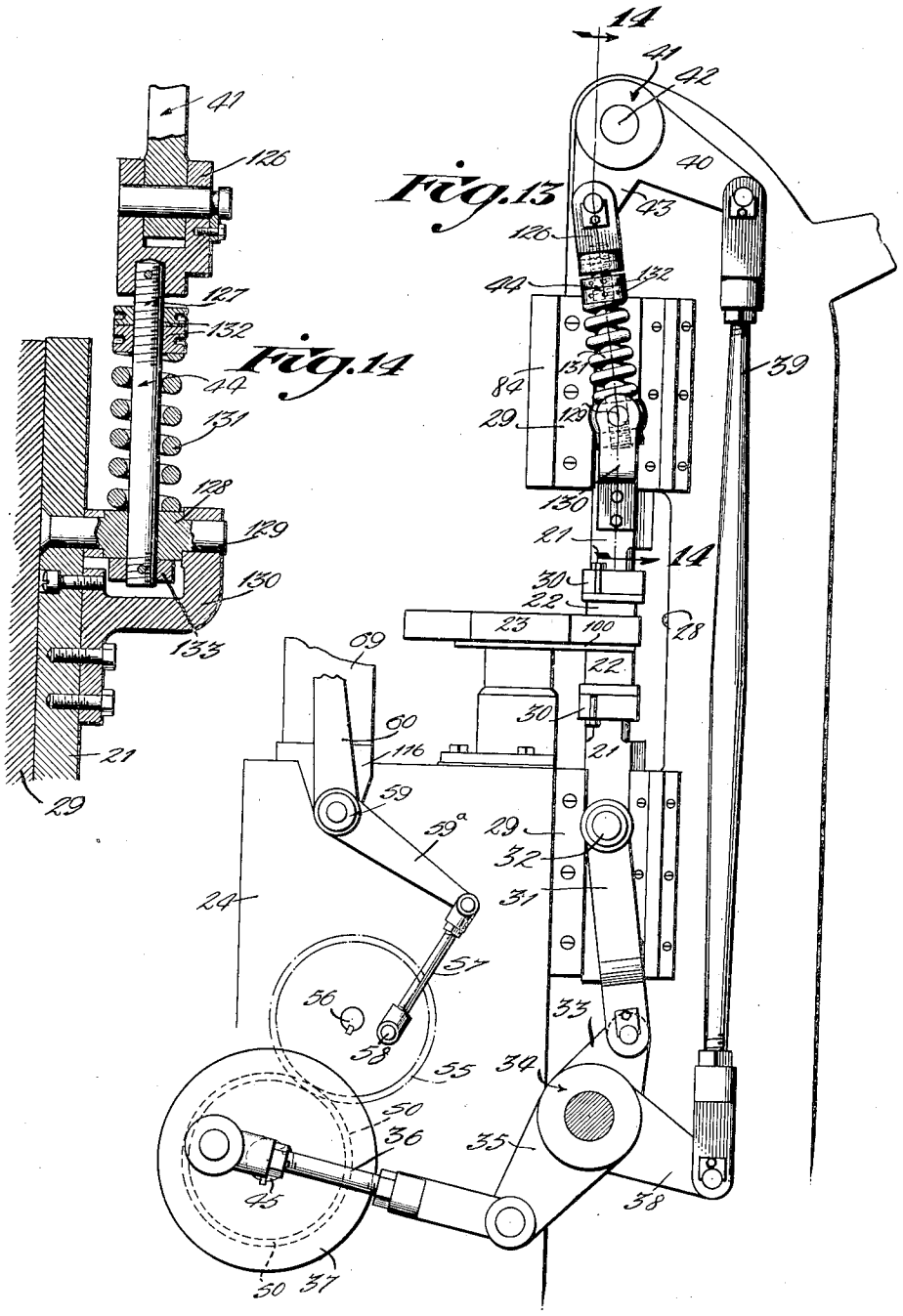


Fig. 13

Fig. 14

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Patented Apr. 24, 1934

1,956,532

UNITED STATES PATENT OFFICE

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PRESS

Ruel Anderson Jones, Covington, Ky., assignor to R. A. Jones & Company, Inc., Covington, Ky., a corporation of Kentucky

Application December 24, 1932, Serial No. 648,743

12 Claims. (Cl. 25—7)

This invention relates to improvements in presses, particularly for compressing soap into cakes, bars or other various forms into which soap is shaped.

