

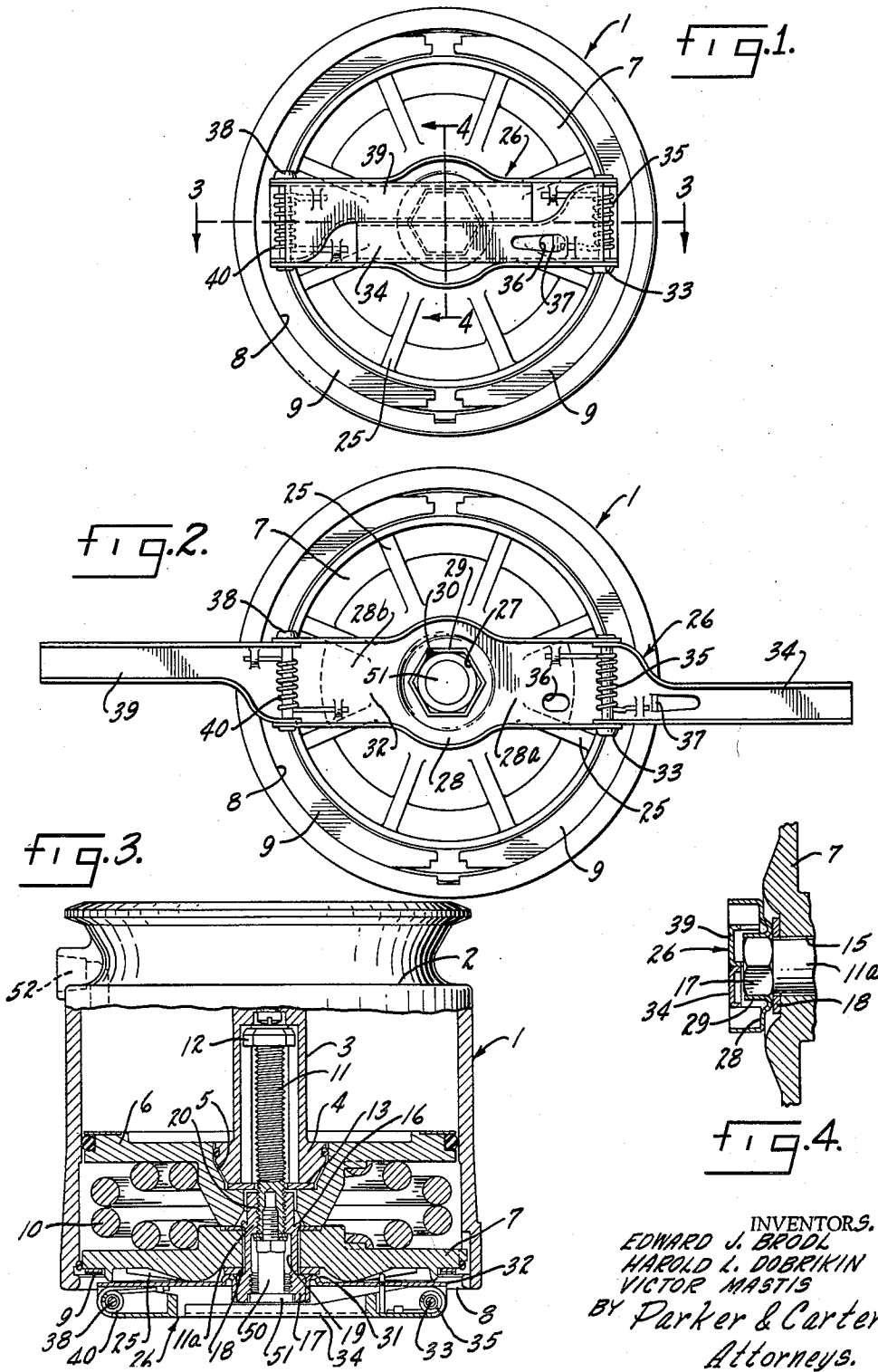
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MANUAL RELEASE STRUCTURE

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MANUAL RELEASE STRUCTURE

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This invention relates to a release means and has particular relation to means for releasing a spring-urged piston and an abutment therefor from a cylinder.

One purpose of the invention is to provide a manual means for the safe removal of a back plate, a piston and a spring positioned therebetween from within a cylinder.

