Nov. 20, 1934. P. WITTE 1,981,490

FEEDING AND STRIPPING MECHANISM FOR TUBE FORMING MACHINES

Filed Nov. 7, 1933 3 Sheets-Sheet 1

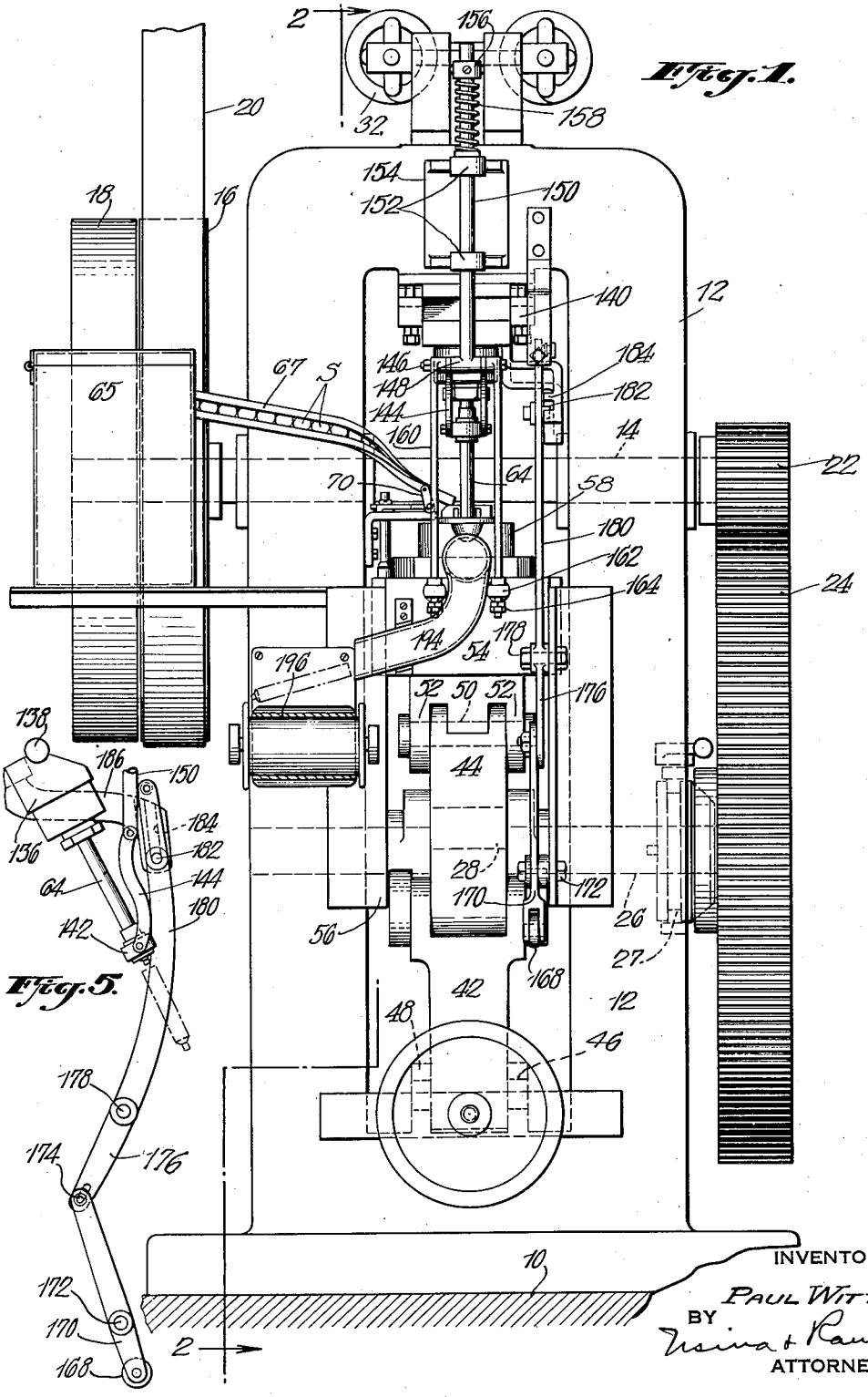


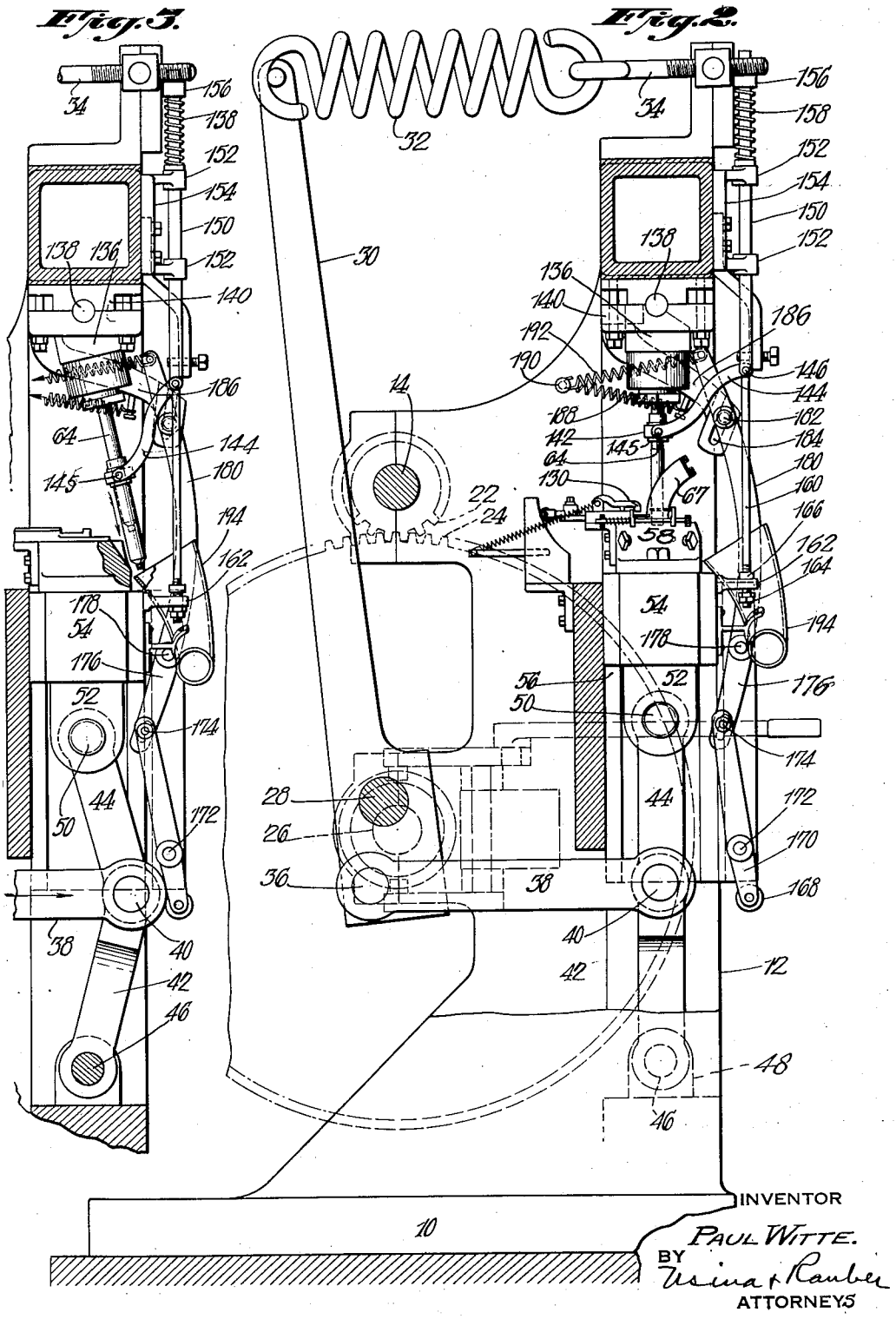
Fig. 1.

