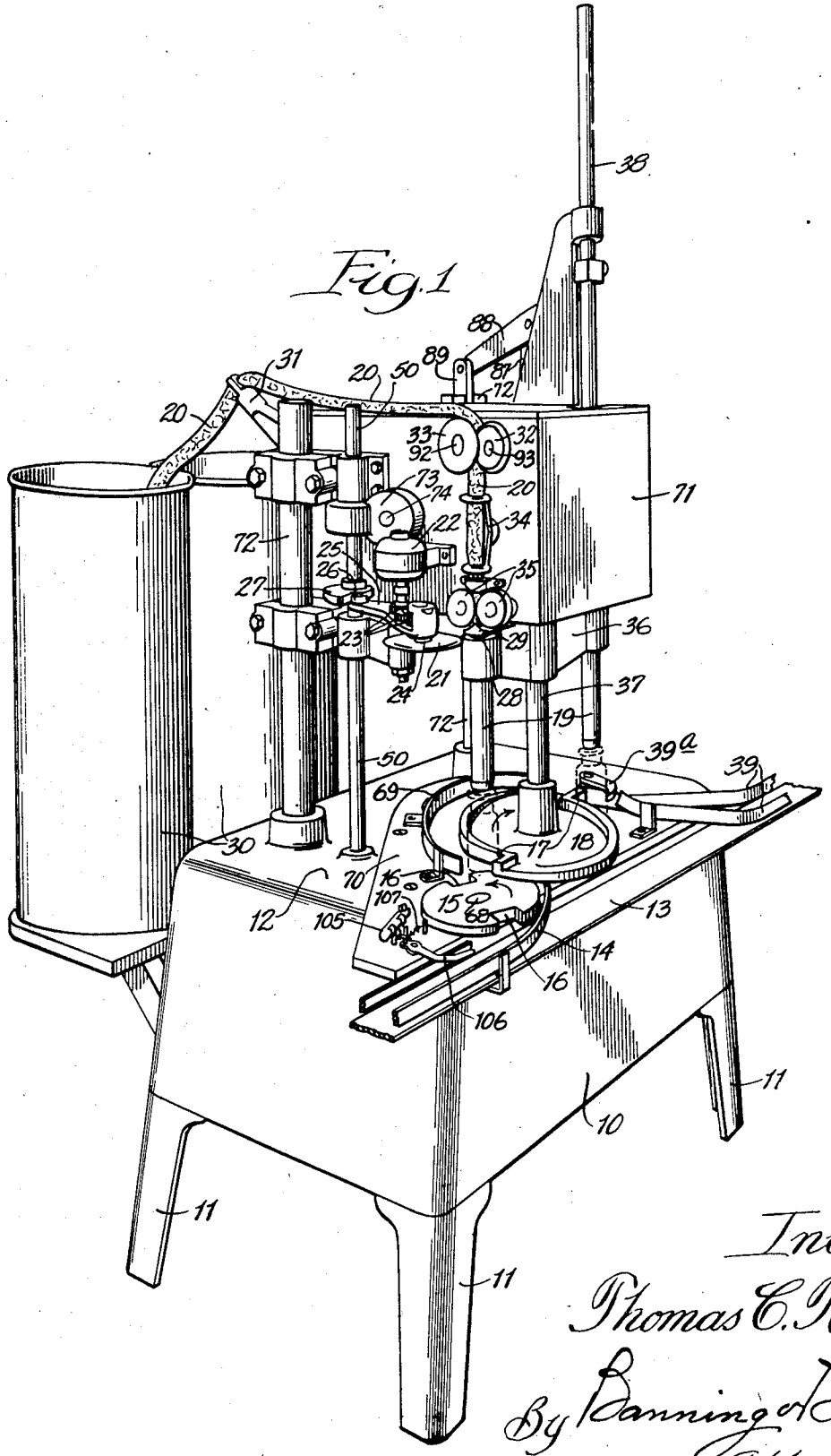
Sept. 5, 1939. T. C. KELLY 2,171,572

BOTTLE-WADDING MACHINE

Filed Feb. 10, 1938 6 Sheets-Sheet 1

Fig. 1



Inventor:
Thomas C. Kelly,
By Banning & Banning
Attorneys.

Sept. 5, 1939. T. C. KELLY 2,171,572

BOTTLE-WADDING MACHINE

Filed Feb. 10, 1938 6 Sheets-Sheet 2

Fig. 3

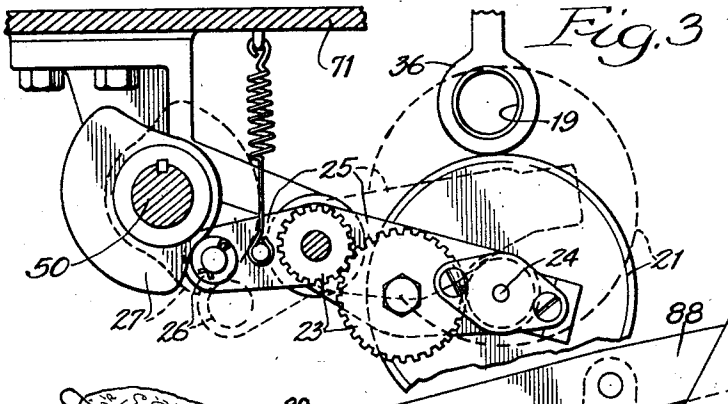


Fig. 2

Inventor:
Thomas C. Kelly,
By Dunning & Dunning
Attorneys.