Another purpose is to provide a means for rendering ineffective an emergency brake operating mechanism.

Another purpose is to provide a means for clamping a spring between a piston and a back plate and for removal of the same as a unit from a cylinder.

Another purpose is to provide a manual release handle which may be folded within the diameter of a cylinder and which is effective to accomplish the removal from said cylinder of a back plate, a piston and a spring compressed therebetween by means of said handle.

Another purpose is to provide a self-mounted manual means for restraining a brake-operating device against movement toward brake-operating position.

Another purpose is to provide a brake-release device having an external, manually operable member.

Another purpose is to provide an automatic visual indication of the unintended movement of release elements toward release position.

Another purpose is to provide a manual release handle for a piston and cylinder arrangement wherein means are provided for prevention of unintended movement of release members toward release position.

Another purpose is to provide a manual release handle of maximum simplicity and compactness as well as maximum economy in manufacture and use.

Another purpose is to provide a release mechanism capable of accomplishing the removal of a piston and back plate from a cylinder while rendering a spring positioned between said back plate and piston inoperative.

Another purpose is to provide for the manual release of a piston and spring from a cylinder without the use of additional tools.

Another purpose is to provide a manual release handle having means to prevent vibratory movement of a release mechanism toward release position.

Another purpose is to provide a manual release handle for use in connection with the release of a brake-operating piston.

Another purpose is to provide a mechanism for release of a brake-operating piston.

Other purposes will appear from time to time during the course of the specification and claims.

We illustrate our invention more or less diagrammatically in the accompanying drawings, wherein:

FIGURE 1 is an end view;

FIGURE 2 is an end view illustrating a portion of the invention with parts in another position;

FIGURE 3 is a view in partial cross section taken on the line 3-3 of FIGURE 1; and

FIGURE 4 is a view taken on the line 4-4 of FIGURE 1.

Like parts are indicated by like numerals throughout the specification and drawings.

Referring now to the drawings, the numeral 1 generally designates a cylinder. The cylinder 1 has a substantially closed end 2, the center of which may be apertured (not shown) to permit passage therethrough of an

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operating member such as the hollow tubular element 3. It will be realized that the cylinder 1 may be affixed, or otherwise associated with, a brake-operating cylinder and that the tube 3 may have an operating engagement with brake elements effective to apply the brakes when the tube 3 is urged outwardly through the end wall 2 of cylinder 1.

The inner end 4 of tube 3 seats within a socket 5 formed in piston 6 which is in turn reciprocal within chamber 1. A back or closure plate 7 is fitted in the open end 8 of cylinder 1 opposite the end wall 2 thereof. The back plate 7 is removably held in the open end of cylinder 1 by any suitable means such as the lock rings 9. Operative between the plate 7 and piston 6 is a spring 10, one end of which bears against the inner surface of plate 7 and the opposite end of which bears against the opposed face of piston 6 to urge the piston away from plate 7 and toward end wall 2, and thus to urge the tube 3 into operating engagement with the brake elements referred to above.

The socket 5 of piston 6 is centrally apertured to permit the passage therethrough of a rotatable threaded rod or bolt 11 which extends into the area within tube 3. A ring 13 seats on the bottom wall of the socket 5 and has an inner diameter sufficient to permit the passage therethrough of member 11 but less than the outer diameter of member 12, whereby member 12 may be brought into abutting relationship with the ring 13.

The rod or bolt 11 extends rearwardly from piston 6 and into an inwardly threaded sleeve 11a which is rotatably positioned in a central aperture 15 formed in the back or closure plate 7. A portion 16 of the member 11a may be peened, or otherwise flared, adjacent and in contact with the area about the inner edge of aperture 15 to provide for the free rotation of member 11a in said aperture 15 and to preclude longitudinal movement of member 11 outwardly through aperture 15.

A head 17 is carried by the end of member 11a opposite that on which portion 16 is formed, the head 17 being positioned outwardly of plate 7 and having a diameter greater than that of aperture 15 whereby member 11a remains freely rotatable in aperture 15 but is prevented from movement thereinto by the engagement of head 17 with the plate 7. As the parts are illustrated, an abutment ring 18 seats against the area of plate 7 surrounding and adjacent the aperture 15 and the head 17 seats on an inner annular portion of the ring 18. The sleeve 11a has a bore 19 formed therein and outwardly open through head 17. The bottom wall of bore 19 in turn communicates with an axially aligned, inwardly threaded bore 20 of reduced diameter which is formed in the end of member 11 which is threadedly engaged in sleeve 11a.