Fig. 5.

Nov. 20, 1934. P. WITTE 1,981,490

FEEDING AND STRIPPING MECHANISM FOR TUBE FORMING MACHINES

Filed Nov. 7, 1933 3 Sheets-Sheet 2

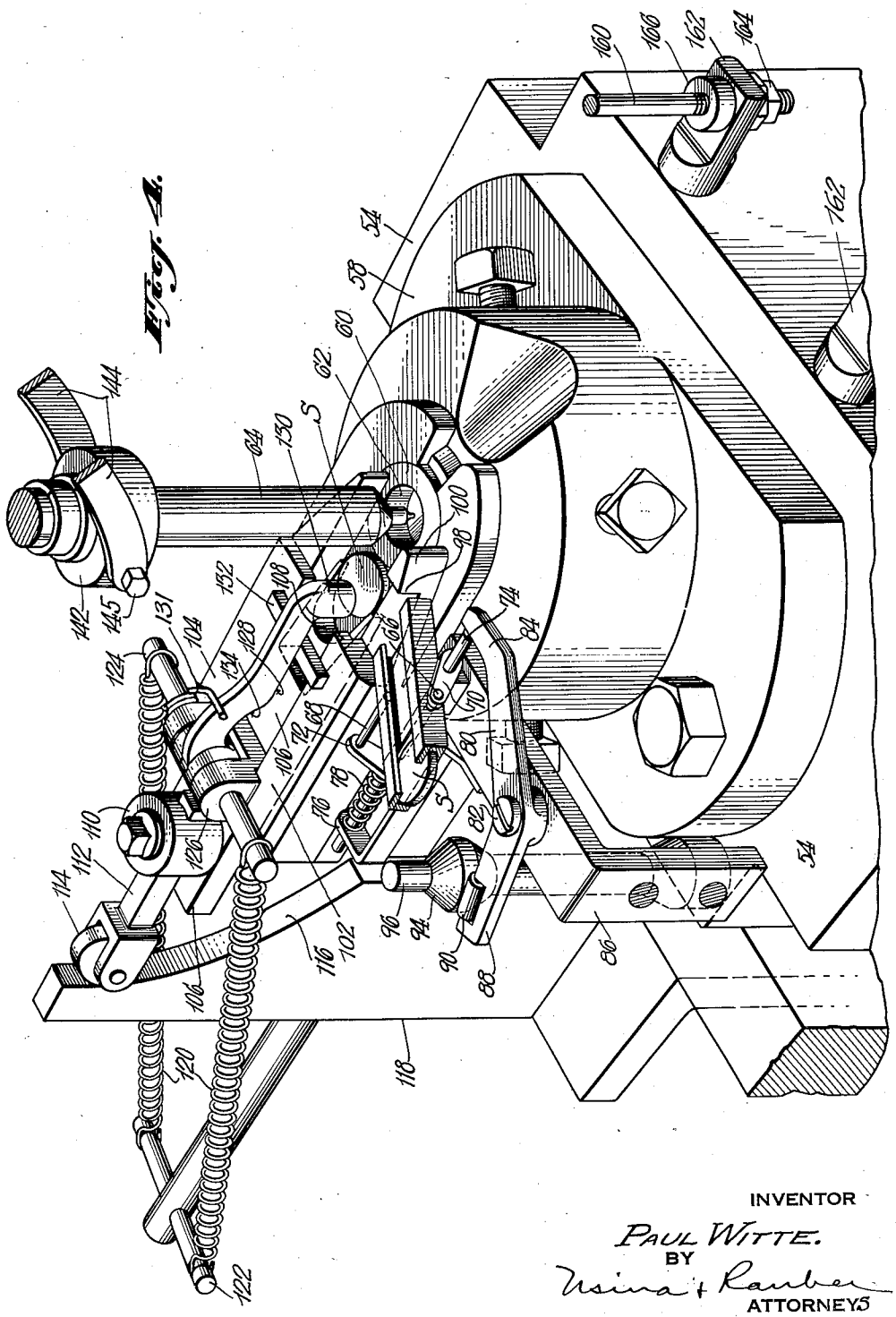


Nov. 20, 1934. P. WITTE 1,981,490

FEEDING AND STRIPPING MECHANISM FOR TUBE FORMING MACHINES

Filed Nov. 7, 1933 3 Sheets-Sheet 3

Fig. 4.



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FEEDING AND STRIPPING MECHANISM FOR TUBE-FORMING MACHINES

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8 Claims. (Cl. 207—9)

This invention relates to machines for making collapsible tubes from blanks of block tin, white metal, or similar somewhat ductile material and particularly to improvements in the means for feeding blanks or slugs to such machines and the mechanism for stripping the completed tube from the machine. While not limited thereto the feeding and stripping mechanism of my invention is well suited for use in machines of the punch press type, such as used for making collapsible tubes of block tin, or similar ductile metal of the character used as containers for tooth paste, shaving cream, oil paints and similar more or less plastic substances.

The novel features of the invention will be fully apparent from the following detailed description when read in connection with the accompanying drawings, in which—

Fig. 1 is a front elevation of a tube-making machine equipped wth my improved slug feed and tube stripping mechanism; Fig. 2 is a vertical section taken approximately on the staggered line 2—2 of Fig. 1; Fig. 3 is a fragmentary view similar to Fig. 2, showing certain parts in a different position; Fig. 4 is an enlarged perspective detail view illustrative chiefly of my improved mechanism for feeding slugs to the die carried by the reciprocating platen of the machine; Fig. 5 is a skeleton view showing a stripper and associated mechanism in the extreme position it assumes in the act of ejecting a formed tube from the plunger.