Sept. 5, 1939. T. C. KELLY 2,171,572

BOTTLE-WADDING MACHINE

Filed Feb. 10, 1938 6 Sheets-Sheet 3

Fig. 4

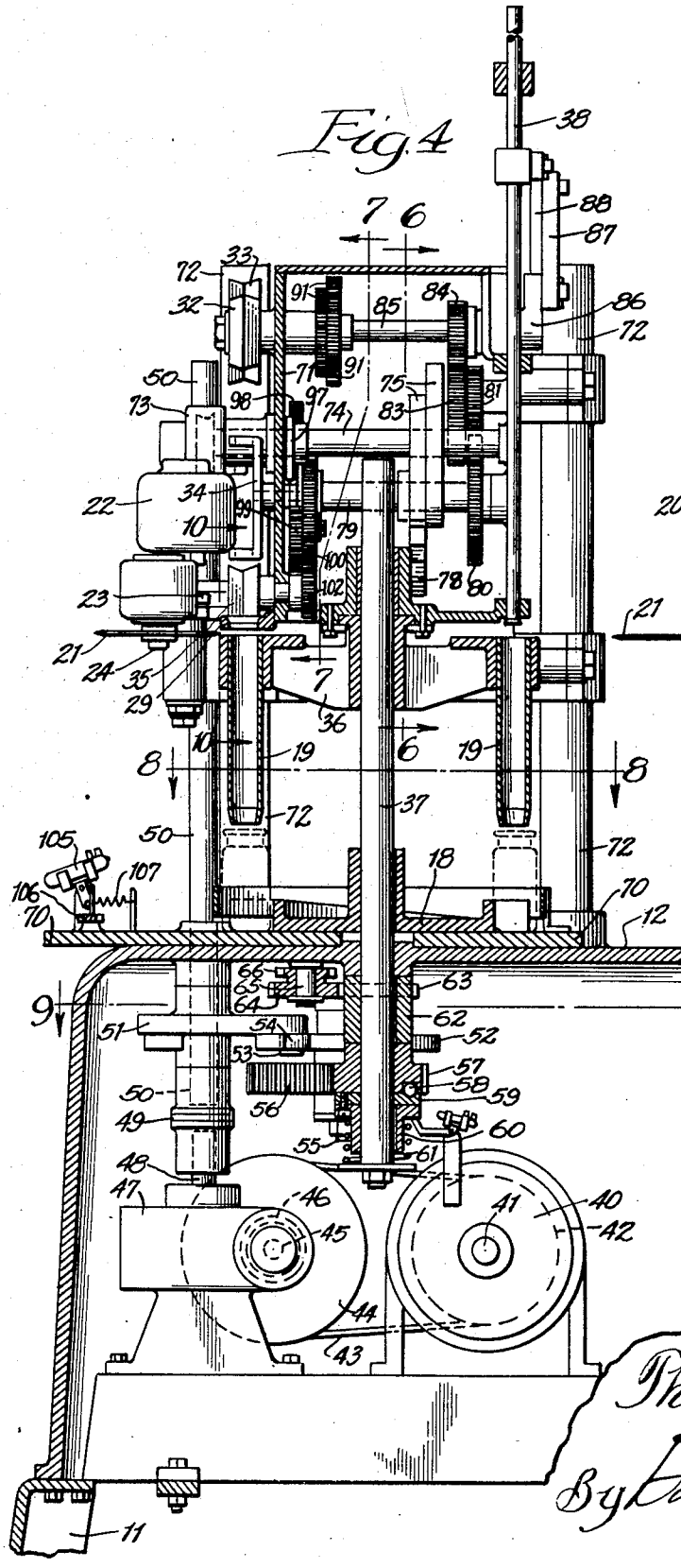
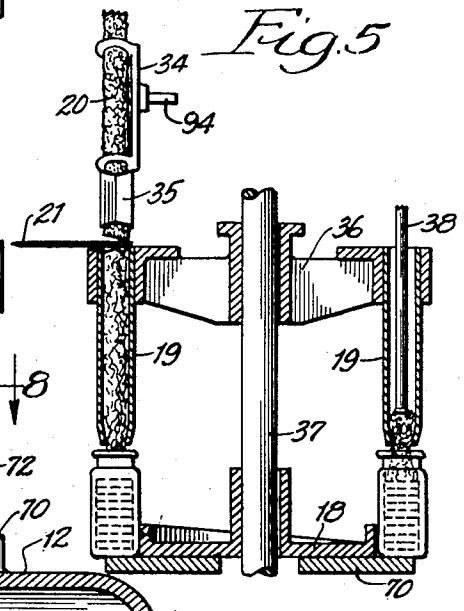


