C. P. HIDDEN.

EQUALIZING MECHANISM.

APPLICATION FILED JAN. 22, 1906.

924,069.

Patented June 8, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

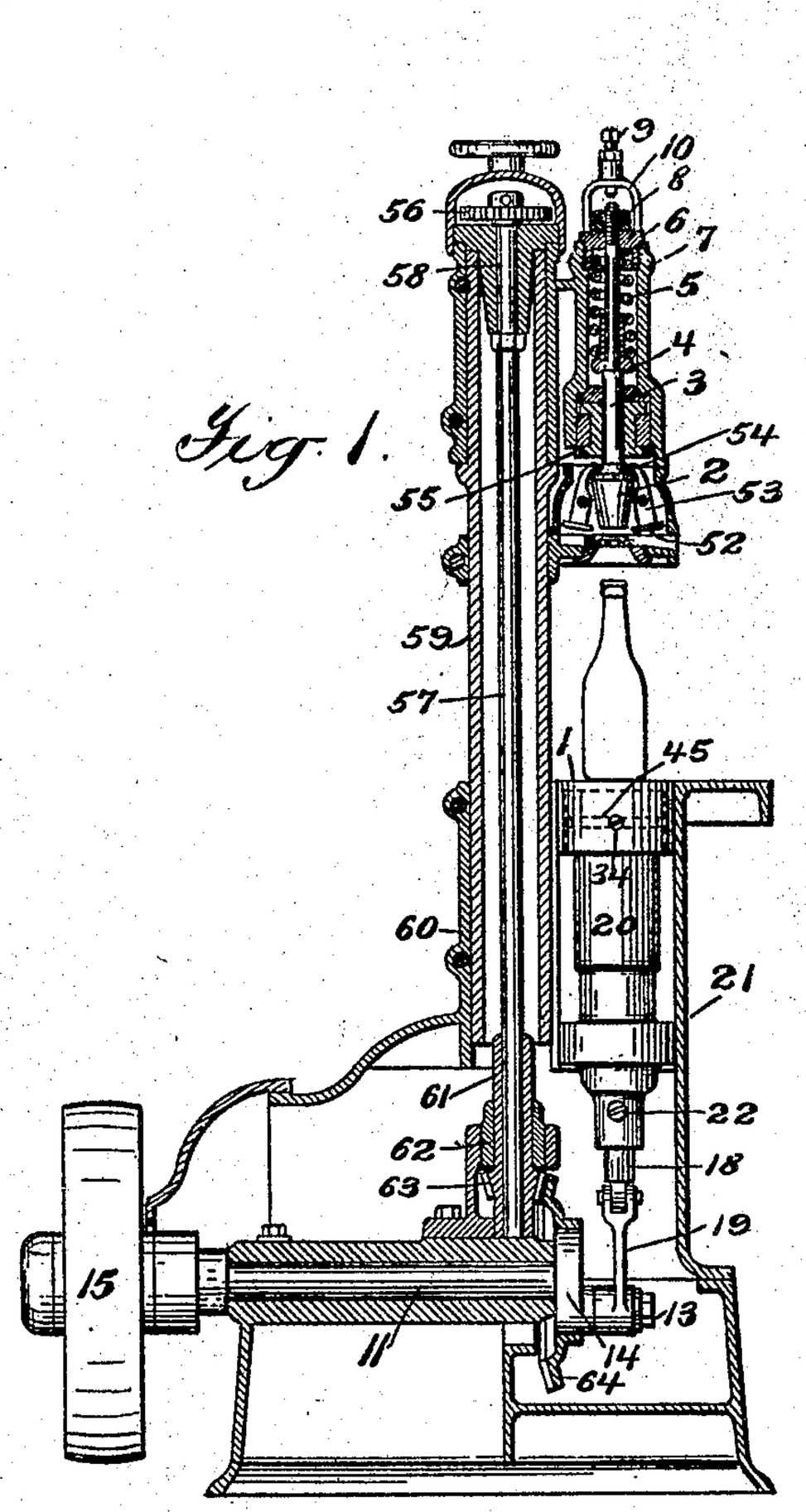
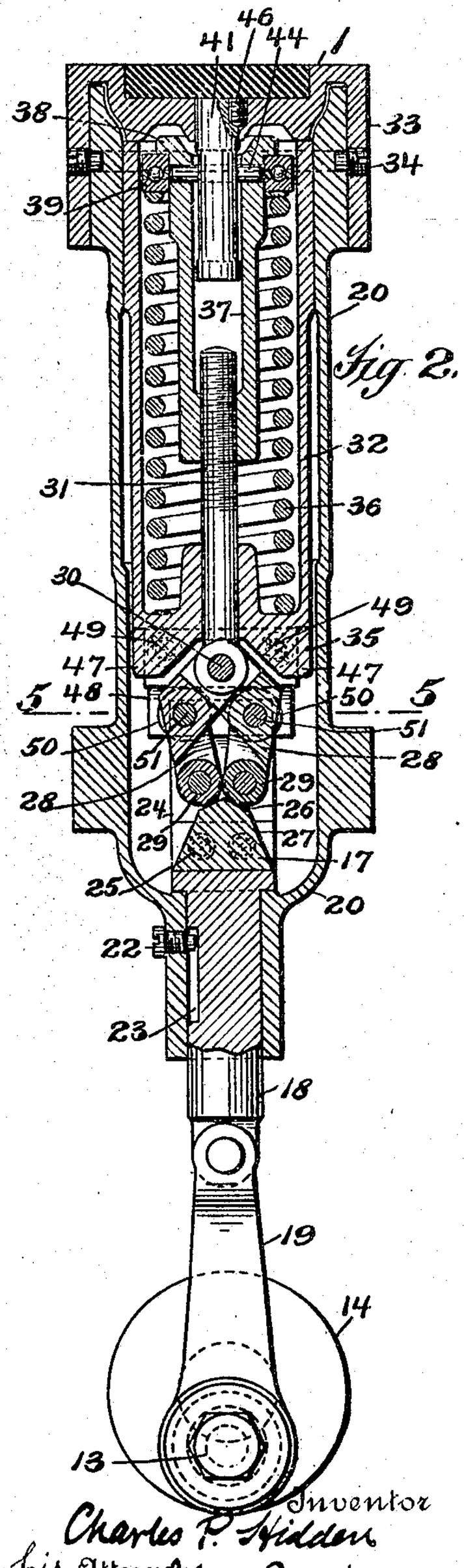


