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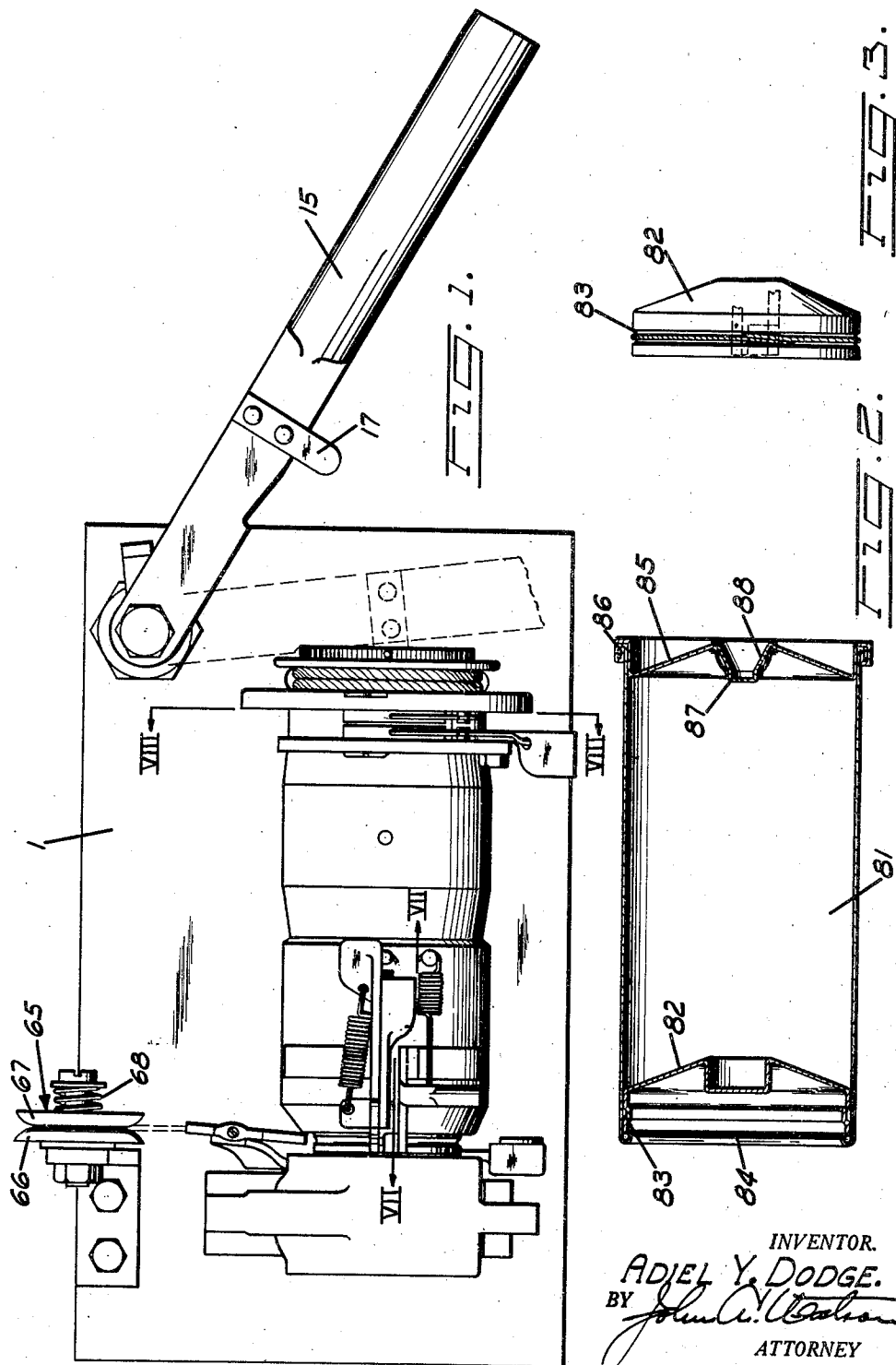
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MACHINE FOR ASSEMBLING PACKING ON PISTONS AND THE LIKE