Fig. 5



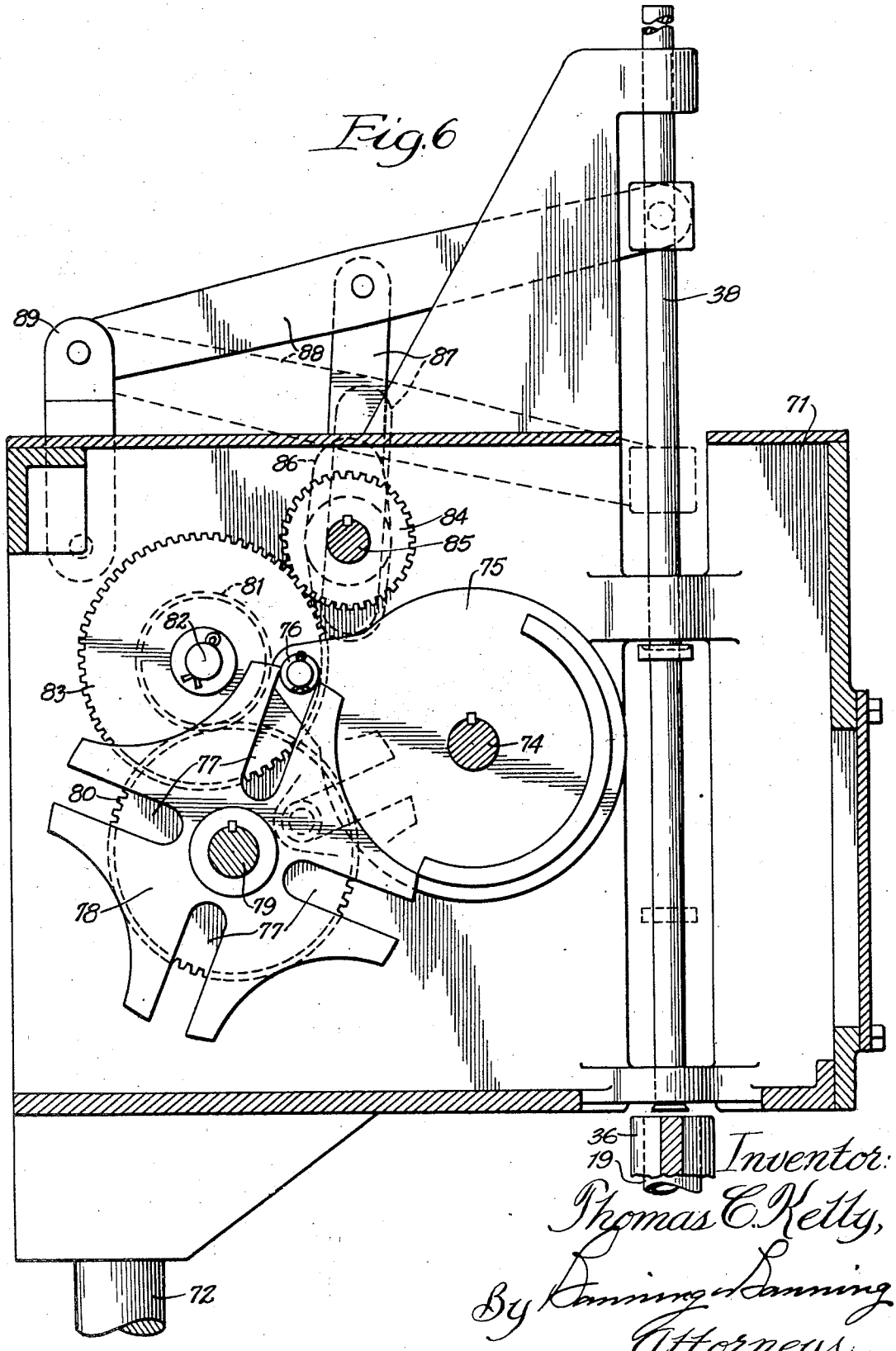
Inventor.
Thomas C. Kelly,
By Dunning & Dunning
Attorneys.

Sept. 5, 1939. T. C. KELLY 2,171,572

BOTTLE-WADDING MACHINE

Filed Feb. 10, 1938 6 Sheets-Sheet 4

Fig. 6



Inventor:
Thomas C. Kelly,
By Dunning & Dunning
Attorneys.

Sept. 5, 1939. T. C. KELLY 2,171,572

BOTTLE-WADDING MACHINE

Filed Feb. 10, 1938 6 Sheets-Sheet 5

Fig. 7

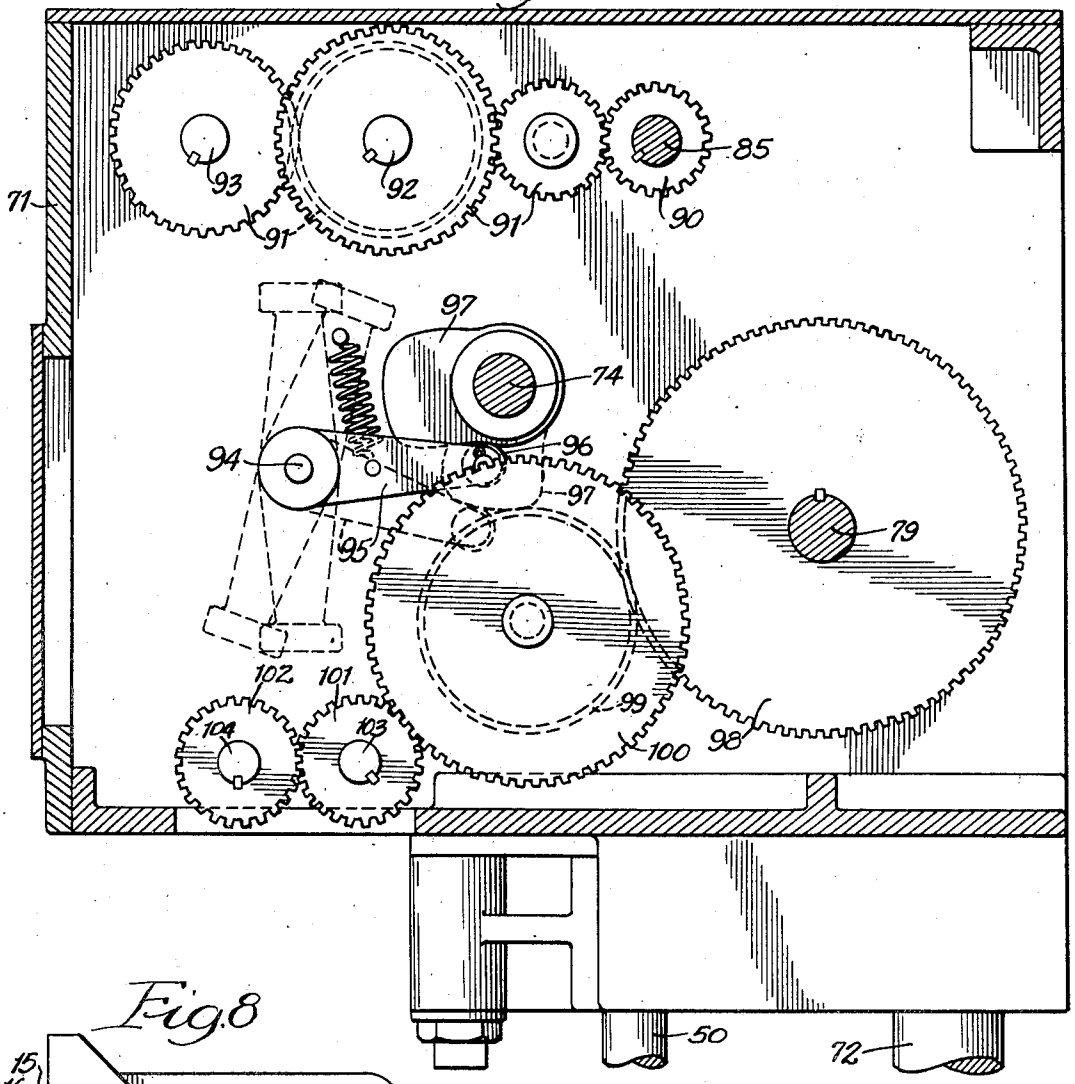
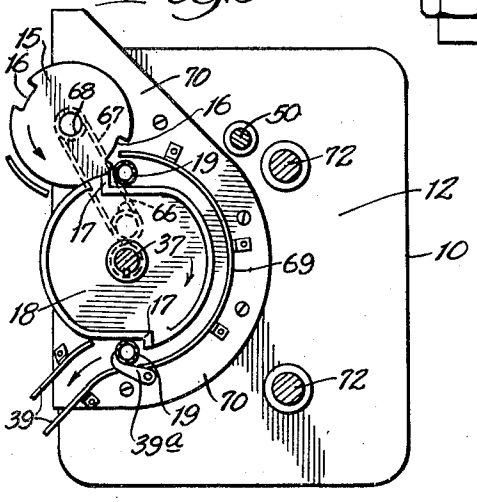