It is an object of this invention to provide a press with a pair of opposing die carrying plungers, each reciprocated by a toggle and the toggle of both linked together for unitary operation.

It is a further object of this invention to provide a soap press in which successive bars of soap are fed from a magazine by means of an ejector and are successively delivered to a position over and above each pausing mold opening of a matrix in exact vertical registry therewith and wherein the soap is momentarily suspended and is then moved downwardly and deposited in the mold opening for subsequent feed to the position between the pressing dies, and in which means is included for discharging the pressed soap from the mold opening after advance from the pressing station and delivering the same to the conveyor belt for discharge from the machine.

Other objects and further advantages will be more fully apparent from a description of the accompanying drawings in which:

Figure 1 is a front elevation of the improved press, certain of the parts being broken away for illustrating internal mechanism.

Figure 2 is a side elevation of the press, certain parts of this view being broken away likewise for illustrating internal parts and the dies of the press being shown advancing into soap compressing position.

Figure 3 is a sectional view taken on line 3—3, Figure 1, showing the matrix and its relation to the magazine and the conveyor for removing the pressed cakes of soap.

Figure 4 is a sectional view taken on line 4—4, Figure 1, detailing the Geneva gear in the transmission to the matrix driving shaft.

Figure 5 is a side view taken similar to Figure 2 but illustrating the soap compressing dies entirely drawn away from the matrix and the soap feeding plunger starting forward for the operation of moving a cake of soap from the magazine to a position above the matrix.

Figure 6 is a sectional view taken on line 6—6, Figure 5, detailing a flexible connection in the transmission linkage for the toggle operated dies.

Figure 7 is a fragmentary sectional view taken on the same line as Figure 3 but enlarged for illustrating the details of the soap magazine and soap feeding mechanism to the matrix.

Figure 8 is a sectional view taken on line 8—8, Figure 7, detailing the matrix and its mounting as well as the soap feeding and guiding mechanism adjacent thereto.

Figure 9 is a sectional view taken on line 9—9, Figure 7, detailing one of the clamp devices for supporting the soap in position prior to insertion in the matrix.

Figure 10 is a fragmentary front view of a soap press illustrating a modified form of magazine including a mechanism for supporting the stack of soap bars and properly delivering the same to the matrix.

Figure 11 is a sectional view taken on line 11—11, Figure 10, further detailing the feed control mechanism.

Figure 12 is a fragmentary view taken similar to Figure 11, but showing one of the bars of soap advanced into the matrix.

Figure 13 is a fragmentary side view of a press showing a modified arrangement for yieldably mounting the upper die.

Figure 14 is a sectional view taken on line 14—14, Figure 13, detailing the yieldable mounting for the die.

Referring to the drawings, 20 indicates a columnar frame slidably supporting a pair of opposing vertically reciprocal plungers or slides 21 carrying dies 22 between which a soap block within a matrix 23 is compressed. The frame at a forward side of the column is in the form of a hollow knee 24 providing a casing for journalling and housing the transmission for the various moving parts. The upper side of the knee serves as a table for supporting the rotatable matrix 23, a magazine 25 for the soap blocks, an ejector 26 for consecutively dispensing the soap blocks from the magazine for deposit into the matrix, and a conveyor 27 for receiving the compressed cake when discharged from the matrix.