Filed Jan. 16, 1936

5 Sheets-Sheet 1



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MACHINE FOR ASSEMBLING PACKING ON PISTONS AND THE LIKE

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5 Sheets-Sheet 2

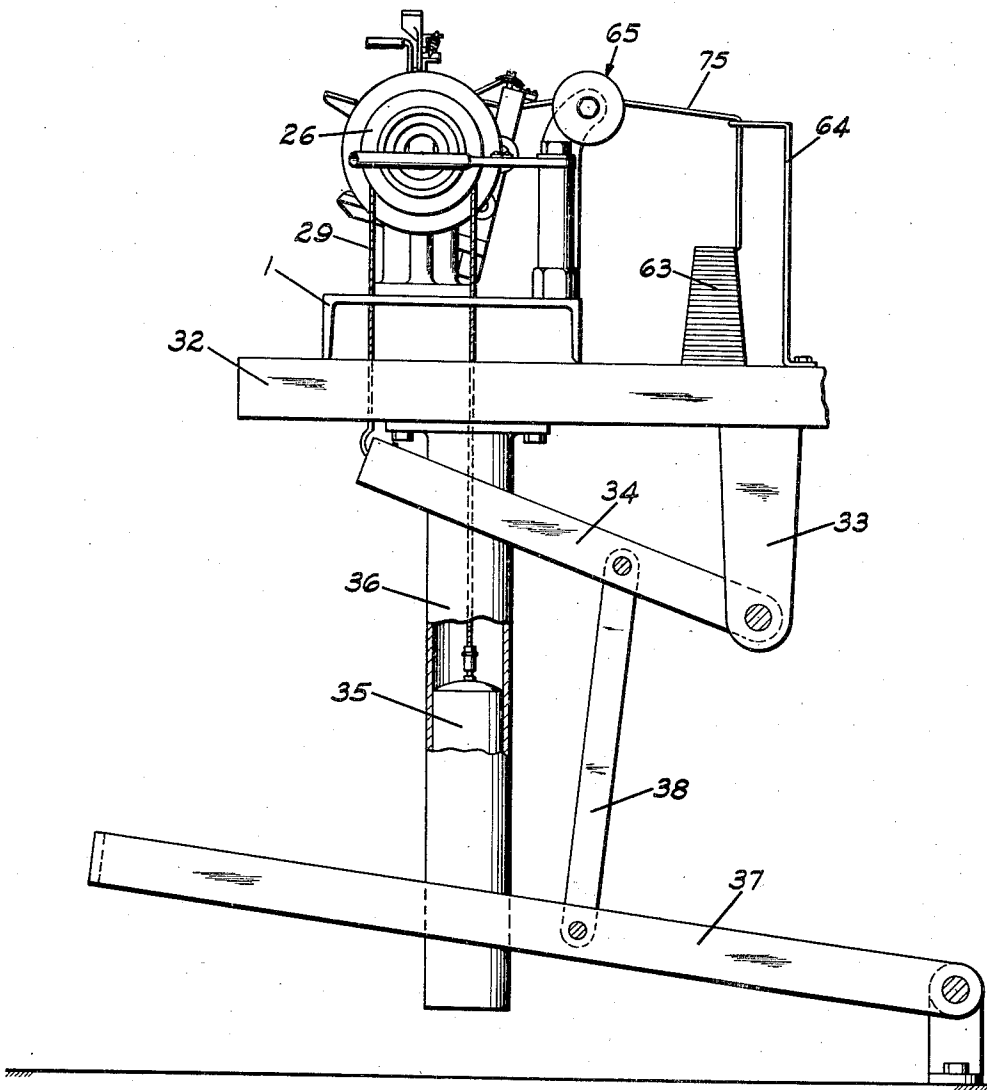


FIG. 4.