Fig. 8



Inventor:
Thomas C. Kelly
By Dunning & Dunning
Attorneys.

Sept. 5, 1939. T. C. KELLY 2,171,572

BOTTLE-WADDING MACHINE

Filed Feb. 10, 1938 6 Sheets-Sheet 6

Fig. 9

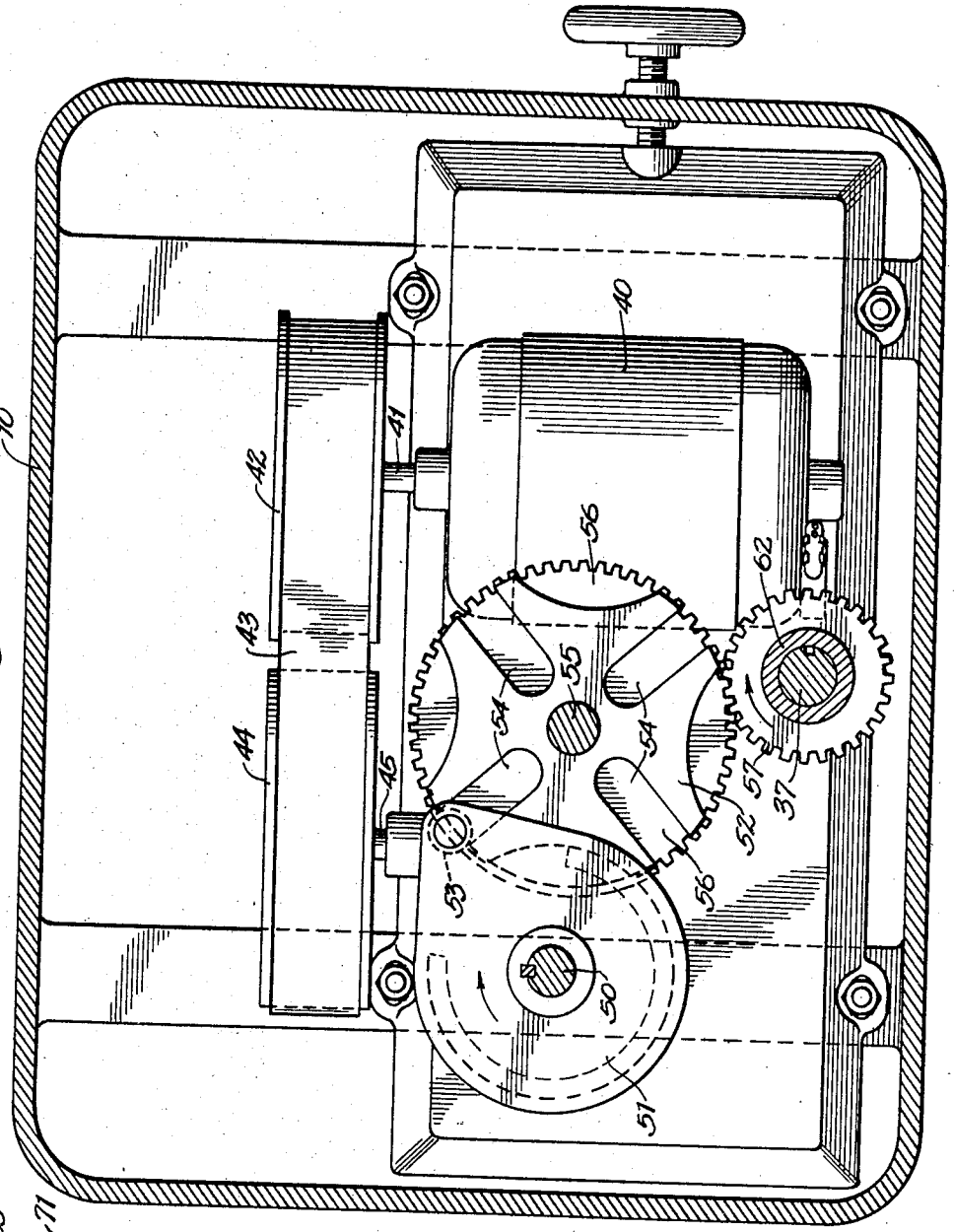
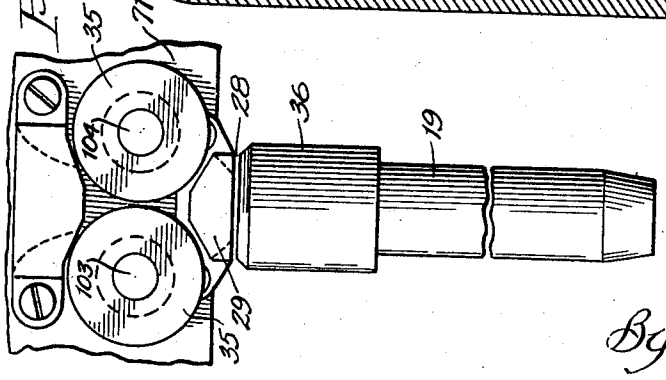


Fig. 10



Inventor:
Thomas C. Kelly,
By Canning & Canning
Attorneys.