The column at its forward side above the table portion of the knee 24 is formed to provide an intermediate work receiving throat 28 which the rotatable matrix traverses for cooperating with the pair of opposing reciprocating dies 22. Opposing plungers or slides 21, one as an upper plunger and a second as a lower plunger, each of half dove-tail structure in cross section, are respectively slidably mounted to one side of the column by gib brackets 29—29 fixed to the column and at opposite sides of the plunger.

The plungers are of duplicate construction each at one end having a rectangular or square head 30 to which the die 22 is removably secured. The dies 22 in a compression stroke of the plungers

opposingly cooperate and engage into the matrix, holding a block of soap subsequently deposited therein, for compressing the soap block into a desired cake or bar shape.

Each plunger is reciprocated by a toggle. The toggle for the lower plunger consists of a link 31 at one end pivotally connected to a stud pin 32 fixed to and laterally extending from the plunger 21. The opposite end of the link is bifurcated or of yoke form to straddle an arm 33 of a bell crank lever 34 to which it is pivotally connected. The bell crank lever has a second arm 35 pivotally connecting to one end of a link or pitman 36 which in turn connects with a crank wheel 37. A third arm 38 of the bell crank lever 34 pivotally connects to one end of a connecting link 39 vertically disposed alongside the column having its opposite or upper end pivotally connected to an arm 40 of a bell crank lever 41 of the toggle for the upper plunger 21. The bell crank lever 41 for the upper plunger toggle is pivotally supported upon a stud pin or bolt 42 fixed to and extending laterally from the column and has a second arm 43 pivotally connected to a link 44 which in turn pivotally connects with the upper plunger 21.

The main power shaft 45 for the press is journalled in the hollow knee or transmission casing and a belt driven power pulley 46 is fixed on the extended end of this shaft. A clutch 47 is incorporated adjacent the pulley and a long clutch control lever 48 is extended to a convenient point. The crank wheel 37 is fixed on this shaft as well as a matrix driving gear 49 and a soap feed plunger actuating gear 50.

The gear 49 meshes with a gear 49[a] fixed on a vertical shaft 51 journalled in the hollow knee. A matrix driving shaft 52 is vertically mounted adjacent the shaft 51 and a Geneva gear assembly (see Figure 4) connects the lower ends of these shafts whereby intermittent rotation is imparted to the matrix in 90 degree steps making four pauses or stations for the matrix equal in number to its circumferentially arranged soap receiving openings 53 for purposes hereinafter related. A casing 54 encases the Geneva gear. The matrix is rotatively supported on a journal box of the knee as shown in Figure 8.

The gear 50 drives a crank wheel gear 55 mounted on a cross shaft 56. A link 57 pivotally connects a wrist pin 58 on the gear with the end of an arm 59[a] of a bell crank lever 59. The other arm 60 of this lever is pivotally connected to a link 61 connecting to a lug 62 depending from the ejector slide 26 mounted on a horizontal slideway 64 at the bottom of the vertical magazine 25. The lug moves in a slot of the slideway and the slide traverses the bottom of the magazine and is designed to eject and feed the lowermost soap bars successively at the same time supporting the remainder of the stack.

The magazine is fabricated of three substantially vertically disposed angle metal strips. The two forward strips 66 are secured to a bracket 69 and the other angle iron strip 67 is attached at the lower end by means of an angle plate 68 to the bracket 69. The path of movement of the slide of the soap ejecting plunger is toward the circumferential path of movement of the matrices and over and above the matrix element particularly at a position of pause for each opening.

As detailed in Figures 7 and 8 the soap is ejected between rails 70, 71, one of which, namely 70, is fixed on the slideway and the other of which, namely 71, is laterally yieldably mounted on a bracket 72 and acts in the nature of a clamp for supporting the bar of soap prior to vertical feed movement and deposit into the matrix. This floating or flexible guide wall 71 is supported on a pair of links 73, each extended between a lug 74 of the wall and a lug 75 on the bracket and is urged against the soap by means of a coil spring 76. This coil spring is mounted upon a stud 77 which extends from the back of the wall and traverses the wall of the bracket 72. Stop nuts 78 are screwed on the outer end of the stud whereby the inner spring urged movement of the guide plate or wall is limited.