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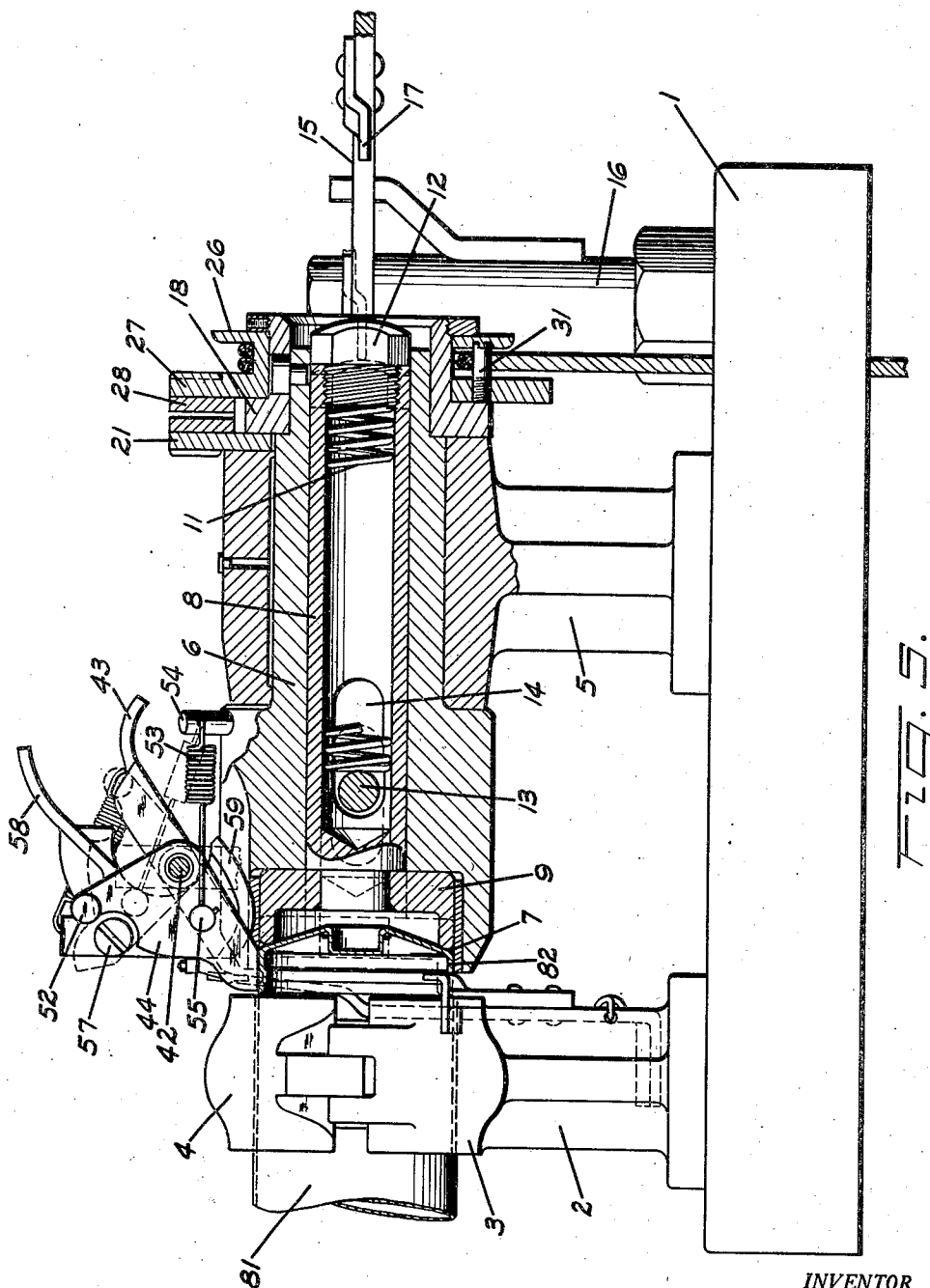
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5 Sheets-Sheet 3