The plate 7 has a plurality of circumferentially spaced, radially disposed ribs or projections 25 uprising from its outer surface. The head 17 rises beyond the ribs 25. A handle member, generally indicated by the numeral 26, is mounted upon the head 17. A central aperture 27 is formed in the handle 26 and has a configuration corresponding to that of head 17, as well as dimensions corresponding substantially thereto. While the head 17 and aperture 27 are shown in the drawings as being hexagonal, it will be understood that a plurality of of non-circular forms may be employed, and that even a circular form may be employed where the handle 26 may be secured to head 17 by some other manner, without departing from the nature and scope of the invention.

The handle 26 has a generally rectilinear longitudinal central or base section 28 extending on opposite sides of the aperture 27 for a distance less than the radius of cylinder 1 whereby the member 28 is retained within the diameter of cylinder 1, as is illustrated in all three figures of the drawings. The oppositely disposed segments

of handle base 28 are indicated at 28a, 28b. The base 28 is generally U-shaped in cross section as shown in FIGURE 4.

Surrounding and defining the aperture 27, the handle member 26 may have an axially disposed wall 29, the inner surface of which operatively engages the opposed outer surfaces of head 17. For permanency, one or more spot welds 30 may, if desired, be added to retain the handle 26 on head 17. As may be best seen in FIGURE 3, the wall 29 has a rounded inner edge portion 31 which rotatably seats upon the outer annular surface of ring 18 beyond that surface thereof against which head 17 seats. The substantially flat main wall 32 of handle base 28 may ride upon the higher portions of ribs 25, as may be clearly seen in FIGURE 3.

Pivotally mounted, as at 33, adjacent one outer end of handle base segment 28a, is a manually operable handle portion 34. A spring 35 engages segment 28a and portion 34 to urge the portion 34 into closed position overlying handle section 28, as illustrated in FIGURES 1 and 3. As observable in FIGURE 3, the portion 34 has an outer segment reduced in cross sectional measurement, and said outer segment is urged toward and seats upon the head 17 and outer edge of wall 29 in response to spring 35.

An aperture 36 is formed in handle segment 28a and a lock pin or arm 37 is carried by member 34 for excursion into and through aperture 36 when the member 34 is closed upon segment 28a. The member 37, which may conveniently be bent from a part of portion 34, is of sufficient linear extension to extend through aperture 36 and into position for engagement with a side wall of an adjacent projection 25 on back plate 7. To facilitate such engagement, should the same be occasioned, the aperture 36 is arranged adjacent one side wall of segment 28a, and thus overlying the back plate 7 adjacent a rib or projection 25. While a plurality of projections 25 is shown, one such projection is sufficient to provide for locking handle 26 in the position shown. It will be realized that pin 37 could similarly engage a depression in the outer face of plate 7 without departing from the nature and scope of the invention.

An opposite handle segment 28b similarly has pivotally mounted adjacent the outer edge thereof, as at 38, a manually operable handle portion 39 yieldingly urged toward closed position overlying handle base section 28 by a spring 40. It will be observed that the handle 26 is conveniently formed of generally U-shaped elements, the member 34 being reduced in one plane in one direction and the member 39 being reduced in the same plane in the opposite direction to facilitate an interfitting folding and the manual grasping and rotation of the handle 26.

Referring now to FIGURE 3, it will be observed that an indicator member 50 is positioned within the sleeve 11a and is threadably engaged within the bore 20 in member 11. The member 50 has a head 51 positioned within the outer end of sleeve 11a and, with the parts in the fully brake-operational position illustrated in FIGURE 3, the head 51 has its outer surface in alignment with the outer surface of head 17. Hence, the handle portions 34, 39 rest upon the outer surface of head 17 and the outer surface of head 51. Should there be any unintentional rotation, due to vibration or otherwise, of sleeve 11a, the member 12 will be rotated in the sleeve 11a and will be withdrawn through tube 13, bringing the head 12 therewith, and the member 50 and head 51 will be moved outwardly of sleeve 11a. The outward movement of head 51 will produce an outward movement of handle portions 34, 39 against the action of springs 35, 40.