Movement of the bar of soap outwardly or into position between the guide walls is limited by means of a stop pad 79 fixed in the bracket 72 in the path of travel of the block, this stop limiting movement of the soap to a position of vertical registry exactly above the matrix.

After the crude block of soap has been fed to a suspended position above the matrix, it is then delivered downwardly into the matrix. This downward movement is accomplished by means of a plunger 80 having a soap engaging head 81 moving vertically downwardly between the guide walls to move the soap into the matrix. This plunger 80 is carried on an arm 82 extended from a slideway 83 mounted in gib plates 84 upon the column. The slide is reciprocated by means of a swinging lever 85 pivotally mounted upon the column and having a link 86 connecting its outer end with a lug 87 on the slide, the lever 85 receiving actuation from the rotating shaft of the upper toggle through an arm 88 thereof and a link 89 connecting the arm to an intermediate portion of the first mentioned arm.

It is noted here that this same slide is utilized for carrying a second plunger 90 (see Figures 1 and 8) mounted on an arm 91 extended from the first arm, the plunger including a head 81, which plunger functions to traverse each particular matrix after it has made two 90 degree swings and eject the pressed soap onto the conveyor 27.

The conveyor 27 consists of an endless belt mounted on spaced pulleys 92, 93 and travelling between spaced guide rails 94. One of the pulleys, in this instance pulley 92 adjacent the delivery end of the belt, is mounted on a drive shaft 95 journalled in a bracket 96 on the frame. This shaft is driven by means of a sprocket chain 97 engaging a sprocket gear 98 on the shaft and driven from a second sprocket gear 99 fixed on the shaft 56 through which the soap feeding slide is operated.

In the intermediate stop or pause between the delivery and discharge stops or station of each matrix, there is a soap pressing station. Between the delivery station and the soap compressing station within the 90° arc of travel of each mold opening of the matrix element an arcuate table or support plate 100 is mounted beneath the matrix just out of contact therewith to prevent downward displacement of the soap after it has been delivered in crude form into the matrix prior to the pressing operation. This table terminates in vertical registry with the first edge 101 of the particular mold opening as the matrix pauses to dispose the particular opening in the pressing station whereby the support plate does not interfere with the closing movements of the dies.

As has been previously described, the dies are operated from the same driving link through

toggle mechanisms which bring the dies together for shaping the soap within the matrix (see Figure 2). The link 36 connecting the crank wheel and the bell crank lever of the lower toggle is extensible. For this purpose, referring to Figure 6, this link consists of a bifurcated link 102 attached to the bell crank lever and an element 103 pivotally attached on the wheel which includes a head 104 operating in the bifurcated link against a compression coil spring 105.

More specifically, a stud 106 extends from the pivotally mounted hub lug 103 and carries adjustable head elements or nuts 104a screwed on its inner end and slidably mounted between the arms of the bifurcated link 102. The coil spring 105 under compression surrounds the stud 106 and is fixed between the head 104 and the end of the link. Therefore, as the dies reach maximum pressure on the soap and dead center position, the link is free to elongate for governing the maximum pressure applied to the soap.

The operation of the machine, following a cake of soap through the machine, is as follows: A stack of crude bars of soap are mounted in the magazine. Normally the stack is supported on top of the slideway and the lowermost bar is disposed in the path of movement of the slide when the slide is fully withdrawn. As the slide moves forward the lowermost bar is pushed between the rigid guide wall 70 and the laterally flexible guide wall 71 and brought up against the stop 79, thereby positioning the bar in clamped position in perfect vertical registry with the mold opening pausing therebeneath.