Patented Sept. 5, 1939

2,171,572

UNITED STATES PATENT OFFICE

2,171,572

BOTTLE-WADDING MACHINE

Thomas C. Kelly, Hinsdale, Ill.

Application February 10, 1938, Serial No. 189,721

14 Claims. (Cl. 226—2)

In the packaging of medicinal tablets or the like, it is customary, either before or after the bottle has been filled with the required number of tablets, to insert a wad of cotton or other fibrous material into the bottle, to hold the contents in place or for other purposes. Heretofore this work has usually been done by hand and in a somewhat irregular or haphazard manner. This method of wadding bottles is objectionable, in that it may be unsanitary and is frequently wasteful of cotton, as well as relatively slow and expensive.

The wadding or inserting machine of the present invention is designed to operate in adjacent relation to a conveyor along which bottles, jars, cans or like receptacles are fed in the form of a continuous procession, and to divert the stream of bottles or other containers from the runway and through the machine of the present invention, which is designed to cut off charges of cotton wadding or like fibrous material from a continuous rope, sheet or strip of material, and to plug the bottles with the charge thus severed, and again deliver them back onto the runway in preparation for the reception of the caps or covers.

The machine includes mechanism for switching or shunting the bottles from the runway and delivering them into register with a chute; mechanism for charging the chute with a predetermined length of the fibrous wadding and severing the same; mechanism for arresting the feeding of the charge during the cutting operation to prevent the delivery of an excess amount; plunger mechanism for packing the charge down into the bottle; and driving means and connections for timing the various operations in such a way as to insure proper advance of the bottles through the machine and the performance in timed sequence of the various operations.

Further objects and details will appear from a description of the invention in conjunction with the accompanying drawings, wherein—

Figure 1 is a perspective view of the entire machine, showing a section of the runway;

Fig. 2 is a side elevation of the exterior operating parts viewed from a position at the left of Fig. 1;

Fig. 3 is a detail taken on line 3—3 of Fig. 2, showing the rotary cutter and associated parts;

Fig. 4 is a sectional elevation taken on line 4—4 of Fig. 2, looking in the direction of the arrows;

Fig. 5 is a sectional elevation of the wadding chute and plunger mechanism;

Fig. 6 is a sectional elevation taken on line 6—6 of Fig. 4, looking in the direction of the arrow;

Fig. 7 is a similar view, looking in the opposite direction, and taken on line 7—7 of Fig. 4;

Fig. 8 is a sectional plan view, taken on line 8—8 of Fig. 4;

Fig. 9 is a sectional plan view of the lower portion of the machine, taken on line 9—9 of Fig. 4; and

Fig. 10 is an elevation of the lower feed rollers and associated parts, taken on line 10—10 of Fig. 4.

The machine as a whole comprises a lower housing 10 of boxlike formation and mounted upon legs 11 to bring its top wall 12 to about the level of a runway 13 of the character commonly employed in the feeding of bottles or similar receptacles throughout a series of filling or packaging operations. The bottles proceed as a procession along the runway and are diverted inwardly to the wadding machine by a curved guide bar 14 which brings each bottle into proper relation to an intermittently rotating feed disk 15 provided on opposite sides with notches 16 which engage the bottles while standing upright. When a bottle is engaged it is moved forwardly by the feeding disk until it reaches the first position indicated in dotted lines in Fig. 1, at which point it will be engaged by one of two shoulders 17 formed by offsetting the flanged rim of an intermittently rotating carrier disk 18.

The means for operating these devices will be presently described in full detail, but for the present it suffices to state that the feeding disk and the carrier disk rotate in intermittently timed relation and in opposite directions to one another, as indicated by the arrows in Fig. 1.

After the bottle has reached the first position indicated in dotted lines, its progress will be momentarily arrested while it stands immediately beneath and in register with one of the pair of tubes 19 containing a charge of cotton wadding, which is cut free from a continuous rope 20 thereof by the action of a rotary cutter wheel 21 which is constantly driven at a high rate of speed by a motor 22 the shaft of which is in train through a set of gears 23 with a stub shaft 24 which carries the cutter wheel. These parts are carried by a swinging arm 25 which swivels upon the motor shaft as a center, and the arm at its rear end is provided with a roller 26 which is held by a spring against a cam 27 (Fig. 3) so that at recurrent intervals the constantly rotating cutter wheel will be swung inwardly into a slot or gap 28 located between the upper end of

one of the tubes 19 and a fixed shoe 29. The continuous rope of wadding is fed across this gap and into the tube 19, so that when the knife swings inwardly it will cut off a charge equal in length to that portion of the rope or strand which extends below the cutting line.

The wadding rope is housed within a tank or receptacle 30 and if fed upwardly therefrom through a guide arm 31 and between an upper convexly edged feed roll 32 and a concavely edged feed roll 33. The rope then passes downwardly through an oscillating guide arm 34, which at recurrent intervals is thrown into angular relation to the normal advance of the rope in order to temporarily impart a kink or bend therein for the purpose of momentarily drawing back the rope at the instant of cutting and thus preventing slivers of material being pulled downwardly during the cutting operation. Feeding and guiding of the wadding rope is further assisted by a pair of concavely edged lower feed rolls 35 located immediately above the shoe 29.