The use and operation of the invention are as follows:

Provided is a release mechanism for spring-operated pistons. As illustrated, the cylinder 1 has piston 6 recip-

rocal therein. The piston 6 is normally held in the retracted position illustrated in FIGURE 3 by air pressure entering the chamber 1, as through the inlet 52, on the side of piston 6 opposite that engaged by spring 10. If a loss or diminution of pressure within cylinder 1 should occur, the spring, 10 is effective to urge the piston and the operating rod 3 thereof toward one end of cylinder 1 to apply the brakes of a vehicle, for example.

When it becomes necessary to remove the piston 6 from the cylinder 1, for replacement of seals associated therewith or for other purposes, the back plate 7, against which spring 10 bears, must be removed. Unless spring 10 can be de-energized, the removal of plate 7 becomes difficult and dangerous. The plate 7 would have to be moved inwardly against the action of spring 10 to permit the removal of lock rings 9 and, upon removal of lock rings 9, the spring 10, of sufficient strength and power to apply the brakes of a large vehicle, immediately urges the plate 7 outwardly in an explosive manner which would be dangerous to the mechanic engaged in the operation.

Similarly, with air pressure absent from cylinder 1, it may be desirable to release the brakes which were applied upon loss of said pressure.

In order to release the emergency brake operating mechanism (to release the vehicle brakes, to provide for the removal above described, or for any other purpose) it is necessary to hold piston 6 against the action of spring 10 and thus to de-energize the said spring. This is accomplished by rotation of head 17 and sleeve 11a. Rotation of sleeve 11a in one direction causes a movement of member 11 rearwardly or outwardly of cylinder 1, bringing head 12 into engagement with ring 13 and through ring 13 into retaining engagement with piston 6.

Rotation of head 17 is accomplished by manual release handle 26. The operator merely unfolds manually operable handle portions 34, 39, from the position illustrated in FIGURE 1 into the position illustrated in FIGURE 2. The operator thereafter, grasping portions 34 and 39, merely rotates these to rotate sleeve 11a and thus to withdraw member 11 and release the brake-operating elements within cylinder 1. When the operator has finished with the handle 26, he merely releases manual control of portions 34, 39 which, under the urging of springs 35, 40, respectively, immediately return to the folded compact position illustrated in FIGURE 1.

A lock member 37 is carried by member 34. It will be realized that the member 37 could be carried by portion 39, and that two such lock pins could be provided without departing from the nature and scope of the invention. When the handle 26 is not in operation, the pin 37 is automatically placed in position to lock the handle 26, and through its engagement with head 17, to lock sleeve 11a against unintended rotation, and thus to prevent unintended release, or even partial release, of the brake-operating elements within chamber 1.

Should, however, any unintended movement of the brake release elements toward brake release position occur, due to vibration of the vehicle, or other causes, the indicator member 50 will, since it is carried by member 11, be moved outwardly of plate 7 and head 17 immediately upon any movement of member 11 toward release position. Such outward movement of head 51, since it engages portions 34, 39, will cause said portions to move outwardly against the action of spring 35, 40. Thus is provided an immediate visual indication to the operator that the emergency brake-operating elements within cylinder 1 have been moved toward brake release position. All that is necessary, in such event, is for the operator to fold the handle portions 34, 39 outwardly and rotate the handle 26 in a direction to turn rod 11 into the position illustrated in FIGURE 3 to provide for resumption of full operation of the brake-operating elements in cylinder 1.

Whereas we have shown and described an operative form of the invention, it should be understood that this

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showing and description are to be taken in an illustrative or diagrammatic sense only. There are many modifications in and to the invention which will be apparent to those skilled in the art and which will fall within the scope and spirit of the invention. The scope of the invention should, therefore, be limited only by the scope of the hereinafter appended claims.

We claim:

1. In combination with a cylinder having a piston reciprocal therein, a back plate removably positioned adjacent one end of said cylinder, and a spring operative between said back plate and said piston, the combination therewith of a sleeve rotatably mounted in said back plate, a rod threadably engaging said sleeve and extending through said piston, a head on said rod on the opposite side of said piston from said back plate, said sleeve having a head positioned beyond said back plate from said piston, and manually operable handle means including a base section secured to said last named head for rotation therewith and a handle portion pivoted to said base section and yieldingly urged into overlying relationship with said base section.