As the slide moves back, the delivery plunger 80 comes down and the soap is moved vertically directly into the matrix and into position of support on the arcuate table 100. As soon as the soap is in position in the matrix, the matrix element is moved a quarter of a turn and the soap is then disposed between the opposing dies which thereupon close upon the bar and form it into the exact shape desired, the sides of the matrix opening functioning as a part of the die chamber and the soap bar being expanded into position in the matrix where it will remain until forced out. Another quarter turn of the matrix opening, being described in particular, brings it into position just above the delivery end of the discharge conveyor belt immediately following which the discharge plunger 90 descends and forces the soap onto the conveyor, the conveyor moving continuously at a moderate rate of speed for carrying the finished soap to the delivery end of the machine.

It is apparent that three of the mold openings, each in its particular position, namely, crude soap delivery, die pressing position, and discharge position, are functioning on successive bars of soap. In other words, the closing movement of the dies through the down movement of the upper die moves the delivery plunger and the discharge plunger and all three operations are performed simultaneously, the forward movement of the soap feeding plunger being synchronized so as to deliver a crude bar of soap just prior to each descent of the upper die.

Referring to Figures 10 to 12, inclusive, of the drawings, a modified form of magazine and feed to the matrix is illustrated. The magazine is disposed directly vertically above the mold openings of the matrix as they pause in position for receiving the crude bars of soap. The magazine structure includes a pair of spaced angle iron rails 107, 107, which are disposed at a slight angle from the horizontal and are turned vertically downwardly at their inner ends for directing the bars of soap into proper registry with the mold openings. These rails are secured to the framework of the machine by means of a bracket 108 and angle iron plates 109. A back rail or guide 110 for the magazine is also fastened to the bracket 108 and is curved outwardly and fastened to the spaced rails by means of a clip 111 providing a throat for receiving the bars of soap as they move down the incline into the vertically disposed portion of the magazine.

Normally the entire stack of soap bars is supported against downward feed by means of a clamping plunger 112 moving into endwise engagement with the lowermost bar of the stack through a cutaway portion of the magazine. This plunger is slidably mounted in a block 113 bolted to the framework and includes a tip 114 of pliable material for contacting the soap (see Figure 12). This plunger is reciprocated by means of a bell crank lever 115 pivoted on a pivot bracket 116 attached to the frame. This lever 115 has its upper end pivotally attached to the plunger and its lower end includes a roller 117 engaged in a cam groove 118 formed in the side of a gear 119 which replaces the crank wheel gear 55 shown in the main form.

The upper end of the bell crank lever is pivotally connected to a block 120 which is slidably mounted on the extended end of the plunger 112 and engages against a compression spring 121 disposed between the block and a shoulder 122 of the plunger, outward movement of the block being limited by means of a stop 123.

As the plunger is reciprocated into engagement with the bar of soap, the contact is yielding due to the fact that the spring 121 will compress when maximum clamping pressure has been exerted and a yieldable holding force will be maintained. Cooperating with this stack supporting clamping plunger, a stack lowering plunger 124 is provided. This plunger is disposed for vertical movement traversing the mold opening of the matrix and moving against the bottom of the stack. The plunger includes a head 125 for this purpose and traverses an opening in the arcuate support plate beneath the matrix. This plunger is fixed to the slide 21 for the lower toggle, which slide moves at the proper time for synchronizing the lowering of the soap bar stack to bring the lowermost bar into the matrix opening in synchronism with the movements of the matrix and the other operations.

As the stack lowering plunger 124 is elevated into contact with the bottom of the stack, the clamping plunger 112 is retracted and lowering movement of the first mentioned plunger 124 permits all of the stack to move downwardly and the lowermost bar to be deposited in the matrix opening. As the next adjacent bar moves into position in the path of movement of the clamping plunger, the clamping plunger will be moved in for engaging this bar preventing its movement into the mold opening and holding the stack clear thereof, whereby the entire stack of soap bars is supported by the clamping plunger. In the meantime, the lowering plunger moves entirely clear of the matrix and the support plate to position entirely therebeneath.

