April 15, 1941. G. R. NAPIER 2,238,182

MEAT STUFFER

Filed May 19, 1938

Fig. 1.

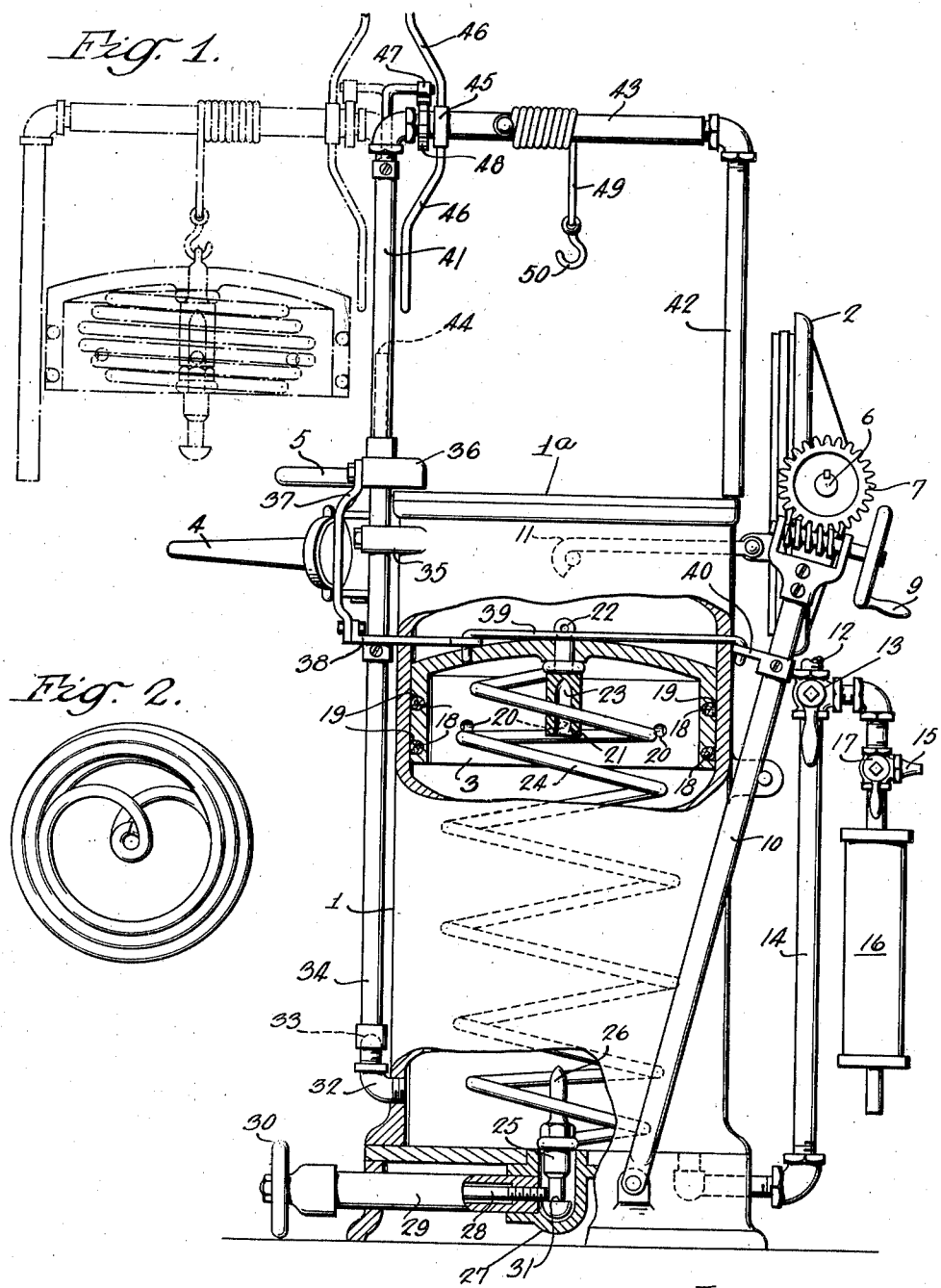


Fig. 2.