Referring in detail to the drawings, 10 represents a suitable base or bed plate which carries an upstanding frame 12 carrying suitable bearings for a main drive shaft 14, carrying tight and loose pulleys 16 and 18 adapted to cooperate with the drive belt 20. The shaft 14 carries at one end a pinion 22 which meshes with the gear 24 carried on a shaft 26, there being any suitable type of clutch 27 by means of which the driving connection between the gear 24 and the shaft 26 can be made and broken at will. The shaft 26 carries a crank pin 28 which engages a pitman 30 having an elongated arm, the free end of which is engaged by a spring 32 anchored by an adjustable connection 34 to the frame. The pitman 30 carries a pin 36 which through a floating link 38 and another pin 40 actuates the toggle links 42 and 44.

The toggle link 42 is fulcrumed on a pin 46 secured to suitable fixed brackets 48. The toggle link 44, at its upper end, carries a pin 50 secured in depending ears 52 carried by a platen 54, which travels in vertically disposed guides 56. As thus arranged, it is clear that as the shaft 26 revolves, the crank motion will be imparted to the pitman 30, which through pin 36 and link 38 will actuate the toggle links in such manner as to vertically reciprocate the platen 54.

The reciprocating platen carries a die holder 58 which in turn carries a die 60 formed with a recess 62 adapted to receive a blank or slug S, from which a collapsible tube is to be formed by a process of extrusion by coaction with a plunger 64.

A supply of the metallic disc-like slugs, from which the tubes are adapted to be formed, is carried in a suitable magazine 65, a suitable mechanism therein forming no part of the present invention is provided for agitating the slugs and causing them to enter a gravity feed chute 67. The feed chute, as illustrated in part in Figs. 1 and 2 and in part in Fig. 4, is inclined to such angle that the discs guided therein will feed downwardly by gravity. The lower end of the feed chute 67, as shown in Figs. 1 and 4, terminates at a point in juxtaposition to the upper limit of travel of the die, which is carried by the vertically reciprocating platen.