Referring to Figures 13 and 14, another form of die operating toggle mechanism is disclosed. In this case the lower main actuating link 36 extending from the crank wheel is adjustable as to length but is not yieldably extensible. The

upper toggle link 44 is made yieldably extensible and the throw of the toggles by changing the relation of the crank wheel and leverage is arranged for moving past dead center so that a double die pressing action is exerted on the soap.

The upper toggle link described in detail includes a yoke element 126 pivoted on the arm of the bell crank lever 41 and includes a stud 127 fixed therein and having its lower end slidably disposed in a trunnion 128 having its studs 129 journalled in the slide and a bracket 130 fixed thereto. A coil spring 131 under compression is disposed about the stud and is adjustably maintained under compression against the trunnion by means of nuts 132 on the stud. A nut 133 is fixed on the extreme lower end of the stud and lies against the underside of the trunnion for maintaining the link in normal extended position.

It will be apparent that the action of the dies in this modification will be as follows: As the dies come together on the soap in the matrix and reach dead center, a definite maximum die pressing pressure will be exerted. However, this would be a yielding pressure since to get past dead center the upper toggle will yield or compress. A second yieldable pressing action will occur when the toggles pass dead center on return. Since only the upper die is yieldable, the upper die will tend to keep the soap disposed against the lower die during the entire pressing cycle. The double pressing action is effective in obtaining a finer finish for the cake of soap.

Having described my invention, I claim:

1. In a soap press, a frame structure, a pair of opposingly reciprocable die carrying plungers slidably supported on said frame structure, a matrix supported upon said frame structure intervening the dies for receiving a block of material and cooperating with the dies for compressing the block of material, toggles respectively for said plungers connected for unitary actuation, said toggles each comprising a bell crank lever pivoted to the frame structure, and a link connecting with an arm of the bell crank lever and the plunger, a link joining a second arm of the bell crank levers of toggles of both plungers, and power transmission means connecting with one of said toggles.

2. In a soap press, a frame structure, a matrix element rotatively mounted in said frame, transmission means for intermittently rotating said matrix element, a vertical magazine for soap bars, a reciprocating ejector slide traversing the bottom of said magazine, means for reciprocating said ejector slide, a clamping device disposed above the matrix and including spaced walls for yieldably receiving the lowermost ejected bar of soap, said clamping device disposed for receiving and supporting the ejected bar of soap in vertical registry above each progressing mold opening of the matrix when in position of dwell, and a vertically operating plunger device for forcing the clamped bar of soap downwardly into the mold opening.

3. In a soap press, a frame structure, a matrix supported on said frame, a magazine for soap bars, a reciprocating soap bar ejector slide traversing the delivery end of said magazine, means for reciprocating said ejector slide for feeding the lowermost bar of soap, a clamping device disposed above the matrix for receiving and supporting the ejected bar of soap in vertical registry above the matrix, and a vertically operating plunger device for forcing the clamped bar of soap downwardly into the matrix.

4. In a soap press, a frame structure, a matrix mounted on said frame structure, a magazine for soap bars, a reciprocating ejector slide traversing the delivery end of said magazine, means for reciprocating said ejector slide for ejecting the lowermost bar of soap, spaced plates for receiving the lowermost ejected bar of soap, a pivotal mounting for one of said walls, a spring for urging said latter wall toward the other wall, a stop for limiting movement of the ejected bar of soap between said plates, said plates and stop disposed for receiving and supporting the ejected bar of soap in vertical registry above the matrix, and a vertically operating plunger device for forcing the clamped bar of soap downwardly into the mold opening of the matrix.

5. In a soap press, a frame structure, a matrix mounted on said frame structure, a vertical magazine extended above the matrix for supporting a stack of soap bars in vertical registry therewith, a horizontal reciprocating clamping finger adapted to engage and clamp the lowermost bar of the stack, a lowering plunger moving vertically and traversing the matrix for supporting the stack of bars of soap, transmission mechanism for said clamping plunger and said lowering plunger synchronizing the movement of these plungers whereby the clamping finger is retracted when the lowering plunger is supporting and lowering the stack for permitting the lowermost bar to be deposited in the mold opening of the matrix, and whereby thereafter the clamping finger moves into clamping position for supporting the remainder of the stack clear of the mold opening.