The tubes 19 are located at opposite ends of an intermittently rotating head 36 keyed upon the intermittently rotating shaft 37, which also mounts the carrier disk 18, so that as the nearer of the tubes 19 stands in position to receive a charge of wadding, with a bottle aligned with its lower end, the other tube 19 will have advanced to the farthermost position, at which point the previously loaded charge is forced downwardly into the bottle by the action of a reciprocating plunger rod 38 which strikes downwardly through the aligned tube 19 and forces the charge into the bottle during an instant of rest. The bottle at this instant is steadied by a spring backed hooked finger 39a, and after the wadding has been inserted into the bottle it passes outwardly between guide rails 39 and back onto the runway for capping or further manipulation.

The carrier disk and the tubes with their mountings rotate intermittently in unison with two periods of rest during each complete cycle, the first of which affords time for the cutting off of a charge of wadding, and the second of which affords time for the delivery of the charge. The mechanism for performing these operations in properly timed relationship will now be described in detail.

Referring to Fig. 4, the housing 10 has mounted therein a motor 40 having a shaft 41 carrying a pulley 42 mounting a belt 43 which imparts power to a pulley 44 on a shaft 45 which carries a worm 46 engaging a gear in a reduction gear box 47 for imparting rotation to a stub shaft 48, which is connected by a coupling 49 with a vertical shaft 50 which extends upwardly through the top of the housing and carries the cam 27 for oscillating the cutter wheel mountings.

The shaft 50, within the housing, carries a disk 51 which constitutes part of a Geneva movement group and coacts with a star wheel 52 (Fig. 9) through the medium of a pin 53 which successively engages and rides down into each of a plurality of radial slots 54, thereby serving to impart intermittent rotary movement to a vertical stub shaft 55 which carries a spur gear 56 meshing with a pinion 57 loosely mounted upon the vertical shaft 37 which carries the head 36 and the carrier disk 18.

The freely mounted pinion 57 on its lower face is recessed to receive clutch balls 58 which engage a recess in a friction plate 59 carried by a collar 60 surrounded by a coil spring 61. The collar 60 is slidably keyed to the shaft 37 so that the spring will normally maintain a clutching relationship between the shaft and the pinion 57, but in the event of breakage of a receptacle in the machine, the clutch arrangement will permit yielding of the parts in order to avoid damage.

The shaft 37 also carries a collar 62 having gear teeth 63, which collar is keyed upon the shaft and rotates therewith. The gear teeth mesh with a pinion 64 mounted upon a depending stub shaft 65 which carries a sprocket wheel 66 upon which is mounted a sprocket chain 67 (Fig. 8) for imparting intermittent rotation to the shaft 68 which carries the feed disk 15. This arrangement causes the feed disk and the carrier disk to rotate in unison in opposite directions and in timed relationship to deliver a bottle to the carrier disk at the instant when one of the offset shoulders 17 arrives at and momentarily stops at the receiving position, at which point the bottle will be released by the feed disk, and after momentary arrest will be carried forward within a runway afforded by a curving guide plate 69 having a curvature concentric with the axis of the carrier disk 18. The floor of the runway thus provided is afforded by the surface of a flat plate 70 secured to the top of the housing 10.

The mechanism for actuating the feed rolls, the rotary cutter, and the plunger, will now be described. The continuously rotating shaft 50 carrying the cutter actuating cam 27 extends upwardly outside of the upper housing 71 carried by standards 72 springing upwardly from the top of the lower housing 10. The shaft 50 actuates a worm gear train located in a worm gear box 73 for driving a horizontal shaft 74 which carries the actuating disk 75 of a Geneva movement, being provided with a roller 76 which recurrently engages the slots 77 of a star wheel 78 mounted upon a shaft 79 (Fig. 6)

The shaft 79 carries a spur gear 80 meshing with a pinion 81 on a shaft 82, which also carries a spur gear 83 meshing with a pinion 84 on a crank shaft 85, which at its rear end mounts a crank 86 on which is pivoted a link 87 connecting with a lever arm 88 pivoted at its rear end upon a swinging arm 89 and pivoted at its forward end to the plunger 38. This train of connections serves to recurrently impart quickly timed reciprocating movements to the plunger at the instant when one of the tubes 19 has been swung around to registering position at the lower end of the plunger and is momentarily arrested, so that at this instant the previously inserted charge of wadding will be driven downwardly and packed through the mouth of the bottle, and the plunger will return before the advancing movement of the bottle is resumed.

It will be observed that the gear train for transmitting motion from the intermittently rotated Geneva wheel shaft 79 is one which imparts a 1 to 4 ratio of movement to the crank shaft 85, so that a one-eighth turn of the star wheel 78 will impart the downward thrust of the plunger 38 which brings the star wheel to the dotted line position of rest, after which a one-eighth rotation of the star wheel will restore the plunger rod to its elevated position. These movements are thus speeded sufficiently to effect a ramming down of the cotton wadding through the tube 19 while the parts are in register and at rest, since the star wheel 52, which controls the movements of the carrier disk, acts in timed relation with the plunger actuating mechanism so that the necessary movements can occur without interference.

As shown in Fig. 7, the shaft 35 carries a gear 90 which through a gear train 91 actuates feed roll shafts 92 and 93 upon which the upper feed rolls 33 and 32 are respectively mounted. The peripheries of these rolls nest together so that in unison they exert sufficient clamping pressure against the rope of cotton wadding to intermittently feed the same downwardly through the oscillating guide tube 34. This tube, which normally is vertically aligned with the rope of wadding, is mounted upon an oscillating pintle 94 which carries an arm 95 having a roller 96 which is engaged by a cam 97 on the continuously rotating Geneva movement shaft 74, so that the guide tube 34 will be recurrently oscillated into an oblique position which puts a kink or bend into the wadding rope at the instant when the rotary feed wheel moves to cutting position, so that the rope will be drawn back during the interval while a charge is being severed.