I provide improved means for releasing one slug at a time from the feed chute and restraining the remaining slugs and also for transferring the released slug laterally of the die and for imparting a gentle blow to the face of the slug so as to properly position it in a recess of the die. Inasmuch as the die partakes of a vertical reciprocating motion and the slug feed chute is fixed, it will be appreciated that part of the feeding movement of the slug will take place while the latter is in motion. This presents a problem which is not present in those types of presses wherein the slugs or blanks are fed to a fixed die. To properly receive the slug released by the chute and to position it in the die, I provide a transfer mechanism and the hammer mechanism to be presently described, which is peculiarly well suited for use in connection with the slug feed release mechanism and the stripper mechanism.

Extending transversely of the path of travel of the slugs S in the chute 67 and located near the discharge end thereof, I provide laterally movable slug feed control pins 66 and 68 which are secured to arms 70 and 72, respectively, carried by a transversely shiftable rod 74 mounted for sliding movement in suitable bearing openings formed in a bracket 76. A spring 78 surrounds a portion of the rod 74 and is restrained between an ear on the bracket 76 and the arm 72 and thus tends to move the pins 66 and 68 transversely of the feed chute in one direction.

A dog 80 pivoted at 82 has a finger 84 which is adapted to move the rod 74 and thus the pins 66 and 68 in a direction contrary to that of the spring 78. The pivot stud 82 for the dog 80 is carried by a bracket 86, which is suitably secured to any fixed part of the frame of the machine. The dog has an operating arm 88 carrying a roller 90 for coaction with cam-like enlargement 94 formed near the upper end of a dog actuating member 96 secured to and movable with the platen 54. As thus arranged, it will be clear that near the end of the downstroke of the platen the cam enlargement 94 will rock the dog on its pivot and thereby shift the rod 74 transversely of the feed chute. This act will withdraw the pin 68 and thereby release the lowermost slug S, permitting it to glide by gravity to position for engagement with transferring mechanism to be presently described. At the same time, the pin 66 will be moved inward to the position shown in Fig. 4, so as to hold back the remaining slugs.

As the platen 54 makes its upward stroke, the spring 78 will move the rod 74 in a direction to withdraw the pin 66 from the feed chute, thus releasing a slug which will slide down the chute until stopped by the pin 68. This pin 68 will prevent the slug from leaving the feed chute until the dog 80 is rocked by engagement with the cam enlargement 94, which action takes place just slightly before the platen reaches the limit of its downward travel.

The slug S released by the pin 68 slides through a guide notch 98 formed in the member 100 supported by and movable with the platen 54. This member 100 carries guide members 102 and 104 for a transversely movable slide 106 having a notched portion 108 for engagement with the slug. The slide carries an upright 110 to which is secured a rearwardly extending member 112 carrying a roller 114 for coaction with a cam surface 116 formed on an upright plate 118, secured to any fixed part of the frame. Springs 120 secured at one end to a fixed anchor 122 and at their opposite ends to a rod 124 carried by brackets 126 tend to retract the slide, the cam of course tending to move the slide inwardly toward the die upon the downward movement of the platen. Such downward movement of the platen will thus cause the notch 118 of the slide to embrace the slug S and move it laterally to a position in which it will register with the recess 62 formed in the die. As the slug moves over the recess, it will be appreciated that the weight thereof may tend to cause it to tilt and thus become skewed or improperly positioned within the die. To prevent such skewing, I provide means for imparting a gentle blow or pressure to the upper face of the slug, so as to properly position it within the die.

This means, as best shown in Fig. 4, includes a hammer member 128, the head 130 of which will gently tap the upper face of the slug upon its properly being registered with the recess in the die. This hammer is pivotally mounted on the rod 124, which carries a torsion spring 131. The underside of the hammer during the initial part of its movement rides on a fixed bridge piece 132. But, when the transfer slide and the hammer reaches a position where the slug is aligned with the recess in the die, a cut away, cam-like portion 134 comes opposite the bridge piece 132 thereby permitting the spring 131 to apply a gentle hammer blow so as to properly seat the slug within the die.