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

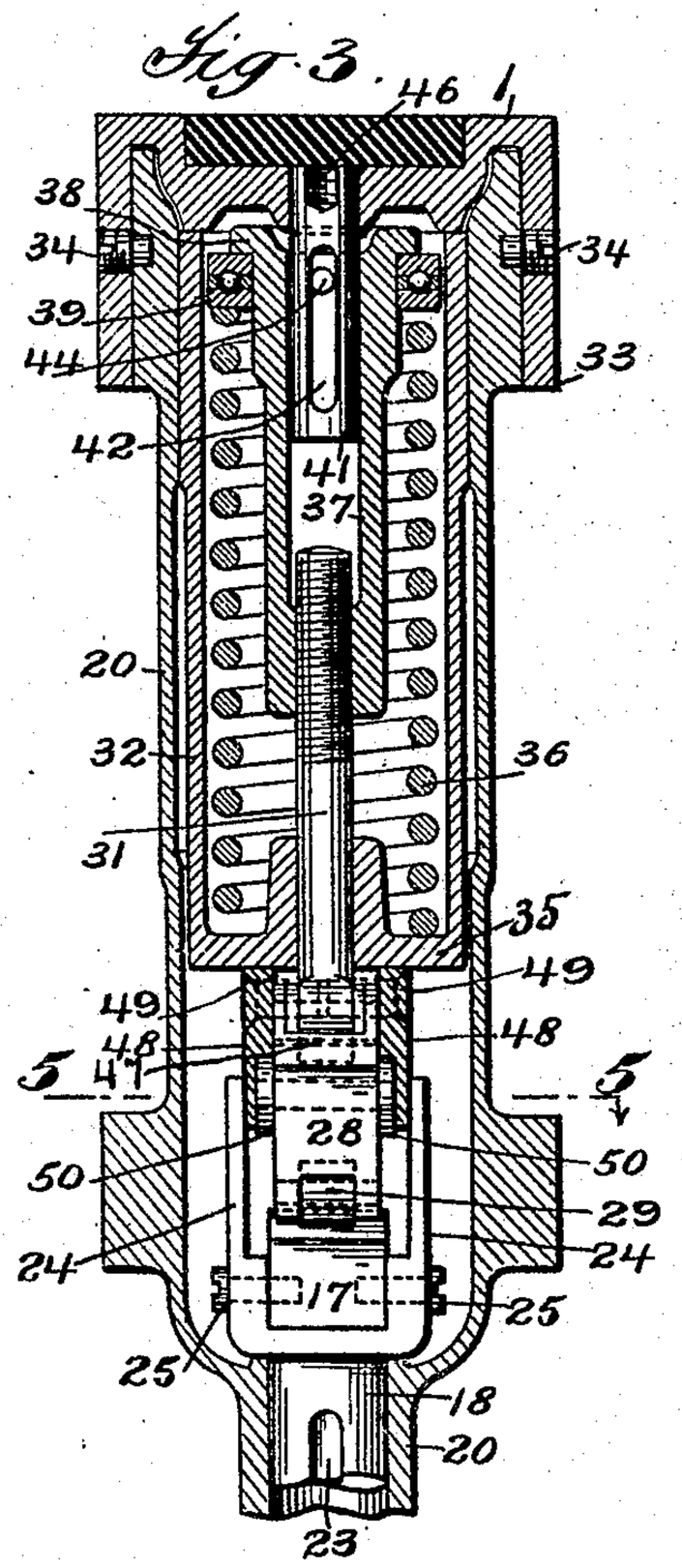