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Filed Jan. 16, 1936

5 Sheets-Sheet 4

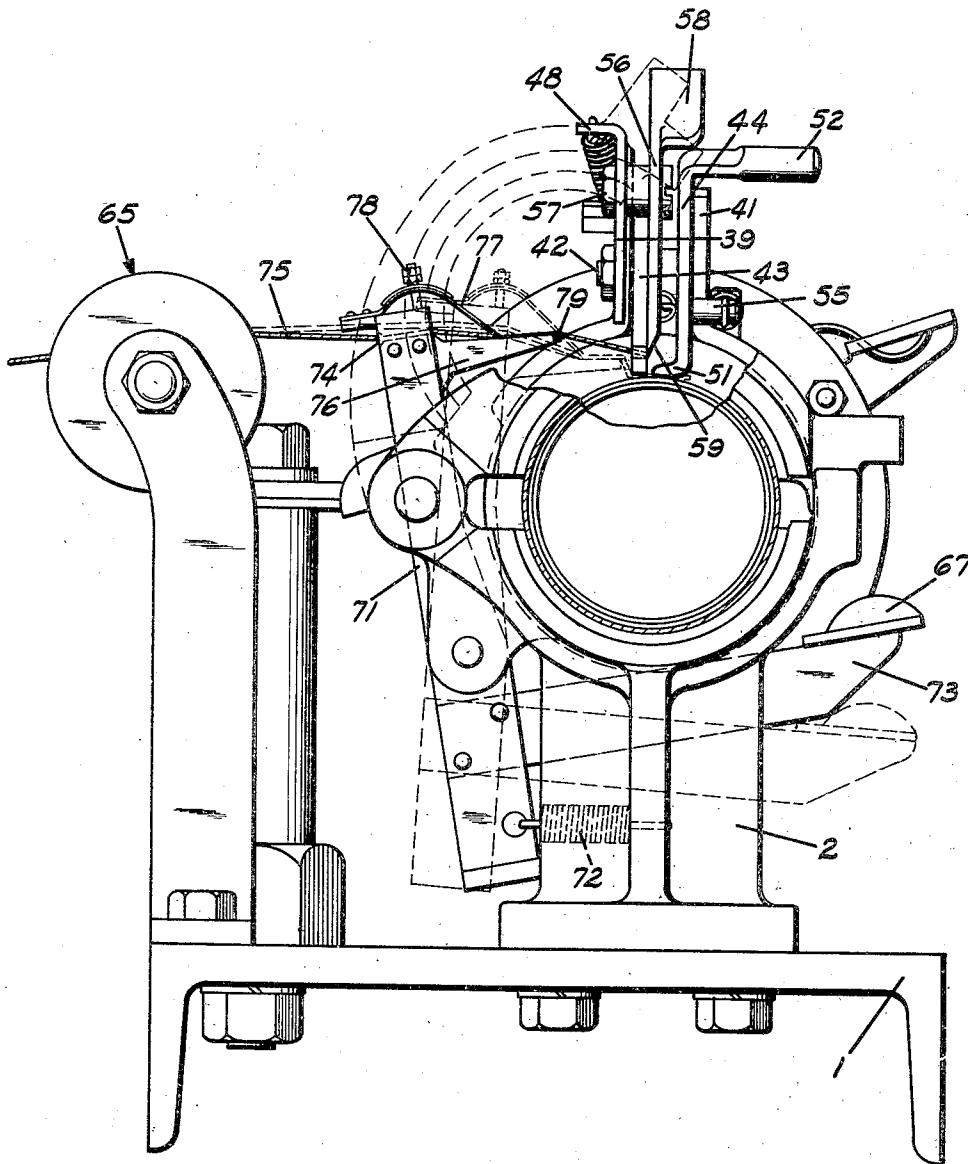


FIG. 6.

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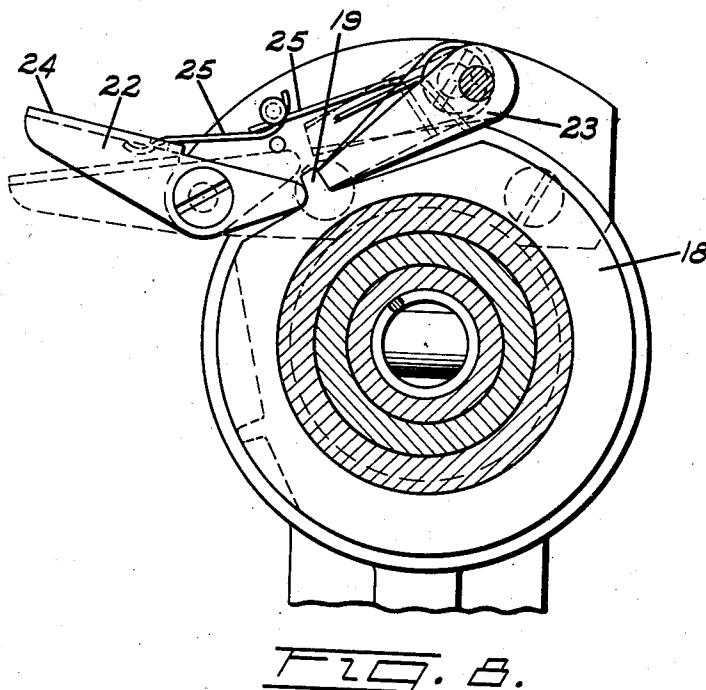
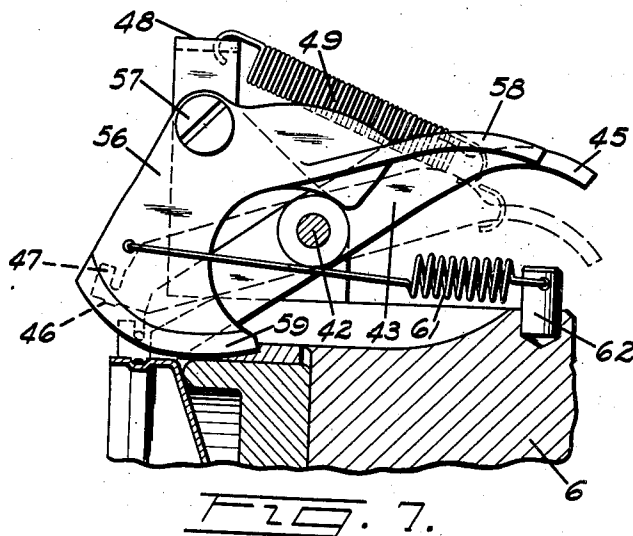
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MACHINE FOR ASSEMBLING PACKING ON PISTONS AND THE LIKE

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## UNITED STATES PATENT OFFICE

2,138,144

MACHINE FOR ASSEMBLING PACKING ON  
PISTONS AND THE LIKEAdiel Y. Dodge, South Bend, Ind., assignor to The  
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Application January 16, 1936, Serial No. 59,414

13 Claims. (Cl. 29—84)

This invention relates to assembling machines and more particularly to machines for assembling packing material in the form of an elongated strand on pistons or followers.