Approximately at the end of the downward stroke of the platen, the slug will have thus been properly positioned in the die. During the initial portion of the upstroke of the platen the slug transfer slide will be retracted. Thereupon, continued upstroke of the platen will bring the die 60 and the punch 64 into such cooperative relationship that the slug will be transformed by sort of an extrusion process into a tube surrounding the plunger. My invention contemplates improved means for stripping the thus formed tube from the plunger. The plunger 64 is carried by a head 136 mounted for oscillation about a trunnion 138 carried in suitable bearings 140, secured to the frame of the machine.

A sleeve-like stripper 142 surrounds or embraces the plunger 64 and as indicated is arranged for edgewise engagement with the butt end of the tube when the latter is being pushed from the plunger. This stripper is adapted to be actuated by links 144 acting through studs 145 carried in the free ends thereof. These links are actuated by a cross bolt 146 secured to a head 148 formed at the lower end of a rod 150 mounted for vertically sliding movement in guides 152 carried by a bracket 154. The rod 150 carries a collar 156 against which presses a spring 158. This spring, reacting against the upper guide 152, assists in properly positioning the parts when they start to change movement from one extreme position to another as will more fully hereinafter appear. Rods 160 extend downwardly from the pin 146 carried by the cross piece 148 and pass freely through outwardly extending brackets 162 secured to cross head 54. The rods 160 at their lower ends carry nuts 164, which are adjustable relatively to the underside of the brackets 162 and collars 166, which are engageable with the upper faces of the brackets 162. The nuts 164 and collars 166 are so arranged that there is a limited amount of lost motion between them and said brackets 162.

As the platen 54 moves downwardly, means are provided for automatically oscillating the plunger 64 about the trunnion 138 and this angular oscillating movement augmented by the downward movement of the platen is effective to quickly and positively strip the tube from the plunger and eject it through a guide hopper, in a manner and by mechanism which will now be described.

As the link 38 in Fig. 2 moves to the right, the toggle mechanism will cause a downward movement of the platen 54. The link 38 during this downward movement of the platen will strike a roller 168 carried at the lower end of a lever 170, pivoted at 172 to the frame of the machine. This lever, at its opposite end, carries a pin 174 which operates in a slot formed in the lower arm 176 of another lever pivoted at 178 and having upwardly extending arm 180 which carries a stud 182 which coacts with an angularly disposed slot 184 formed in an arm 186 secured to and adapted to oscillate the plunger supporting member 136. A spring 188 secured at one end to a suitable fixed anchorage 190 and at the other end to a stud carried by the arm 186 normally tends to hold the plunger supporting member in a substantially vertical position and yet permits said member to yield so as to oscillate the same through the linkage connections shown and described. A spring 192 anchored at one end to the spring anchorage 190 and at the other end to the upper extremity of the arm 180 tends to rock said arm about its fulcrum pin 178 in a direction tending to hold the plunger 64 in substantially vertical position and, therefore, in alignment with the vertically mov-

able die carried by the platen 54. When the toggle links operate to move the platen downwardly, they will through the connections described rock the arms 180 and 186 and thus oscillate the plunger 64 from its truly vertical position through the intermediate position shown in Fig. 3 and to the ultimate tube discharging position shown diagrammatically in Fig. 5, thus the relative motion of the parts will, through the links 144, cause the stripper 142 to move in the direction of the length of the punch and thus strip the completed tube from the plunger while it is oriented in a position at an angle to the vertical.

In this way, the tube will be ejected with a slight impetus to a receiving hopper 194. This hopper will gently guide the completed tube to a traveling conveyor 196 which will carry the tube to any desired storage point or in position to be further acted upon by suitable tube finishing machinery.