Fig. 4.

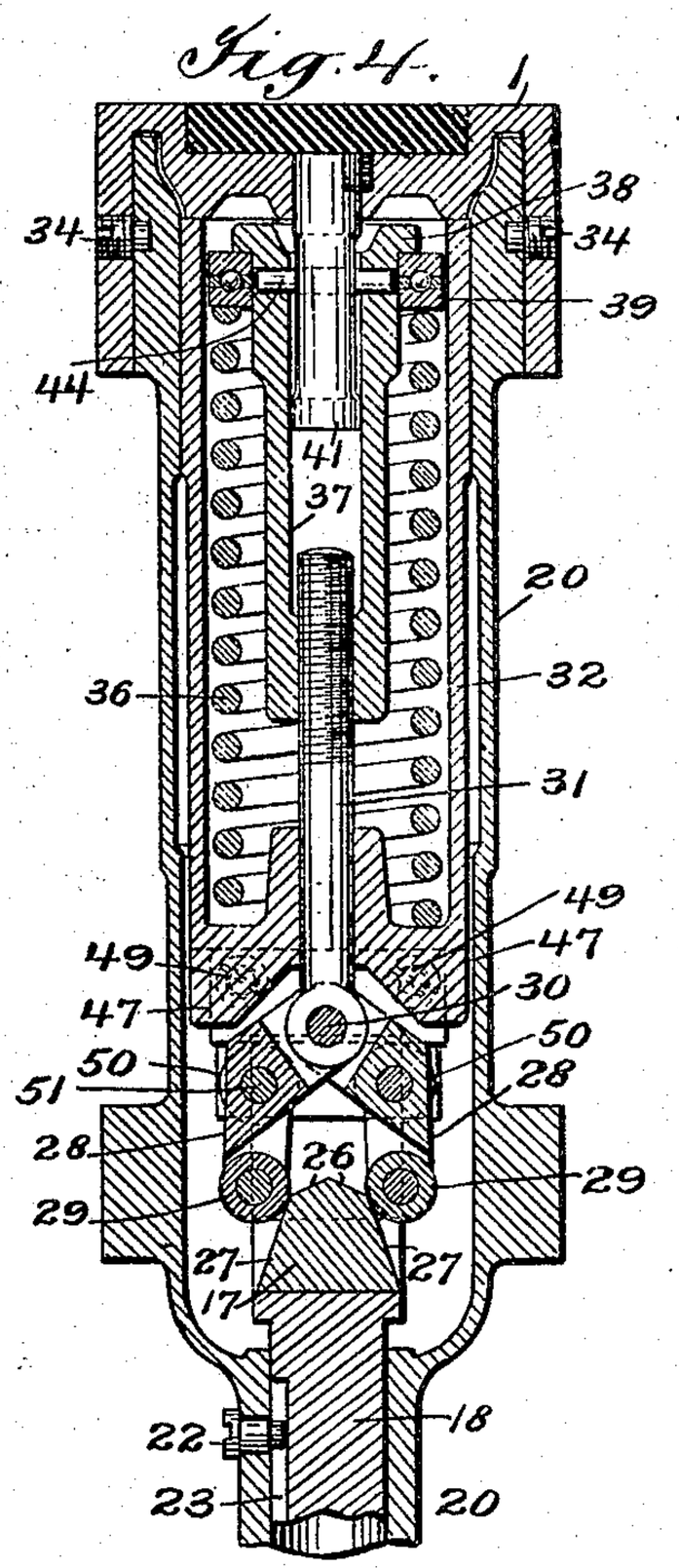
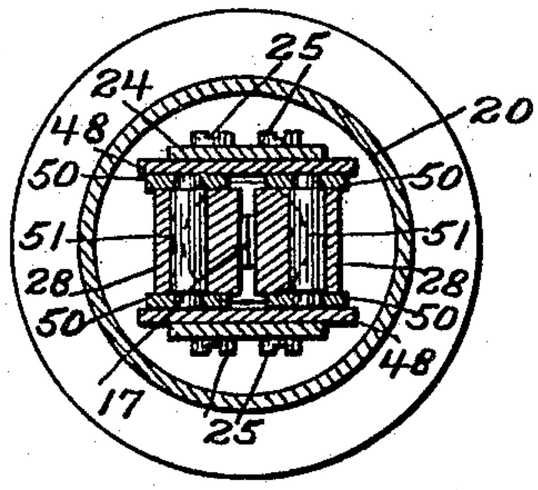