6. In a soap press, a frame structure, a matrix element mounted on said frame structure, means for intermittently rotating said matrix element, a magazine extended vertically and angularly above said matrix for supporting a stack of soap bars in vertical registry therewith, a reciprocating clamping finger adapted to engage and clamp the lowermost bar of the stack, a lowering plunger moving vertically and traversing the matrix for supporting the stack of bars of soap, transmission mechanism for said clamping plunger and said lowering plunger synchronizing the movement of these plungers whereby the clamping finger is retracted when the lowering plunger is supporting and lowering the stack for permitting the lowermost bar to be deposited in the mold opening of the matrix, and whereby thereafter the clamping finger moves into clamping position for supporting the remainder of the stack clear of the mold opening.

7. In a soap press, a frame structure, a matrix mounted on said frame structure, a vertical magazine extended upwardly above said matrix for supporting a stack of soap bars in vertical registry therewith, a lowering plunger moving vertically and traversing the matrix for supporting the stack of bars of soap, transmission mechanism for said lowering plunger whereby the lowering plunger supports and lowers the stack and permits the lowermost bar to be deposited in the matrix, and means for sustaining the stack, excepting the lowermost bar of soap, clear of the matrix.

8. In a soap press, a frame structure, a matrix mounted on said frame structure, a vertical magazine extended upwardly above said matrix for supporting a stack of soap bars in vertical registry therewith, a reciprocating clamping finger adapted to engage and clamp the lowermost bar of the stack, and transmission mechanism for reciprocating said clamping finger for withdraw-

ing said clamping finger to permit lowering of the lowermost bar into the matrix.

9. In a soap press, a frame, a pair of opposingly reciprocable die carrying slides supported on said frame, a matrix supported upon said frame intervening the dies for receiving a block of material and cooperating with the dies for compressing the block of material, toggles respectively for said plungers connected for unitary actuation, one of said toggles including a compressible link, and a transmission connected to one toggle for actuating said toggles, said transmission fixed for moving the toggles past dead center in each operation, whereby a double pressing action is imparted to the block of material.

10. In a soap press, a frame, a matrix element mounted on said frame, means for intermittently rotating said matrix, said matrix including a plurality of circumferentially arranged vertically disposed mold openings, a clamping device for supporting a block of material over said matrix in position directly in vertical registry with each successively pausing mold opening, a delivery device for delivering the block of material to said clamping device, dies for compressing the block of material at the next pause of each mold opening beyond the delivery pause, a vertically reciprocable slide, and plungers mounted on said slide, one of which is adapted to force the block of material from the clamping device into the mold opening adjacent thereto and the other of which is adapted to traverse the mold opening advanced beyond the pressing position for discharging the soap therefrom.

11. In a soap press, a frame, a pair of opposingly reciprocable die carrying slides supported on said frame, a matrix supported upon said frame intervening the dies for receiving a block of material and cooperating with the dies for compressing the block of material, toggles respectively for said plungers connected for unitary actuation, one of said toggles including a sectional link, a compressible spring between the sections of said link, permitting compression of the link, and a transmission connected to one toggle for actuating said toggles, said transmission fixed for moving the toggles past dead center in each operation, whereby a double pressing action is imparted to the block of material.

12. In a soap press, a frame, a matrix element mounted on said frame, means for intermittently rotating said matrix, a support device for supporting a block of material over said matrix in position directly in vertical registry when the matrix pauses therebeneath, a delivery device for delivering the block of material to said support device, dies for compressing the block of material at the next pause of the matrix beyond the delivery pause, a vertically reciprocable slide, and plungers mounted on said slide, one of which is adapted to force the block of material from the clamping device into the matrix and the other of which is adapted to traverse the matrix when advanced from the pressing pause for discharging the soap therefrom.

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