Various modifications may be made by those skilled in the art without departing from the invention as defined in the appended claims.

What I claim is:—

1. A machine for making collapsible tubes comprising a reciprocating platen carrying a die, a plunger for coaction with said die, means for supporting the plunger for swinging movement about a fixed pivot, mechanism for reciprocating said platen, means for swinging said plunger about said fixed pivot, a one piece stripper sleeve embracing the plunger, a slidably mounted member, means for transmitting movement thereto from said platen and a link having a pivotal connection with the stripper sleeve and with said member and effective to move said stripper sleeve lengthwise of the plunger.

2. A machine for making collapsible tubes comprising a reciprocating platen carrying a die, a plunger for coaction with said die, means for supporting the plunger for swinging movement about a fixed pivot, mechanism for reciprocating said platen, means for swinging said plunger about said fixed pivot, a stripper embracing the plunger, a member slidable in a plane parallel to but offset from the plane along which the longitudinal axis of said die reciprocates, means for transmitting movement from the platen to said member and an angularly disposed laterally extending link connecting the stripper with said member and effective to move said stripper lengthwise of the punch.

3. A machine for making collapsible tubes comprising a vertically reciprocating platen carrying a die, a plunger for coaction therewith, a slug transfer slide carried by the platen, a gravity feed slug chute arranged to deliver slugs to said transfer slide, feed control pins movable transversely of the feed chute, and actuating means including a member carried by the platen for alternately shifting one of said pins to release a slug to said transfer slide and move the other pin to a position to restrain the movement along the chute of following slugs.

4. A machine for making collapsible tubes comprising, a reciprocating platen carrying a die, a plunger for coaction therewith, a gravity feed slug chute terminating adjacent said die, means for successively releasing one slug at a time from said chute, means for transferring such released slug to a position in registry with the die and means operable upon registration of the slug with the die for applying a light blow to the slug to properly seat it within the die.

5. A machine for making collapsible tubes comprising a reciprocating platen carrying a die, a plunger for coaction therewith, a gravity feed slug chute, terminating adjacent said die, means for successively releasing one slug at a time from said chute, a slide movable with said platen for transferring such released slug to a position in registry with the die and a hammer movable with said slide for gently striking the face of the slug to thus seat it within the die.

6. A machine for making collapsible tubes comprising a reciprocating platen carrying a die, a plunger for coaction therewith, a fixedly mounted slug feed chute having its outlet end terminating at a zone adjacent the line of travel of said die, a pair of slug feed control members responsive to the movement of said platen and effective to successively release one slug at a time from said feed chute when the platen reaches a predetermined position, means actuated by the movement of the platen for transferring each released slug to a point in registry with the die, and means synchronized with the movement of said transferring means for applying a light blow to the slug to properly seat it within the die.

7. A machine for making collapsible tubes comprising a reciprocating platen carrying a die, an oscillatably mounted plunger for coaction with said die, a fixed slug feed chute having its outlet end terminating at a zone adjacent the line of travel of said die, means for releasing one slug at a time therefrom, means movable with the platen for transferring such released slug to a point of registry with the die, means for imparting a gentle blow to the thus registered slug to properly position it within the die, a non-gripping stripper sleeve which partakes of the oscillating movement of said plunger and means for moving said stripper sleeve relatively to and in the direction of the length of said plunger.

8. A machine for making collapsible tubes comprising a reciprocating platen carrying a die, an oscillatably mounted plunger for coaction with said die, a fixed slug feed chute having its outlet end terminating at a zone adjacent the line of travel of said die, means for releasing one slug at a time therefrom, a slide mounted on the platen for transferring such released slug and positioning it within the die, a fixed cam for coaction with a roller for reciprocating said slide, a non-gripping stripper sleeve which partakes of the oscillating movement of said plunger and means for moving said stripper sleeve lengthwise along the plunger.

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