Fig 5.



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UNITED STATES PATENT OFFICE.

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EQUALIZING MECHANISM.

No. 924,069. Specification of Letters Patent. Patented June 8, 1909.

Application filed January 22, 1906. Serial No. 297,204.

To all whom it may concern:

Be it known that I, CHARLES P. HIDDEN, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Equalizing Mechanism, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in mechanism for producing equalized pressures.

In certain types of machines, the article to be operated upon is located between a pair of pressure producing heads, or a pressure producing head and an abutment, as, for instance, in certain styles of presses and in bottle capping machines. In these machines, it is frequently desirable to operate one or both of the pressure producing heads by mechanism which has a constant stroke. If, however, the stroke of the mechanism is such as to produce a given pressure on the article when an article of a given length is between the heads, it follows that if a longer article is to be operated upon, either the stroke of the mechanism must be adjusted or some means be provided for permitting the mechanism to run without changing the relation of the heads.

It is the object of this invention to produce a new and improved pressure equalizing device for use in pressure producing machines, which is simple in construction, positive in its operation, and by which a certain predetermined pressure can be produced and maintained without danger of having the pressure rise above the predetermined point.

With this and other objects not specifically referred to in view, the invention consists in certain constructions, and in certain parts, improvements and combinations as will be hereinafter fully described and specifically set forth.

Referring to the drawings—Figure 1 represents in sectional elevation a construction embodying the invention. Fig. 2 is a sectional view on an enlarged scale illustrating the details of construction of the pressure controlling mechanism. Fig. 3 is a section of the pressure controlling mechanism illustrated in Fig. 2, the plane of section being at right angles to the plane of section of that of Fig. 2. Fig. 4 is a view similar to Fig. 2 with the driver omitted, the parts being shown in a different position. Fig. 5 is a horizontal section on the line 5—5 of Fig. 2.

The particular embodiment of the invention which has been chosen for purposes of illustration is a bottle capping machine, but it is to be understood that the invention may be embodied in machines of varying types or kinds.

The particular machine selected to illustrate the invention embodies a pair of pressure producing heads 1 and 2, one of which, in the machine shown, serves as a support or rest on which the bottle to be capped is placed, and the other of which serves to force the cap, which is thereafter locked upon the bottle by a suitable mechanism, down to its seat preparatory to the operation of the cap locking devices. While the head 2 might be stationary, in the particular construction shown, it has a limited movement. As shown, this head is mounted upon a stem 3 said stem being provided with a collar 4 which serves as a support for a spring 5, the other end of which bears against the under side of a cap 6. This cap 6, in the machine shown, is threaded in a casing 7 which serves to contain the head, stem and other operating parts of the machine. The upper end of the stem projects through the cap 6, the stem being maintained in position by a suitable adjusting nut 8. The upper end of the stem is arranged to strike a stop screw 9 tapped into a bracket 10 rising from the cap 6, said screw serving to limit the upward motion of the stem.

Machines embodying the invention may have either or both of the pressure heads moved by the driving mechanism. In the construction shown, however, the head 1 upon which the bottle rests is thus moved.