5 The invention is especially useful in connection with the manufacture of containers or cartridges for plastic or semi-plastic materials such as the lubricant cartridge described and claimed in the patent to McConkey No. 1,955,339, dated  
10 April 17, 1934. This cartridge includes a movable end closure which may serve as a piston against which thrust is exerted to eject the contents of the cartridge forcibly or as a follower to prevent air from piercing or cavitating the  
15 lubricant as it is aspirated or sucked from the cartridge. In order to prevent leakage, the piston or follower (hereinafter referred to simply as a piston) may be provided with a peripheral groove and a strand of packing material such as  
20 twine, paper, tape or the like may be wound around the groove to form a tight seal with the walls of the container or cartridge.

The assembly of a strand of packing material on a piston has been found to be very slow and  
25 tedious when done by hand and it has been difficult to maintain the packing strand in place on the piston during assembly of the piston in the cartridge. Accordingly, it is a primary object of the invention to provide an assembling machine  
30 which will form and assemble a strand of packing material on a piston and thereafter insert the piston into a cartridge with a maximum of speed and accuracy.

35 Another object is to provide an assembling machine which will wind a strand of packing material around a piston and cut off the strand at the desired point.

40 Other objects, the advantages and various novel features of the invention will be apparent from the following description when read in connection with the accompanying drawings, in which:

Fig. 1 is a plan view of a machine embodying the invention;

45 Fig. 2 is a central section of a completed cartridge which may be assembled on the machine of Fig. 1;

Fig. 3 is a side view of the piston of Fig. 2 with packing material assembled thereon;

50 Fig. 4 is an end view looking from the right of Fig. 1 with parts in section;

Fig. 5 is a side elevation of the machine of Fig. 1 with parts in section;

55 Fig. 6 is an end elevation looking from the left of Fig. 1 with parts removed;

Figs. 7 and 8 are partial sections on the lines VII—VII and VIII—VIII, respectively, of Fig. 1.

The form of the invention illustrated in the drawings consists essentially of a base supporting a clamp to hold a cartridge body into which a piston is to be assembled, a rotary head for supporting a piston and carrying clamp means and cut off means for holding a strand of packing material on the piston and severing it at the proper time, a feeding device for feeding a strand of material on to the piston during rotation of the head and mechanism for removing the piston from the head and forcing it into the cartridge. In use, a piston is placed in the head, the end of a strand of packing material is clamped against the piston and the head is rotated to wind the strand around the piston. After the strand has been wound around the piston, it is cut off and the piston is forced from the head and into a cartridge which is supported in the clamping device.

Referring more particularly to the drawings there is shown a base 1 to which is rigidly secured a bracket 2 terminating at its upper end in a semi-cylindrical clamp member 3. The clamp is completed by a semi-cylindrical clamp member 4 pivoted to the clamp member 3 and cooperating therewith to clamp a cartridge body in place. Aligned with the bracket 2 is a bracket 5 providing a cylindrical bearing surface for rotatably supporting a head 6 substantially in alignment with the clamp 3—4. The head terminates at one end adjacent the clamp in a socket 7 which is adapted to receive and to engage frictionally a piston on which a packing is to be assembled.

The head 6 is bored axially and an ejector 8 is slidably mounted in the bore therein and terminates in an end portion 9 slidably fitting in the socket 7. The ejector 8 has a hollow rearwardly extending stem to receive a compression spring 11 seating at one end against the end 12 of the ejector and its opposite end against a pin 13 which is secured in the head 6 and projects through suitable slots 14 in the ejector. The spring serves to urge the ejector rearwardly or to the right as viewed in Fig. 5 and a lever 15 pivoted on a post 16 which is secured to the base 1 is adapted to be swung into engagement with the end 12 of the ejector to move the ejector to the left and force a piston from the socket 7. If desired, the lever 15 may be provided with a projecting finger or lug 17 to engage the end of the ejector.