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Patented Apr. 15, 1941 2,238,182

UNITED STATES PATENT OFFICE

2,238,182

MEAT STUFFER

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Application May 19, 1938, Serial No. 208,880

4 Claims. (Cl. 17—39)

This invention relates to new and useful improvements in sausage and other meat stuffers and more particularly to stuffers of the power or pressure actuated piston type, being a continuation in part of my copending application Serial No. 104,717, filed October 8, 1936, which has matured into Patent No. 2,157,494 dated May 9, 1939.

Up to the present time, in the majority of pressure actuated meat stuffers the weight of the piston has been depended upon to return said piston to its lowermost or inoperative position after the meat has been discharged from the stuffer and the pressure exhausted from the pressure side of the piston. In order to overcome the friction between the packing of the piston and the walls of the stuffing cylinder as well as the resistance offered by the tallow and other fats in the meat it will be obvious that these pistons must necessarily be of great weight. This of course presents a danger and risk of injury in the event the pistons are accidentally blown out of the cylinder, and due to their excessive weight and the various complicated and ingenious schemes devised to prevent such blow-outs the operators of these stuffers rarely if ever remove the pistons from the stuffers for cleaning purposes although in fact they should be removed and thoroughly cleaned at least once each day that the stuffer is used.

The principal object of the invention is to provide a meat stuffer of the character set forth wherein movement of the piston is effectively controlled by means of a spring to prevent blow-outs and at the same time effect return of said piston to inoperative position without the aid of gravity thus permitting a piston of relatively light weight to be employed.

Another object of the invention is to provide a stuffer of the stated character wherein the piston is controlled by a spring embodying novel features of construction and arrangement designed to prevent sagging thereof and to exert a downward pull upon the piston all the way to the bottom or lower end of the cylinder.

Another object of the invention is to provide a piston operated meat stuffer of the stated character which is constructed and arranged to permit relatively easy rapid removal and replacement of said piston for cleaning purposes.

A further object of the invention is to provide a piston operated meat stuffer of the character set forth wherein novel means is provided for relieving or exhausting pressure behind the piston when it emerges from the upper end of the cylinder to eliminate entirely the possibility of accidental blow-out of the piston and possible injury resulting therefrom.

These and other objects of the invention and the features and details of construction thereof are set forth hereinafter and shown in the accompanying drawing, in which:

Figure 1 is a view in elevation partially in section of a stuffer made in accordance with the present invention, and

Figure 2 is an inverted plan view of the novel coil spring shown in Figure 1.

Referring now to the drawing, Figure 1 thereof illustrates a meat stuffer of the usual type comprising a cylinder 1 which is permanently closed at one end and provided with a removable cover member 2 at its other or open end which is surmounted by a detachable ring 1a of hard metal to prevent damage to the upper end edge of the cylinder and insure a tight smooth seat for said cover 2 thereon. A piston 3 is reciprocable within the cylinder 1 and is actuated in the usual manner, by means of a suitable compressed gas, liquid or other fluid which is led into said cylinder 1 behind or below said piston 3, to force meat placed in said cylinder outwardly thereof through one or more outlets 4 controlled by valves 5. The removable cover member 2 previously mentioned is suspended from an eccentric shaft 6 having a toothed wheel 7 thereon which is rotated by means of a worm operated by a hand wheel 9 to rotate the eccentric shaft 6 and elevate or lift the cover member 2 to or from closing relation upon the upper end of the stuffing cylinder 1, the shaft 6 and cover member 2 being carried by pivotally mounted rods 10 for movement to the left with respect to Figure 1 of the drawing to a position overlying the upper or open end of the stuffing cylinder 1 and being limited in its outward or open movement by means of the member 11, the hooked end portion of which engages a stud projection on the exterior of the cylinder 1.