The operating or driving mechanism from which the head receives its movement may be of any suitable character. In the construction shown, the driving mechanism embodies a shaft 11 having a crank thereon, the crank in the construction shown being formed by a pin 13 mounted on a disk 14. The crank shaft, when a crank shaft is employed, may be driven in any suitable manner, as, for instance, by a driving pulley 15. Inasmuch as the crank has a constant stroke, it would tend to produce, and, if directly connected to the head or part which is operated, by

connections of an ordinary character, would produce a movement of that part which would be of a constant or predetermined extent, the extent of stroke bearing a determined relation to the eccentricity of the crank. It will be readily understood, however, that if the crank and connections were designed to impart to the movable member, or to both members, of the pressure producing pair of heads, a constant stroke which is adapted to produce a predetermined pressure on a bottle of given length, which pressure would be the pressure required to seat its cap thereon, the insertion in the machine of a longer bottle would result in crushing or breaking the bottle. To adapt the machine, therefore, to the capping of bottles varying in length, a pressure equalizing device is employed.

In the machine which has been selected to illustrate the invention, the equalizing mechanism is included in the connections between the crank and the movable part 1, though it might be otherwise located. Where, as in the present construction, the equalizing mechanism is included in the connection between the operating or driving mechanism and one of the pressure heads, it will be of such a character that the full force of the stroke of the driver will be transmitted to and operate to produce a movement of the head of sufficient extent to produce a pressure upon the bottle sufficient to effectually seat the cap thereon, after which the continuance of the driving stroke will not change the relative position of the heads or materially increase the pressure upon the bottle.

The particular construction of equalizing mechanism may be varied within wide limits. As shown, this mechanism includes a thrust member the form and construction of which may be varied within wide limits. It will, however, include two members which are in shifting contact. While the construction of these members may be varied, in the particular embodiment of the invention selected for purposes of illustration, one of these members consists of a thrust block 17 which is mounted on a plunger 18, this plunger being connected by a link 19 to the crank pin 13 before referred to. As shown, this plunger is guided in the lower part of a casing 20, this casing being guided in a casing 21 which forms a part of the machine frame. In order to keep the parts in proper relative position a securing device, as, for instance, a screw 22, may be provided, this screw taking in a channeled way 23 in the plunger. The thrust block may be secured to the plunger in any desired way. As illustrated, the upper end of the plunger 18 is formed to provide a fork 24 in which the thrust block is secured by means of screws 25, in any other suitable manner. While the configuration of this thrust block may be widely varied, in the best constructions, it will consist of a block provided with a double inclined bearing face 26 and with inclined sides 27.

The member which is in shifting contact with the thrust block may be widely varied in construction and will vary according to the particular construction of thrust block employed. In the particular construction shown, this coöperating member consists of two bent levers 28 which in the best construction will be provided on the ends which are to contact with the thrust member with rolls or other anti-friction devices 29. While these levers may be mounted in any suitable manner, in the particular construction illustrated, they are pivoted at 30 to a carrier in the form of a stud or pin 31.

In the particular construction illustrated, the mechanism is designed so that after a predetermined pressure is brought upon the head 1, the thrust block will act upon the levers 28 to spread the same, thus permitting a movement of the head to release the pressure, so that it may not rise beyond the predetermined limit, this action of the thrust block and bent levers, when the mechanism in which the invention is embodied includes these devices, taking place against a resistance such as that afforded by a suitable spring. In the best construction, furthermore, when a spring is employed, it will be normally under stress. The means for mounting the spring and the various connections by which the results desired are accomplished may be varied within wide limits. In the particular construction illustrated, there is provided a casing 32 which extends upward and bears against the under side of the head 1. It may be here remarked that the head 1 is provided with a depending flange 33 which takes over the upper end of the casing 20, the head being secured to the casing by means of screws 34, or in any other suitable manner. The lower end 35 of the casing 32 forms an abutment and inside this casing is located a spring 36 which rests at one end against this abutment.

Suitable connections which may be varied in character are provided for the purpose of transmitting the force of the spring, when this form of resistance is employed, to the other parts of the equalizing mechanism. As shown, there is provided a sleeve 37 which is secured to the carrier 31, the upper end of the carrier being for the purposes of adjustment, threaded and engaging a tapped opening in the lower part of the sleeve. The upper end of this sleeve 37 is provided with a projecting shoulder 38 against which rests a two-part ball collar 39 of ordinary construction, this shoulder and ball collar forming, in the particular construction shown, an abutment for the other end of the spring. As has been before pointed out, in the best

constructions, the spring will be normally under stress, and in the construction illustrated, this is effected by a proper adjustment of the sleeve 37 with respect to the carrier or stud 31. Various means may be provided, if desired, for varying the adjustment of the parts to vary the stress of the spring. In the particular construction shown, the head 1 is provided with a depending lug 41, this lug being slotted, as at 42 (see Fig. 3), and in this slot is located a cross pin 44 which is secured in the sleeve 37. The screws 34 before referred to engage in a groove 45 (see dotted lines in Fig. 1). When it is desired to vary the adjustment of the parts so as to vary the stress of the spring, the head 1 is rotated, this movement causing the sleeve 37 to be moved up or down upon the threaded portion of the carrier 31. A lock screw 46 is or may be provided to secure the lug 41 in position in the head 1. The spring 36 being normally under stress, it will be seen that it acts to draw the carrier, which moves loosely through the abutment 35, upward, in the particular construction shown, and thus force the bent levers upward against the abutment.