In order to rotate the head 6, it is provided

with an annular flange 18 which is formed with a cut-away portion to leave a single projecting tooth 19. A flange 21 is secured to the bracket 5 adjacent the flange 18 and carries two pivoted 5 pawls 22 and 23 which engage the tooth 19 to properly center the head and to prevent rotation thereof in either direction. The pawl 22 terminates in a thumb piece 24 by which it may be 10 moved to release the tooth 19 and permit rotation of the flange 18 relatively thereto. The pawls 22 and 23 are urged to a position to engage the tooth 19 by suitable springs 25.

A sheave 26 is rotatably mounted on the end of the head 6 adjacent the flange 18 and has an 15 annular flange 27 on which a pawl 28 is pivotally mounted. The pawl 28 faces in the same direction as the pawl 23 and is adapted to engage the tooth 19 so that when the sheave is rotated in a counterclockwise direction as viewed from the 20 left of Figs. 1 and 5, the pawl 28 will engage the tooth 19 to turn the flange 18 and head 6 in the same direction. In order to permit this rotation the thumb piece 24 is first depressed to release the pawl 22, the thumb piece 24 then being 25 released to permit the pawl 22 to re-engage the tooth 19 and stop the head after one complete revolution.

In order to rotate the sheave 26, a cable 29 is wrapped around the sheave and is preferably 30 secured thereto at one point by a pin 31. The cable 29 extends downwardly through openings in the base 1 and in a suitable table or support 32 on which the base 1 is mounted. The table 32 is provided with a downwardly extending bracket 35 33 on which one end of a lever 34 is pivoted, the opposite end of the lever 34 being connected to one end of the cable 29. The other end of the cable 29 is secured to a counter weight 35 which is slidably mounted in a tubular guide 36 secured 40 to the table 32. The lever 34 may be operated by a suitable foot lever or treadle 37 pivoted on one end on a fixed pivot and connected intermediate its ends to the lever 34 by a link 38. When the free end of the lever 37 is depressed 45 as by the foot of an operator, the lever 34 will be swung about its pivot to pull the end of the cable 29 and rotate the sheave 26 in counterclockwise direction.

The head 6 has secured thereto, as by welding 50 or the like, spaced brackets 39 and 41. A suitable pivot pin such as a bolt 42 extends through the brackets 39 and 41 and has pivotally mounted thereon a pair of clamping fingers 43 and 44. The finger 43 lies closely adjacent to the bracket 55 39 and the finger 44 lies closely adjacent to the bracket 41. The finger 43 (Fig. 7) terminates at one end in a thumb piece 45 and at its opposite end in a clamping portion projecting beyond the end of the head 6. The last named end of 60 the finger 43 is shaped to conform substantially to the peripheral edge of a piston as indicated at 46 and is provided on its upper portion with a hook 47 for a purpose to appear later.

The bracket 39 includes an elongated portion 65 48 serving as an anchor for a spring 49 which is secured to the clamp lever 43 to urge it into clamping position. The clamp 44 has a toe portion 51 (Fig. 6) adapted to bear on a piston carried by the head 6 and an operating handle 52 70 projecting laterally therefrom by which it may be operated. A suitable tension spring 53 anchored on a pin 54 on the head 6 is secured to a pin 55 on the clamp lever 44, the pin 55 being so located that swinging of the lever 44 will move the 75 spring across the pivot 42 to effect a toggle action

of the lever by which it will be held in either clamping or released position as indicated in dotted lines in Fig. 5.

A cutting member shown as an arcuate knife 56 is pivoted at 57 on the portion 48 of the bracket 39 and terminates at one end in a thumb piece 58 and at its opposite end in an arcuate cutting edge 59 which is formed about some center other than the pivot point 57. A suitable 10 spring 61 anchored on a pin 62 in the head 6 is secured to the knife 56 to hold it in inoperative position.

Packing material is supplied to the device from a spool 63 supported on the table 32. A strand 15 of packing material from the spool 63 may be led through a guide 64 and through a friction device 65. The friction device 65 may comprise two plates 66 and 67 urged toward each other by a spring 68 to grip the strand of packing material and insure that the same will be wound 20 on the piston with suitable tension. From the device 65 the strand passes into a feed device which is mounted on an arm 71 (Fig. 6) pivoted on the bracket 2. The arm 71 is urged about its pivot by a spring 72 in a direction to move the upper end thereof away from the head 6 as indicated in Fig. 6, and may be moved in the opposite 25 direction by an arm 73 projecting therefrom and terminating in a suitable thumb piece 67.