The intermittently rotating shaft 79 of the Geneva group intermittently drives the lower feed roll 35 through a gear train which includes the spur gear 98, the pinion 99, the spur gear 100, and intermeshing pinions 101 and 102 mounted respectively on the feed roll shafts 103 and 104.

A mercury switch 105 (Figs. 1 and 4) is mounted in proximity to the runway 13 and is adapted to be tilted by a pivoted finger 106 engaged by a spring 107 which normally holds the finger into transverse obstructing relation to the runway, but as containers arrive and pass forward in processional relation, the finger will be pressed inwardly by the pressure of the advancing bottles, and this will tilt the mercury switch into position to close the electrical circuit which controls the supply of current to the motors 40 and 22, so that as long as the bottles are advancing to the bottle wadding machine the motors will be energized and the feeding and wadding operations will continue, but when the procession of bottles terminates or is interrupted, the current will be shut off.

Operation

In operation a procession of bottles or similar receptacles will advance to the wadding machine and be engaged singly by the feed disk and carried inwardly to the first position, at which point the movement of each bottle will be momentarily arrested at the point where it registers with the aligned tube 19. Thereafter, the bottle in register with the tube will be carried around to the second position, during which interval the tube will receive a charge of wadding, which will be cut off from the continuous rope by the action of the cutter wheel.

With the bottle in the second arrested position and in register with the loaded tube 19, the plunger will descend and immediately recede, thereby loading the bottle with a charge of wadding, after which it is delivered back onto the runway and proceeds to its destination.

The mechanism employed for timing and regulating the movements of the operating parts insures the feeding down and cutting off of a charge of wadding during the first interval of rest and the discharge thereof during the second interval of rest, so that the operation of the fixedly positioned mechanisms will be harmoniously coordinated with the intermittently movable tubes 19 and the bottles associated therewith.

The invention is one which insures uniformity in the size of the cotton wads and rapidity and certainty in the wadding operation, without contact with the human hand, thereby obviating the possibility of contamination, and at the same time maintaining a speed of operation commensurate with the speed of advance of the bottles in their progress from the antecedent bottle filling machines or appliances to the point of ultimate discharge.

Although the invention has been described with particularity as to detail, it is not the intention, unless otherwise indicated in the claims, to limit the mechanism to that shown, since modifications in structure may be introduced without departing from the spirit of the invention.

I claim:

1. In a wadding machine of the class described, the combination of a tube adapted to register with the mouth of a receptacle and adapted to receive a charge of wadding for delivery of the same into the interior of the receptacle, means for drawing forward a continuous length of wadding and projecting the forward end thereof into the tube, means for severing the forward end thus fed to constitute a charge, means for bringing the receptacle and the tube into register, a plunger located in position to enter the tube when in register with the receptacle and adapted to eject the charge therefrom into the receptacle, and means for actuating the operating parts in timed relationship.

2. In a wadding machine of the class described, the combination of an intermittently rotatable carrier disk adapted to move a receptacle from a first position of rest to a second position of rest, a tube rotatable with the carrier disk and adapted when standing in the first position of rest to register with the receptacle, means for drawing forward a continuous rope of wadding and projecting the forward end thereof into the tube when in the first position and means for severing the forward end therefrom to constitute a charge, a reciprocable plunger adapted to register with the tube and receptacle when moved to the second position of rest, and means for actuating the operating devices in timed relationship to one another.

3. In a wadding machine of the class described, the combination of an intermittently rotatable carrier disk adapted to move a receptacle from a first position of rest to a second position of rest, a tube rotatable with the carrier disk and adapted when standing in the first position of rest to register with the receptacle, means for drawing forward a continuous rope of wadding and projecting the forward end thereof into the tube when in the first position and means for severing a length therefrom to constitute a charge, a device for obstructing the withdrawal of an excessive amount of wadding during the severing operation, a reciprocable plunger adapted to register with the tube and receptacle when moved to the second position of rest, and means for actuating the operating devices in timed relationship to one another.

4. In a wadding machine of the class described, the combination of an intermittently rotatable carrier disk adapted to move a receptacle from a first position of rest to a second position of rest, a tube rotatable with the carrier disk and adapted when standing in the first position of rest to register with the receptacle, means for feeding forward a continuous rope of wadding into the tube when in the first position and means for severing a length therefrom to constitute a charge, an oscillatory guide member for the rope of wadding, adapted during the severing opera-

tion to be moved into angular relationship to the normal line of advance of the rope to obstruct the free flow thereof, a reciprocable plunger adapted to register with the tube and receptacle when moved to the second position of rest, and means for actuating the operating devices in timed relationship to one another.

5. In a wadding machine of the class described, the combination of an intermittently rotatable carrier disk adapted to move a receptacle from a first position of rest to a sceond position of rest, a tube rotatable with the carrier disk and adapted when standing in the first position of rest to register with the receptacle, means for feeding forward a continuous rope of wadding into the tube when in the first position, and means for severing a length therefrom to constitute a charge, an oscillatory guide tube through which the continuous rope of wadding is directed and adapted during the severing operation to be moved into angular relation to the normal line of advance of the rope to form a kink therein to obstruct the free flow of the material, a reciprocable plunger adapted to register with the tube and receptacle when moved to the second position of rest, and means for actuating the operating devices in timed relationship to one another.

6. In a wadding machine of the class described, the combination of an intermittently rotatable carrier disk provided with a shoulder adapted in its first posiiton of rest to engage a receptacle and carry the same forward in a curvilinear path, a tube mounted for intermittent rotation with the carrier disk and adapted in the first position of rest to register with a receptacle, means for feeding a continuous rope of wadding into the tube while in the first position of rest, a rotary knife and means for rotating the same, and a mounting therefor for swinging the knife inwardly into cutting position during the first interval of rest to sever a charge from the continuous rope of wadding, means for discharging the charge of wadding from the tube when moved to the second position of rest, and connections for actuating the operating parts in timed relationship to one another.