2. In combination with a cylinder having a piston reciprocal therein, a back plate removably positioned adjacent one end of said cylinder, and a spring operative between said back plate and said piston, the combination therewith of a sleeve rotatably mounted in said back plate, a rod threadably engaging said sleeve and extending through said piston, a head on said rod on the opposite side of said piston from said back plate, said sleeve having a head positioned beyond said back plate from said piston, and manually operable handle means secured to said last named head for rotation therewith, said handle member having a central base section of a length not greater than the diameter of said cylinder and a pair of handle portions, each of said handle portions being pivotally mounted on an end of said base section.

3. In combination with a cylinder having a piston reciprocal therein, a back plate removably positioned adjacent one end of said cylinder, and a spring operative between said back plate and said piston, the combination therewith of a sleeve rotatably mounted in said back plate, a rod threadably engaging said sleeve and extending through said piston, a head on said rod on the opposite side of said piston from said back plate, said sleeve having a head positioned beyond said back plate from said piston, and manually operable handle means secured to said last named head for rotation therewith, said handle member having a central base section of a length not greater than the diameter of said cylinder and a pair of handle portions, each of said handle portions being pivotally mounted on an end of said base section, said handle portions being yieldingly urged into folded relationship with each other and with said base section.

4. In combination with a cylinder having a piston reciprocal therein, a back plate removably positioned adjacent one end of said cylinder, and a spring operative between said back plate and said piston, the combination therewith of a sleeve rotatably mounted in said back plate, a rod threadably engaging said sleeve and extending through said piston, a head on said rod on the opposite side of said piston from said back plate, said sleeve having a head positioned beyond said back plate from said piston, and manually operable handle means secured to said last named head for rotation therewith, said handle member having a central base section of a length not greater than the diameter of said cylinder and a pair of handle portions, each of said handle portions being pivotally mounted on an end of said base section, said handle portions being yieldingly urged into folded relationship with each other and with said base section, each of said handle portions seating upon said last named head when in said folded position.

5. In combination with a cylinder having a piston reciprocal therein, a back plate removably positioned adjacent

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one end of said cylinder, and a spring operative between said back plate and said piston, the combination therewith of a sleeve rotatably mounted in said back plate, a rod threadably engaging said sleeve and extending through said piston, a head on said rod on the opposite side of said piston from said back plate, said sleeve having a head positioned beyond said back plate from said piston, and foldable, manually operable handle means secured to said last named head for rotation therewith, said plate having at least one projection on its surface opposite that engaged by said spring, said handle means having a lock element engageable with said projection when said handle means is in folded configuration to prevent unintended rotation of said handle means.

6. In combination with a cylinder having a piston reciprocal therein, a back plate removably positioned adjacent one end of said cylinder, and a spring operative between said back plate and said piston, the combination therewith of a sleeve rotatably mounted in said back plate, a rod threadably engaging said sleeve and extending through said piston, a head on said rod on the opposite side of said piston from said back plate, said sleeve having a head positioned beyond said back plate from said piston, and foldable, manually operable handle means secured to said last named head for rotation therewith, and means engaging said handle means and said back plate when said handle means is in folded configuration to lock said handle means and back plate against relative rotation.

7. In combination with a cylinder having a piston reciprocal therein, a back plate removably positioned adjacent one end of said cylinder, and a spring operative between said back plate and said piston, the combination therewith of a sleeve rotatably mounted in said back plate, a rod threadably engaging said sleeve and extending through said piston, a head on said rod on the opposite side of said piston from said back plate, said sleeve having a head positioned beyond said back plate from said piston, and manually operable handle means secured to said last named head for rotation therewith, said handle means including a pivoted portion yieldingly urged into a position overlying said sleeve head, and means automatically effective to indicate the position of said rod comprising a member secured to said rod and extending through said sleeve head for contact with said overlying portion of said handle means in response to linear movement of said rod outwardly through said sleeve to move said handle means portion in a direction away from said sleeve head.

8. In combination, a cylinder having an open end, a piston reciprocal in said cylinder, a back plate removably positioned in said open end, a spring operative between and against said back plate and said piston, a sleeve rotatable in said back plate, a rod threadably engaging said sleeve and extending through said piston, a head carried by said rod beyond said piston from said back plate, and a handle member having a base section fixed on said sleeve for rotation therewith beyond said back plate from said piston and at least one handle portion pivoted on said base section and yieldingly urged into overlying relationship with said base section.