The upper end of the arm 71 is drilled as at 30 74 to provide an opening through which a strand 75 of packing material may pass and has a projection 76 secured thereto and facing the head 6. A leaf spring 77 is secured at one end to the arm 71 and rests at its outer end on the projection 35 76 to press the strand against the projection 76 and apply additional tension thereto, a suitable adjustment 78 being provided to adjust the pressure of the spring 77. At the outer end, the spring 77 terminates in a fork portion 79 to guide the 40 strand.

Figs. 2 and 3 illustrate a cartridge and piston 45 with which the machine above described is adapted to be used. As shown in Fig. 2, the cartridge is formed with a cylindrical body portion 81 having a piston 82 slidably mounted therein. The piston is formed with a peripheral groove 83 for receiving the packing material and the end of the body portion 81 is preferably rolled 50 over as at 84 to retain the piston in the body. It will be noted that the piston serves as an end closure for the body 81 and is slidable therein so that a force applied to the piston to move it through the body will eject the contents of the cartridge body from the opposite end thereof. 55 Also, in case the contents of the cartridge are aspirated or sucked therefrom, the piston 82 will act as a follower to prevent cavitation or piercing of the cartridge contents by air.

The end of the cartridge opposite the piston 60 82 may be closed by a suitable member 85 crimped or otherwise secured to the end of the cartridge body as at 86 and provided with a central outlet opening 87 which may be formed with a spherical portion to engage and seal against 65 the inlet stud of a lubricant dispenser with which the cartridge is used as illustrated in the McConkey patent referred to above. The opening 87 may be closed by a suitable cap 88 which is frictionally held in place therein. 70

In assembling a packing on a piston such as 82 in the machine described above, a cord or other suitable strand of packing material may be placed in the device as indicated and a piston may be inserted in the socket 7 of head 6 as 75

shown particularly in Fig. 5. The piston will be frictionally held by engagement with the socket 7 and its end portion including the groove 83 will project from the socket. The clamp lever 44 will be moved into its dotted line position of Fig. 5, the clamp lever 43 will be moved into its dotted line position of Fig. 7, and the arm 73 will be depressed to move the arm 72 and projection 76 thereon into the dotted line position of Fig. 6 in which the end of the projection 76 is closely adjacent to the groove in the piston and to the clamping end of the lever 43. This last operation will cause the end of the packing strand 75 to be disposed in the groove 83 of the piston and the clamp lever 43 may be released to press against the packing strand and hold it firmly in place in the groove. The head 6 is then rotated by pressing the thumb piece 24 to release the pawl 22 and operating the treadle 37 to rotate the sheave 26 and the head 6 through the pawl 28 and flange 18. During rotation of the head 6 the strand 75 will be wound around the groove 83 in the piston. When the sheave 26 and head 6 have moved through one complete revolution the pawl 22 will re-engage the tooth 19 and the head 6 will be held against further movement by the pawls 22 and 23.

As the head 6 and with it the clamp member 43 is rotated, the hook 47 will catch under the strand 75 to hold it raised from the piston 82 as shown in Fig. 6. The clamp lever 44 is then swung about its pivot to engage the free end of the strand and also the portion thereof lying adjacent the free end to hold these two portions side by side in the groove 83. The thumb piece 58 of the knife 56 may then be depressed causing the cutting edge 59 of the knife to swing across the hook member 57 and cut off the strand. The strand is now properly assembled in the groove 83 of the piston, suitable tensioning of the strand being assured by the friction device 65 and the leaf spring 77 and the strand being held properly in place on the piston by the clamp lever 44.

It has been found that the strand may be handled more easily if it is soaked with water and I prefer to soak the strand either by immersing the spool 63 or by leading the strand through a suitable liquid bath, not shown, before it is fed to the machine. In order to eliminate any tendency toward rusting which might be produced by water, an emulsion of water and soluble oil are preferably employed.

After the strand has been wound around the piston and cut off as described above, a cartridge body may be placed in the clamp 3-4 as indicated in Fig. 5 with its open end facing and in alignment with the piston 82. The lever 15 may then be operated to cause the pin 17 to engage the end 12 of the ejector 8, thus moving the end portion 9 of the ejector into engagement with the piston and forcing the piston from the socket 7 and into the cartridge body 81. It will be noted that the clamp levers 43 and 44 press against the strand and the piston during this movement thereof and will hold the strand in place in the groove 83 until the piston has entered the cartridge body.

The piston now being assembled in the cartridge body with the packing strand properly in place, the end 85 of the cartridge body may be secured thereon by any suitable operation and when the cartridge is filled with the desired lubricant or other material it is ready for use.