The compressed gas, liquid or other fluid for actuating the piston 3 is led into the cylinder 1 below said piston 3 from a suitable compressor or pump (not shown) through a pipe 12, a three-way valve 13 and pipe 14, said three-way valve 13 being connected in the pressure line so that the interior of the cylinder 1 may be connected at the will of the operator to the compressor or to the surrounding atmosphere either directly through an ejector or nozzle 15 or through a muffler 16 as may be selectively determined by operation of a second three-way valve 17 for the

purpose of exhausting pressure from said cylinder, the ejector being usually employed to exhaust air from the cylinder, thus creating a suction therein which facilitates return of the piston to inoperative position.

The piston 3 is provided with suitable packing or rings 18 extending circumferentially thereof in grooves 19 to prevent dissipation of the compressed gas employed to actuate said piston and a plurality of ports or openings 20 are formed in the side wall of the piston 3 intermediate the packing rings 18 to provide a release or escape for pressure within the cylinder 1 below said piston 3 in the event that the latter is accidentally blown out of said cylinder 1 in a manner to be described hereinafter. As shown, the face of the piston 3 is slightly convex and a pin, stud or the like 21 having an eye portion 22 at its upper end is threaded axially in said piston face and extends or projects a substantial distance above and below the latter.

The lower end of the pin or stud 21 terminates in an elongated socket-portion 23 and one end of a coil spring 24 is secured about said pin or stud 21 between the underside of the face of the piston 3 and the aforementioned socket portion 23. The lower end of the coil spring 24 is looped about a stud 25, and is secured thereto by means of an elongated pin-like element 26 threaded thereon. The stud 25 is mounted coaxially with respect to the stud 21 in a socket or recess formed by a housing 27 secured at the bottom of the cylinder 1, and is removable or releasably retained in said socket or recess by means of a rod or shaft 28 which projects into the socket or recess and has threaded engagement with a laterally extending tubular element 29 in which it is mounted, said shaft 28 being rotatable by a hand wheel 30 into or out of engagement with a groove 31 adjacent the lower end of the stud 25. The diameter of the bore of the socket portion 23 previously mentioned is arranged to receive the pin-like element 26 when the piston is in its lowermost position for the purpose of maintaining the stud 25, piston 3 and its stud 21 substantially in alignment with each other and the ends of the coil spring 24 connected therebetween, such relationship of the parts being illustrated in the piston assembly suspended from the lift or hoist in Figure 1 of the drawing.

A feature of the invention resides in the novel construction and arrangement of the spring 24 to eliminate or prevent sagging thereof and exert a downward pull upon the piston 3 all the way to the bottom or lower end of the cylinder 1, and to this end the coils of said spring are of increasing diameters inwardly from the ends of the spring so that when said spring is not under tension the successively outer coils thereof tend to assume positions or nest inwardly of the next inward coil thereof, whereby the minimum height of the spring is considerably reduced, permitting it to exert a downward pull on the piston 3 until it is returned all the way to the lower end of the cylinder 1.

In addition to the function of returning the piston 3 to the lowermost or inoperative position at the completion of a stuffing operation the spring 24 performs another equally important function in that it acts as a definite connection between said piston and its cylinder 1 to prevent blowing out of the former in the event that pressure is accidentally supplied to said cylinder when the cover 2 is unlocked or open, thus eliminating the danger of injury to the operator or other persons. In this connection the spring 24 will tend to prevent the piston 3 from emerging beyond the open end of the cylinder 1 until the previously mentioned port or aperture 20 therein is exposed or uncovered, at which time the pressure actuating said piston 3 will pass outwardly through said port or opening 20 to the surrounding atmosphere.