The bent levers are of such a configuration that they have a bearing against the abutment 35 between their ends. While this bearing may be provided for in any desired way, in the particular construction illustrated, the abutment is formed with lugs 47 to which are secured wear or track plates 48, these abutment wear or track plates being held in position by screws 49, or in any other suitable manner. To allow the levers to move freely with respect to the abutment plates 48, each of these levers is or may be provided with a pair of rolls 50, these rolls being supported on studs 51 which pass through the levers.

The construction being as described, it will be understood that when pressure is brought to bear on the head 1, as, for instance, by placing a bottle between the heads 1 and 2, the head 1 will tend to force the casing 32 and the abutment 35 downward. The tendency of the casing and abutment to move downward will, however, be resisted by the bent levers which are in contact with the double inclined face of the thrust block, the levers being held in position by the force of the spring 36. Until the pressure on the head exceeds the predetermined limit which is proportional to the force or stress of the spring, there will be no action of the equalizing mechanism. As soon, however, as the pressure on the head exceeds this predetermined limit, the force by which the spring holds the bent levers together is overcome and the thrust block enters between the rolls 29 on the levers, swinging the levers on their pivot 30, the carrier 31 moving downward as the levers spread, the rollers 51 allowing easy movement of the levers along the abutment tracks or wear plates. The increase in the force of the spring due to its increased compression is taken care of by the increased leverage due to the change in position of the levers.

When the rolls 29 in their outward travel have passed off the double inclined face 26 of the thrust block, the resistance which the spring and levers offer to the downward movement of the head has been substantially overcome and the head and casing and parts connected therewith will move downward easily, the resistance to this downward movement being proportional to the incline of the sides 27 of the thrust block, it being understood that the nearer these sides are to the vertical, the less the resistance will be to the downward movement of the head. It is desirable, however, that a slight incline such as shown be given the sides of the thrust block to enable the spring to reset the mechanism, after pressure is removed from the head.

It will be observed that the mechanism is exceedingly compact, it being possible to arrange the parts of the equalizing mechanism and the head in the same line, so that the mechanism can be contained in a small compass. Furthermore, only a very slight relative movement between the thrust block and the coöperating lever mechanism is necessary in order to relieve the pressure as soon as the predetermined limit is exceeded. Further, should it be desired to control the rapidity with which the pressure is released, this can be done readily by properly varying the configuration of the thrust block and levers. The mechanism illustrated is designed to effect a practically instantaneous release of the pressure after the predetermined limit is reached.

When the invention is employed in connection with a capping machine in which the cap is first seated upon the receptacle to be capped and then locked in position by forcing the flange of the cap under a shoulder on the receptacle, the particular means employed for forcing the flange of the cap underneath the shoulder on the receptacle may be of any desired character. As shown, the forcing of the flange of the cap under the shoulder of the receptacle is effected by means of spinning wheels 52 mounted on pivoted arms 53, the upper ends of these arms bearing on a cone 54 carried above the head 2. As the head 2 moves up, therefore, the spinning wheels will be thrown into operative relation with the flange of the cap. The spinning wheels may be driven in any suitable manner. As shown, there is provided a gear 55 which is connected to the part on which the spinning wheel carrying arms are pivoted. This gear 55 is driven by suitable gearing (not shown) from a gear 56 mounted on a long vertical shaft 57. As

this particular construction has no bearing on the invention of this application, it is not fully illustrated, but reference is made to the patent to Shriner, No. 799,095, dated Sept. 12, 1905, which shows substantially the arrangement of gearing and connected devices above referred to. This long vertical shaft 57 has its upper end mounted in a bearing 58 which is connected to a long tubular casing 59. The lower end of this tubular casing is supported in a sleeve 60 forming a part of the general casing of the machine. The lower end of the shaft 57 is splined to a sleeve 61, said sleeve being supported in a bracket 62. This sleeve 61 is provided with a bevel gear 63 which meshes with a bevel gear 64 mounted on the crank disk 14.