While one embodiment of the invention has been illustrated and described, it will be apparent

that many changes might be made therein or that the invention might be embodied in other forms. Accordingly, it is not intended to be limited to the forms shown or otherwise than by the terms of the appended claims.

I claim:

1. An assembling machine comprising, a rotatably mounted head for supporting a piston, means for feeding a strand of packing material onto the piston, clamp means carried by said head for holding the end of said strand on the piston, means for rotating the head to wind the strand around the piston, and means for cutting off the strand.

2. An assembling machine comprising, a rotatably mounted head for supporting a piston, means for feeding a strand of packing material onto the piston, clamp means carried by said head for holding the end of said strand on the piston, means for rotating the head to wind the strand around the piston, means for cutting off the strand, and means for ejecting the piston from the head.

3. An assembling machine comprising, a rotatably mounted head for supporting a piston, means for feeding a strand of packing material onto the piston, clamp means carried by said head for holding the end of said strand on the piston, means for rotating the head to wind the strand around the piston, a second clamp means carried by said head for holding the strand on the piston, and means for cutting off the strand.

4. An assembling machine comprising, a rotatably mounted head for supporting a piston, means for feeding a strand of packing material onto the piston, clamp means carried by said head for holding the end of said strand on the piston, means for rotating the head to wind the strand around the piston, means for holding a part of said strand away from the piston after the strand has been wound around the piston, and means for cutting the strand adjacent said last named means.

5. An assembling machine comprising, a rotatably mounted head for supporting a piston, means for feeding a strand of packing material onto the piston, clamp means carried by said head for holding the end of said strand on the piston, means for rotating the head to wind the strand around the piston, said clamp means including a part to engage the strand and hold it away from the piston after the strand has been wound around the piston, and means for cutting off the strand adjacent said part.

6. An assembling machine comprising, a rotatably mounted head for supporting a piston, means for feeding a strand of packing material onto the piston, clamping means carried by said head for holding the end of said strand on the piston, means for rotating the head to wind the strand around the piston, said clamp means including a part to engage a portion of said strand and hold it away from the piston, a second clamp means to engage the end of the strand and an overlapping portion adjacent thereto, and means to cut off the strand between said clamp means.

7. An assembling machine comprising a rotatably mounted head for holding a piston, a pivotally mounted feeding device for feeding a strand of packing material onto the piston and movable toward and away from the piston about its pivot, clamp means on the head for engaging the end of the strand when said feeding device is moved toward the piston, means for moving the feeding device away from the piston, means for



rotating the head whereby the strand will be wound around the piston, and means for cutting off the strand.

8. An assembling machine comprising a rotatably mounted head for holding a piston, a pivotally mounted feeding device for feeding a strand of packing material onto the piston and movable toward and away from the piston about its pivot, clamp means on the head for engaging the end of the strand when said feeding device is moved toward the piston, means for moving the feeding device away from the piston, means for rotating the head whereby the strand will be wound around the piston, a second clamp means adjacent to but spaced from the first clamp means for engaging the strand, and means for cutting off the strand between said clamp means.

9. In an assembling machine for assembling a strand of packing material on a piston, means for holding a piston, a device for feeding a strand of packing onto said piston, said device being movable toward and away from the piston, said means and said device being relatively rotatable whereby the strand will be wound around the piston, and means spaced from said device for cutting off said strand thereby to leave a portion of the strand projecting from the device.

10. In an assembling machine for assembling a strand of packing material on a piston, means for holding a piston, a device for feeding a strand of packing onto said piston, said device being

movable toward and away from the piston, said means and said device being relatively rotatable whereby the strand will be wound around the piston, a clamp to engage the end of the strand and hold it on the piston, and means adjacent said clamp and spaced from said device for cutting off said strand, thereby to leave a portion of the strand projecting from the device to be engaged by said clamp when the device is moved toward the piston.

11. An assembling machine comprising, means for holding a cartridge, means for holding a piston in alinement with said cartridge, means for placing a packing on the piston, and means for forcing the piston into the cartridge.

12. An assembling machine comprising, means for holding a cartridge, means for holding a piston in alinement with said cartridge, means for placing a packing on the piston, means for holding the packing in place on the piston, and means for ejecting the piston from its holding means and forcing it into the cartridge.

13. An assembling machine comprising, a clamp for holding a cartridge, a rotatably mounted head for holding a piston in alinement with the cartridge, means for rotating said head, means for feeding a strand of packing material onto the piston during rotation thereof, means for cutting off said strand, and means for forcing said piston into the cartridge.

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