7. In a wadding machine of the class described, the combination of an intermittently rotatable carrier disk provided with a shoulder adapted in its first position of rest to engage a receptacle and carry the same forward in a curvilinear path, a tube mounted for intermittent rotation with the carrier disk and adapted in the first position of rest to register with a receptacle, means for feeding a continuous rope of wadding into the tube while in the first position of rest, a rotary knife and means for rotating the same and a mounting therefor for swinging the knife inwardly into cutting position during the first interval of rest to sever a charge from the continuous rope of wadding, a plunger mounted for reciprocation in line with the tube when occupying the second position of rest and adapted to then discharge the previously inserted charge of wadding into the receptacle, and connections for actuating the operating parts in timed relationship to one another.

8. In a wadding machine of the class described, the combination of an intermittently rotatable carrier disk adapted when in its first position of rest to engage a receptacle, a pair of tubes and an intermittently rotatable mounting therefor adapted to bring the tubes alternately to the first position of rest and thereafter move them alternately to a second position of rest, feeding means for advancing a continuous rope of wadding and projecting the forward end thereof into each of the tubes alternately when standing in the first position of rest and cutting devices for severing the forward end of the rope of wadding thus delivered to constitute a charge, means for discharging the charges alternately from the respective tubes when moved to the second position of rest, and means for actuating the operating parts in timed relationship to one another.

9. In a wadding machine of the class described, the combination of an intermittently rotatable carrier disk adapted when in its first position of rest to engage a receptacle, a pair of tubes and an intermittently rotatable mounting therefor adapted to bring the tubes alternately to the first position of rest and thereafter move them alternately to a second position of rest, feeding means for advancing a continuous rope of wadding and projecting the forward end thereof into each of the tubes alternately when standing in the first position of rest and cutting devices for severing the forward end of the rope of wadding thus delivered to constitute a charge, a reciprocating plunger for discharging the charges alternately from the respective tubes when moved to the second position of rest, and means for actuating the operating parts in timed relationship to one another.

10. In a wadding machine of the class described, the combination of an intermittently rotatable carrier disk adapted when in its first position of rest to engage a receptacle, a pair of tubes and an intermittently rotatable mounting therefor adapted to bring the tubes alternately to the first position of rest and thereafter move them alternately to a second position of rest, feeding means for advancing a continuous rope of wadding and projecting the forward end thereof into each of the tubes alternately when standing in the first position of rest and cutting means for severing the forward end of the rope of wadding thus delivered to constitute a charge, means for discharging the charges alternately from the respective tubes when moved to the second position of rest, and means for actuating the operating parts in timed relationship to one another, said means including Geneva movement mechanisms for feeding intermittent movements of the carrier disk, the tube mountings, and the discharging mechanisms.

11. In a wadding machine of the class described, the combination of an intermittently rotatable carrier disk adapted when in its first position of rest to engage a receptacle, a pair of tubes and an intermittently rotatable mounting therefor adapted to bring the tubes alternately to the first position of rest and thereafter move them alternately to a second position of rest, feeding means for advancing a continuous rope of wadding and projecting the forward end thereof into each of the tubes alternately when standing in the first position of rest and cutting devices for severing the forward end of the rope of wadding thus delivered to constitute a charge, a reciprocating plunger for discharging the charges alternately from the respective tubes when moved to the second position of rest, and means for actuating the operating parts in timed relation to one another, said means including Geneva movement mechanisms for feeding intermittent movements of the carrier disk, the tube mountings, and the discharging mechanisms.

12. In a wadding machine of the class de-

scribed, in combination with a runway for guiding forward a procession of receptacles, an intermittently rotatable notched feeding disk adapted to engage the receptacles singly and carry the same inwardly, an intermittently rotatable carrier disk provided with a shoulder adapted to singly engage the receptacle delivered by the feeding disk and carry the same forwardly in a curvilinear path from a first position of rest to a second position of rest, an intermittently rotatable tube adapted to register with the receptacle in the first position of rest and to move therewith to the second position of rest, means for feeding forward a continuous rope of wadding material and projecting the forward end thereof into the tube when standing in the first position of rest, cutter means adapted during said interval to sever the forward end of the wadding so delivered to constitute a charge, and means for entering into and discharging the charge from the tube when standing in the second position of rest, and connections for actuating the operating devices in timed relation to one another.

13. In a wadding machine of the class described, in combination with a runway for guiding forward a procession of receptacles, an intermittently rotatable notched feeding disk adapted to engage the receptacle singly and carry the same inwardly, an intermittently rotatable carrier disk provided with a shoulder adapted to singly engage the receptacle forwardly in a curvilinear path from a first position of rest to a second position of rest, an intermittently rotatable tube adapted to register with the receptacle in the first position of rest and to move therewith to the second position of rest, means for feeding forward a continuous rope of wadding material and projecting the forward end thereof into the tube when standing in the first position of rest, cutter means adapted during said interval to sever the forward end of the wadding so delivered to constitute a charge, a reciprocating plunger for entering into and discharging the charge from the tube when standing in the second position of rest, and connections for actuating the operating devices in timed relation to one another.

14. In a wadding machine of the class described, in combination with a runway for guiding forward a procession of receptacles, an intermittently rotatable notched feeding disk adapted to engage the receptacles singly and carry the same inwardly, an intermittently rotatable carrier disk provided with a shoulder adapted to singly engage the receptacle forwardly in a curvilinear path from a first position of rest to a second position of rest, an intermittently rotatable tube adapted to register with the receptacle in the first position of rest and to move therewith to the second position of rest, means for feeding forward a continuous rope of wadding material and projecting the forward end thereof into the tube when standing in the first position of rest, cutter means adapted during said interval to sever the forward end of the wadding so delivered to constitute a charge, a reciprocating plunger for entering into and discharging the charge from the tube when standing in the second position of rest, and connections for actuating the operating devices in timed relation to one another, said actuating connections including Geneva movement mechanisms for imparting intermittent rotary movements to the feeding disk, the carrier disk, and the tube.

THOMAS C. KELLY.