To further insure against accidental blowing-out of the piston 3 when the cover 2 is partially or entirely open an additional release for the pressure behind said piston 3 is provided and includes an exhaust line 32 of substantially L shape which has one end communicating with the interior of the cylinder 1 adjacent the bottom thereof and its other end terminating in an outlet port 33 of relatively restricted area. The outlet port 33 is normally closed to prevent the release of pressure from the cylinder 1 by the lower recessed end of a rod, bar or the like 34 which is slidably mounted in a bracket 35 located externally of the cylinder 1. A lug or like element 36 is rotatably mounted upon the upper end of the rod or bar 34 for movement to and from a position extending over the opening in the upper end of the cylinder 1 and into the path of travel of the piston 3 therein when the cover 2 is open so that in the event the piston 3 is blown out of the cylinder 1 it will, upon emerging from the latter, engage the lug 36 and actuate it upwardly together with the rod or bar 34, thus opening the outlet port 33, permitting pressure to be exhausted or released from said cylinder 1.

Movement of the lug 36 into the path of the piston is accomplished in the present instance by connecting the same through a bracket 37, a member 38 rotatable on the rod or bar 34 and a link 39 to a bracket 40 secured on the rod 10 of the cover assembly, the arrangement being such that as the cover 2 is swung into open relation upon the rods 10 movement of the latter will operate through the aforementioned connections to pivot the lug 36 over the open end of the cylinder 1 and into the path of the piston 3. On the other hand, as the cover 2 is swung from that (open) position to one overlying the upper end of the cylinder 1, the reverse action takes place and the lug 36 is pivoted out of the opening of the cylinder and the path of the piston 3 so as not to interfere with or prevent proper positioning of said cover 2 in closing relation upon the cylinder 1. After the actuating pressure behind the piston 3 has been released or exhausted outwardly through the ports 20 and 33 in the foregoing manner the said spring 24 affording a resilient connection between said piston 3 and the lower end of the cylinder 1 will function to withdraw the piston inwardly of said cylinder and return the same to its lowermost or inoperative position.

For the purpose of effecting or enabling relatively easy rapid removal and replacement of the piston 3 from and into the cylinder 1, a lift or hoist mechanism is mounted externally above said cylinder 1. As shown, the hoist comprises a pair of tubular upright or vertical members 41 and 42 and an upper or cross arm member 43 which is connected and extends horizontally between the upper ends of said uprights 41 and 42. The lower end of the tubular upright member 41 is mounted upon an upwardly projecting stud 44 at or on the upper end of the bar or rod 34 in such manner as to permit the lift or hoist to be swung

between positions overlying the cylinder 1 as shown in solid lines in the drawing, or laterally of said cylinder, for example, as shown in dot and dash lines in said drawing, the lower end of the other upright 42 in the former position being arranged to rest upon the ring 1a and provide adequate support for said lift or hoist. A sleeve 45 having handles 46 and controlled by means of a pawl 47 and ratchet 48 is rotatably mounted upon the upper cross member 43 of the hoist, and a rope or cable 49 secured and adapted to be wound upon said sleeve 45 leads from the latter and is provided at its free end with a hook or the like 50 arranged for engagement with the eye 22 at the upper end of the stud 21 located above the face of the piston 3 whereby the latter may be easily removed from or replaced in the cylinder by operation of the sleeve 45 through its handles 46 and the pawl and ratchet mechanism 47 and 48 respectively.

In operation of the stuffer and assuming that the top or cover 2 is open and the cylinder 1 has been cleaned and oiled, the piston 3 and spring assembly may be lowered within said cylinder by means of the hoist previously described. As the piston 3 reaches the bottom or lower end of the cylinder 1 the stud 25 is received by the housing 27 and secured therein against displacement by means of the shaft 28 which is actuated by the handwheel 30 onto engagement with the notch or groove 31 in said stud 25. Sausage meat, or other substance may now be packed into the cylinder 1 while top or cover 2 is open, after which said cover 2 is closed and air or other compressed fluid introduced into the cylinder 1 below piston 3 as previously described, the piston being actuated thereby to discharge the meat under pressure outwardly of the ports or outlets 4 as controlled by the valves 5. As the piston 3 rises within the cylinder 1 the coiled spring 24 expands until said piston 3 reaches the top of said cylinder and all of the meat has been discharged, after which the pressure within the cylinder is exhausted. The cover 2 may then be opened causing the lug 36 to move into the path of the piston and the coil spring 24 will function to pull or return the piston 3 all the way to the bottom or lower end of the cylinder 1 ready for the next stuffing operation.