The machine is preferably operated by the pulley 15 through a single revolution clutch which may be of any well-known description. Inasmuch as there are various forms of single revolution clutches well-known in the art which are applicable to the present use, and as a description of such a clutch will not in any way conduce to an understanding of the present invention, a description thereof is omitted. The machine is or may be provided with a treadle by which the clutch is controlled.

While the construction illustrated embodies the invention in the best form now known, the invention may be embodied in constructions which differ widely therefrom. The invention is not, therefore, to be limited to the specific construction herein shown and described.

What is claimed is;—

1. In a pressure producing mechanism, the combination with a pair of pressure heads, of a driving mechanism having a constant stroke, operating connections whereby the driving mechanism produces a relative movement between the heads, thus causing pressure to be exerted on an article between them, a pressure controlling device including two members, one of which has a bearing face with which the other is in shifting contact, said members being relatively movable under the pressure produced by the driving mechanism, and a resistance against which said relative movement takes place.

2. In a pressure producing mechanism, the combination with a pair of pressure heads, of a driving mechanism having a constant stroke, operating connections whereby the driving mechanism produces a relative movement between the heads, thus causing pressure to be exerted on an article between them, a pressure controlling device including two members, one of which has an inclined bearing face with which the other is in shifting contact, said members being relatively movable under the pressure produced by the driving mechanism, and a resistance against which said relative movement takes place.

3. In a pressure producing mechanism, the combination with a pair of pressure heads, of a driving mechanism having a constant stroke, operating connections whereby the driving mechanism produces a relative movement between the heads, thus causing pressure to be exerted on an article between them, a pressure controlling device including two members, one of which has an inclined bearing face with which the other is in shifting contact, said members being relatively movable under the pressure produced by the driving mechanism, and a spring normally under stress against which said relative movement takes place.

4. In a pressure producing mechanism, the combination with a pair of pressure heads, of a driving mechanism having a constant stroke, operating connections whereby the driving mechanism produces a relative movement between the heads, a pressure controlling device operatively connected with one of the heads, said device including a pair of arms and a thrust member having a bearing face provided with a double incline with which face said arms are in shifting contact, said arms and member being relatively movable under the pressure produced by the driving mechanism, and a spring normally under stress against which the relative movement of the arms and member takes place.

5. In a pressure producing mechanism, the combination with a pair of pressure heads, of a driving mechanism having a constant stroke, operating connections whereby the driving mechanism produces a relative movement between the heads, a pressure controlling device operatively connected to one of the heads, said device including a pair of pivoted arms and a spreading thrust member with which the arms are in contact, said arms and thrust member being relatively movable under pressure produced by the driving mechanism, and a spring normally under stress against which the relative movement of the arms and member takes place.

6. In a pressure producing mechanism, the combination with a pair of pressure heads, of a driving mechanism having a constant stroke, operating connections whereby the driving mechanism produces a relative movement between the heads, a pair of movable arms connected with the heads, means for causing a movement of the arms to prevent more than a predetermined amount of pressure being exerted upon an article between the heads, and a spring lying between the arms and the head and serving to oppose the movement of the arms.

7. In a pressure producing mechanism, the combination with a pair of pressure heads, of a driving mechanism having a con-

stant stroke, operating connections whereby the driving mechanism produces a relative movement between the heads, a pair of movable arms connected with the heads, a spreader for causing a movement of the arms to prevent more than a predetermined amount of pressure being exerted upon an article between the heads, and a spring lying between the arms and the head and serving to oppose the movement of the arms.

8. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a thrust member, a lever mechanism capacitated to be operated by the thrust member, said mechanism having a shifting contact with the member, a spring against the resistance of which the shift between the lever mechanism and the member occurs, said devices constituting pressure controlling means, and connections between the pressure controlling means and one of the heads, whereby the shift between the lever mechanism and the thrust member occurs when more than a predetermined amount of pressure is exerted between the heads.

9. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a thrust member having a double inclined face, a lever mechanism including two arms in shifting contact with the thrust member, a spring under stress against the resistance of which the shift between the lever mechanism and the thrust member occurs, said devices constituting a pressure controlling mechanism, and connections between the pressure controlling mechanism and one of the heads whereby the shift between the lever mechanism and the thrust member occurs when more than a predetermined amount of pressure is exerted between the heads.

10. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a thrust member, a pair of abutments one of which is located adjacent to the thrust member, said abutments being in line with the thrust member, a spring normally under stress between the abutments, a lever mechanism between the thrust member and the adjacent abutment, connections whereby the stress of the spring is exerted on the lever mechanism, and connections between one of the pressure heads and one of the abutments.

11. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a thrust member having a double inclined face, a pair of abutments in line with the thrust member, a pair of lever arms between one of the abutments and the thrust member, a spring normally under stress between the abutments, connections between one of the abutments and one of the pressure heads, and connections whereby the stress of the spring is imparted to the lever arms.

12. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a casing one end of which forms an abutment, said casing being in operative connection with one of the pressure heads, a thrust member, a lever mechanism between the abutment and the thrust member, a spring normally under stress in the casing, and connections between the spring and the lever mechanism.

13. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a casing one end of which forms an abutment, said casing being in operative connection with one of the pressure heads, a thrust member, a lever mechanism between the abutment and the thrust member, a spring normally under stress in the casing, and adjustable connections between the spring and the lever mechanism.

14. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a casing one end of which forms an abutment, said casing being in operative connection with one of the pressure heads, a thrust member having a double inclined face, a pair of levers between the thrust member and the abutment, a spring normally under stress in the casing, and connections between the lever and the spring.

15. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a casing, one end of which forms an abutment, said casing being in operative connection with one of the pressure heads, a pair of lever arms, an adjustable abutment in the casing, a spring between the abutments, and connections from the spring to the lever arms.

16. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a casing one end of which forms an abutment, a carrier passing loosely through the casing, a second abutment connected with the carrier, a lever mechanism supported by the carrier, and a thrust member with which the lever mechanism coöperates.

17. The combination with a pair of pressure heads, of a driver having a constant

stroke, connections whereby the driver effects a relative movement between the heads, a casing one end of which forms an abutment, a carrier passing loosely through the casing, a second abutment adjustably connected with the carrier, a lever mechanism supported by the carrier, and a thrust member with which the lever mechanism coöperates.

18. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a casing in operative connection with one of the heads, a spring in the casing, a pair of levers connected with the spring, and a thrust member having a double inclined face coöperating with the levers.

19. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a casing in operative connection with one of the heads, a spring normally under stress in the casing, means for adjusting the stress of the spring, a pair of levers connected with the spring, and a thrust member having a double inclined face coöperating with the levers.

20. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a pressure controlling mechanism including a pair of rock levers, a thrust member, a spring, connections whereby the spring opposes the movement of the levers, said devices being in line with the heads, and connections whereby more than a predetermined amount of pressure on one of the heads causes the thrust member to operate the levers and permit a movement of said head.

21. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a pressure controlling mechanism including a pair of rock levers, a thrust member having a double inclined face, a spring, connections whereby the spring opposes the movement of the levers, said devices being in line with the heads, and connections whereby more than a predetermined amount of pressure on one of the heads causes the thrust member to operate the levers and permit a movement of said head.

22. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a casing in operative relation with one of the pressure heads, one end of said casing forming an abutment, a carrier movable through the casing, a pair of bent levers pivoted on the carrier and having a bearing against the abutment, a thrust member having a double inclined face coöperating with the levers, a spring in the casing, and connections from the spring to the carrier.

23. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, a thrust block, a pair of levers coöperating with the thrust block, a resistance for opposing the movement of the levers under the action of the thrust block, said devices constituting a controlling mechanism, and connections from said mechanism to one of the heads, whereby more than a predetermined amount of pressure exerted between the heads causes the thrust block to operate the levers and permit a movement of one of the heads.

24. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, an abutment, a carrier movable through the abutment, a pair of bent levers mounted on the carrier, a spring bearing against the abutment, connections between the carrier and the spring, whereby the levers are held to bear against the abutment, a connection between the abutment and one of the heads, and a thrust member coöperating with the levers.

25. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, an abutment, a carrier movable through the abutment, a pair of bent levers mounted on the carrier, a spring bearing against the abutment, connections between the carrier and the spring, whereby the levers are held to bear against the abutment, a connection between the abutment and one of the heads, and a thrust member having a double inclined face coöperating with the levers.

26. The combination with a pair of pressure heads, of a driver having a constant stroke, connections whereby the driver effects a relative movement between the heads, an abutment, a carrier movable through the abutment, a pair of bent levers mounted on the carrier, a spring bearing against the abutment, connections between the carrier and the spring, whereby the levers are held to bear against the abutment, a connection between the abutment and one of the heads, and a thrust block having a double inclined face and inclined sides coöperating with the levers.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses.

CHARLES P. HIDDEN.

Witnesses:

A. WHITE,

JAMES R. RICE.