9. In combination, a cylinder having an open end, a piston reciprocal in said cylinder, a back plate removably positioned in said open end, a spring operative between and against said back plate and said piston, a sleeve rotatable in said back plate, a rod threadably engaging said sleeve and extending through said piston, a head carried by said rod beyond said piston from said back plate, and a handle member fixed on said sleeve for rotation therewith beyond said back plate from said piston, said handle member having a central base section engaging said sleeve and a manually operable handle portion pivoted at each end of said base section, each said handle portion being foldable into overlying relationship with said base section.

10. In combination, a cylinder having an open end, a

piston reciprocal in said cylinder, a back plate removably positioned in said open end, a spring operative between and against said back plate and said piston, a sleeve rotatable in said back plate, a rod threadably engaging said sleeve and extending through said piston, a head carried by said rod beyond said piston from said back plate, and a handle member fixed on said sleeve for rotation therewith beyond said back plate from said piston, said handle member having a central base section engaging said sleeve and a manually operable handle portion at each end of said base section, each of said handle portions being pivotally mounted on said base section and being yieldingly urged into folded overlying relationship with said base section.

11. In combination, a cylinder having an open end, a piston reciprocal in said cylinder, a back plate removably positioned in said open end, a spring operative between and against said back plate and said piston, a sleeve rotatable in said back plate, a rod threadably engaging said sleeve and extending through said piston, a head carried by said rod beyond said piston from said back plate, and a handle member fixed on said sleeve for rotation therewith beyond said back plate from said piston, said handle member having a central base section engaging said sleeve and a manually operable handle portion pivoted at each end of said base section, said handle portions being foldable into nesting relationship with said base section, and means on at least one of said handle portions for locking said handle member against rotation relative to said back plate, said locking means including an element automatically engaging said plate when said handle portions are in nesting relationship with said base section.

12. In combination, a cylinder having an open end, a piston reciprocal in said cylinder, a back plate removably positioned in said open end, a spring operative between and against said back plate and said piston, a sleeve rotatable in said back plate, a rod threadably engaging said sleeve and extending through said piston, a head carried by said sleeve beyond said piston from said back plate, and a handle member fixed on said sleeve for rotation therewith beyond said back plate from said piston, said handle member having a central base section engaging said sleeve and a manually operable handle portion pivoted at each end of said base section, said handle portions being foldable into positions overlying said sleeve head, and an indicator means carried by said rod and extending through said sleeve for contact with said manually operable handle portions to urge the same away from said folded positions in response to linear movement of said rod through said sleeve.

13. In combination, a cylinder, a piston reciprocal in said cylinder, means for restraining said piston including a rod extending through said piston and carrying a head at one end thereof, means for rotating said rod including a sleeve member rotatably mounted in a wall of said cylinder and threadably engaging the opposite end of said rod and extending outwardly of said cylinder and a handle member engaging said sleeve member outwardly of said cylinder for rotation with said sleeve member, said handle member including a base section and a pair of handle portions pivoted at opposite ends of said base section.

14. In combination, a cylinder, a piston reciprocal in said cylinder, means for restraining said piston including a rod extending through said piston and carrying a head at one end thereof, means for rotating said rod including a member engaging the opposite end of said rod and extending outwardly of said cylinder and a handle member engaging said last named means outwardly of said cylinder for rotation with said last named means, said handle member having a generally rectilinear base section and a pair of manually operable handle portions, one of said handle portions being pivotally mounted on each end of said base section.

15. In combination, a cylinder, a piston reciprocal in said cylinder, means for restraining said piston including a rod extending through said piston and carrying a head at one end thereof, a back plate for said piston, means for rotating said rod including a member engaging the opposite end of said rod and extending outwardly of said cylinder and a handle member engaging said last named means outwardly of said cylinder for rotation with said last named means, said handle member having a generally rectilinear base section and a pair of manually operable handle portions, one of said handle portions being pivotally mounted on each end of said base section, an aperture in said base section, a pin carried by one of said manually operable handle portions for penetration with said aperture when said last named handle portion is in overlying relationship with said base section, said pin being of sufficient extension to engage a portion of said plate when said pin has penetrated said aperture.

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