While a specific embodiment of the invention has been illustrated and described, it is not intended that said invention shall be precisely limited thereto, but that changes and modifications in the construction and arrangement thereof may be incorporated within the scope of the annexed claims.

I claim:

1. In a pressure operated stuffing device of the character described including an open ended cylinder, a closure for the open end of said cylinder movable between positions overlying the latter and laterally adjacent thereto, a supporting structure for said closure, a piston movable under pressure within the cylinder toward the open end thereof to discharge material from said cylinder, an exhaust port communicating with the pressure end of the cylinder, a vertically slidable member normally closing said exhaust port, a laterally projecting element carried by said vertically slidable member at the upper end of the latter, and connections between said laterally projecting element and the closure support for positioning the laterally projecting element over the end of the cylinder and in the path of the piston when the closure is opened so that when said piston is blown out of said cylinder it will engage said laterally projecting element and actuate the same and the said vertically slidable member upwardly to open the exhaust port and relieve the pressure actuating the piston.

2. In a pressure operated stuffing device of the character described including an open ended cylinder, a closure for the open end of said cylinder movable between positions overlying the latter and laterally adjacent thereto, a piston movable under pressure within said cylinder toward the open end thereof to discharge material from the cylinder, an exhaust port communicating with the pressure end of said cylinder, a vertically slidable member normally closing said exhaust port, a laterally projecting element carried by said vertically slidable member at the upper end of the latter, and connections between said laterally projecting element and the closure for positioning the laterally projecting element over the end of the cylinder and in the path of the piston when the closure is moved to open position so that when the said piston is blown out of said cylinder it will engage said laterally projecting element and actuate the same and said vertically slidable member upwardly to open the exhaust port and relieve the pressure actuating the piston.

3. In a pressure operated stuffing device of the character described including an open ended cylinder, a closure for the open end of said cylinder movable between positions overlying the latter and laterally adjacent thereto, a piston movable under pressure within said cylinder toward the open end thereof to discharge material from the cylinder, an exhaust port communicating with the pressure end of said cylinder, a vertically slidable member normally closing said exhaust port, a laterally projecting element carried by said vertically slidable member at the upper end of the latter, connections between said laterally projecting element and the closure for positioning the laterally projecting element over the end of the cylinder and in the path of the piston when the closure is moved to open position so that when the said piston is blown out of said cylinder it will engage said laterally projecting element and actuate the same and said vertically slidable member upwardly to open the exhaust port and relieve the pressure actuating the piston, and a spring comprising a plurality of coils of increasing diametetr inwardly from opposite ends thereof connected respectively to the pressure side of the piston and the opposite end of the cylinder tending to oppose operative movement of the piston and return the same to inoperative position at the completion of a stuffing operation.

4. In a pressure operated stuffing device of the character described including an open ended cylinder, a closure for the open end of said cylinder movable between positions overlying the latter and laterally adjacent thereto, a piston movable under pressure within said cylinder toward the open end thereof to discharge material from the cylinder, an exhaust port communicating with the pressure end of the cylinder, a vertically slidable member normally closing said exhaust port, a laterally projecting element carried by said vertically slidable member at the upper end of the latter, connections between said laterally projecting element and the closure for positioning the laterally projecting element over the end of the cylinder and in the path of the piston when the closure is moved to open position so

that when said piston is blown out of said cylinder it will engage said laterally projecting element and actuate the same and the said vertically slidable member upwardly to open the exhaust port and relieve the pressure actuating the piston, a spring comprising a plurality of coils of increasing diameter inwardly from opposite ends thereof, and having one end connected to the pressure side of said piston, a locking element secured to the other end of said spring, and means for releasably anchoring said locking element at the opposite end of said cylinder.

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