No. 763,285. PATENTED JUNE 21, 1904.

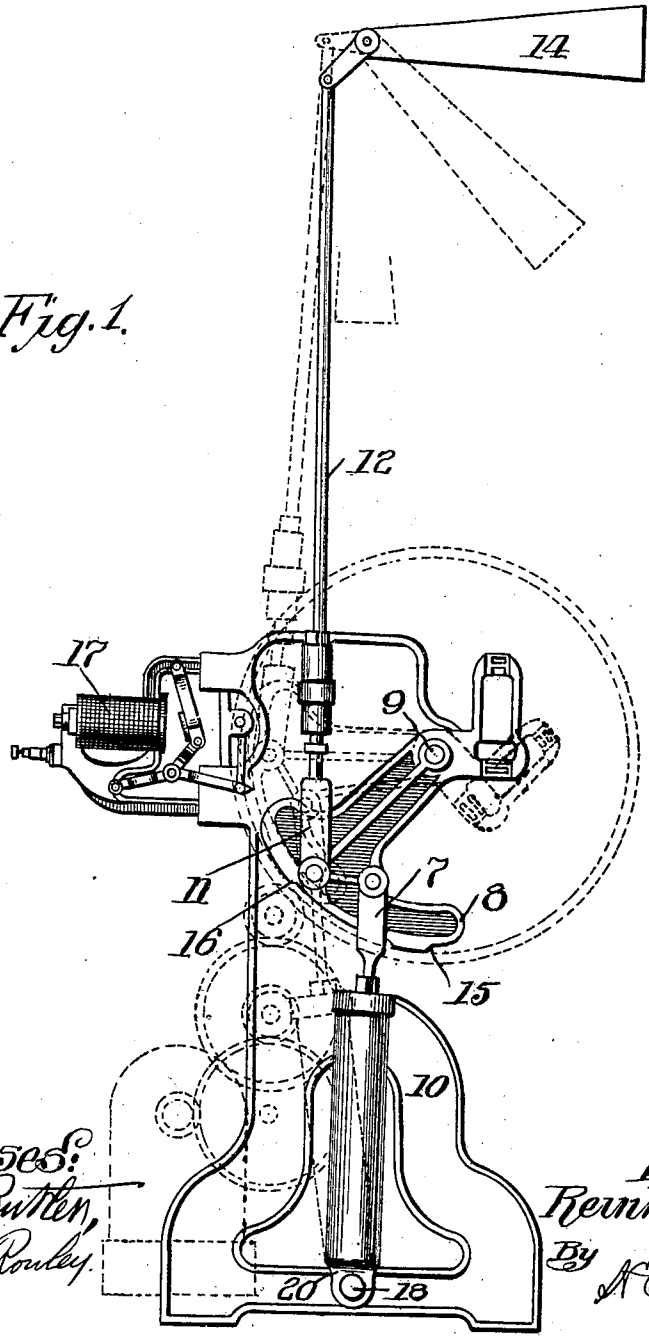
R. HERMAN.

PISTON CYLINDER.

APPLICATION FILED JUNE 3, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 763,285. PATENTED JUNE 21, 1904.

R. HERMAN.

PISTON CYLINDER.

APPLICATION FILED JUNE 3, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

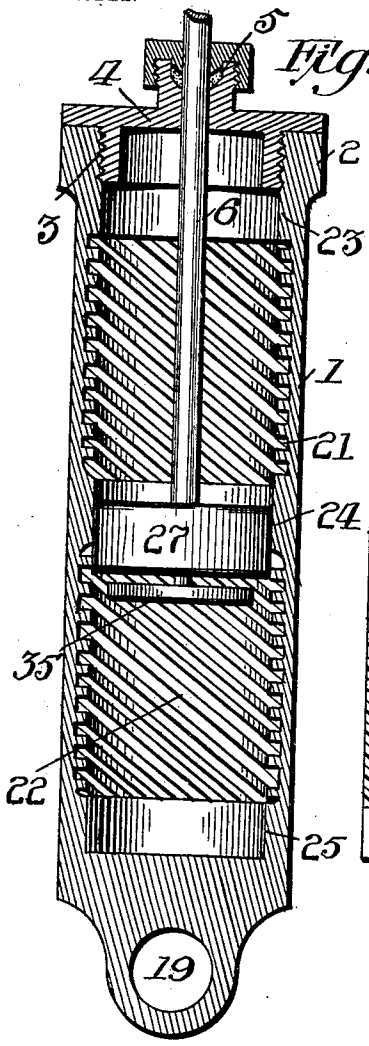


Fig. 3.

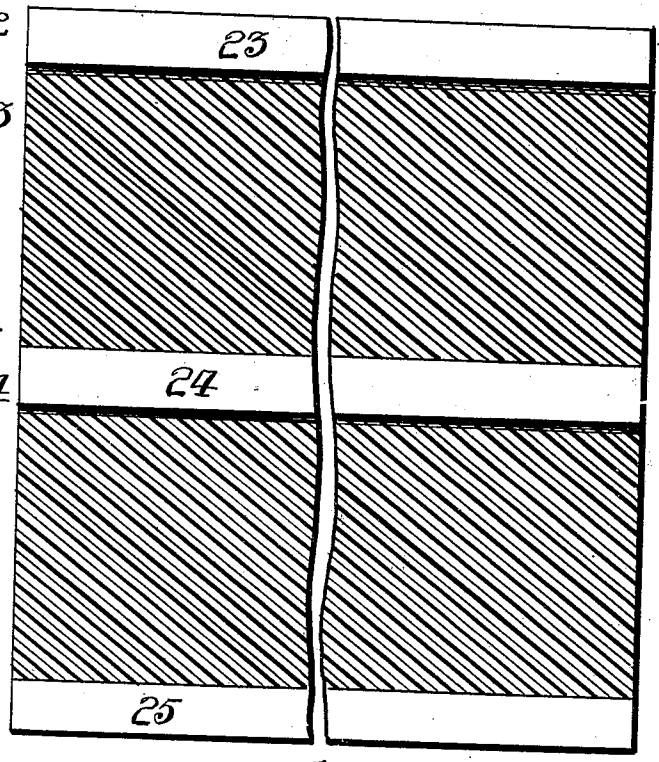


Fig. 4.

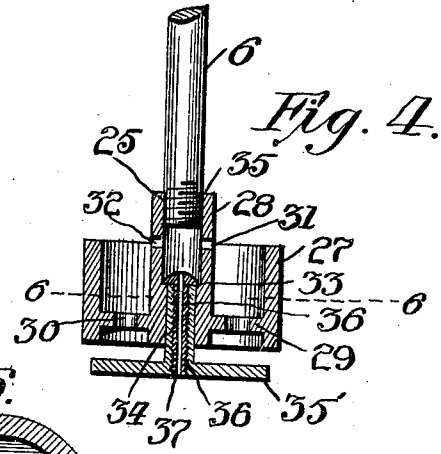


Fig. 5.

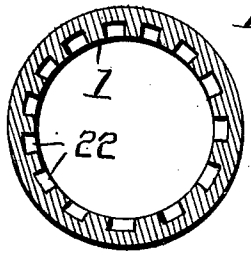
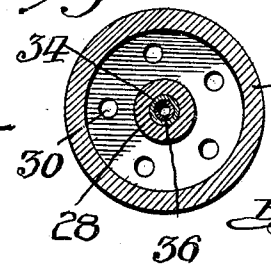


Fig. 6.



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No. 763,285. Patented June 21, 1904.

UNITED STATES PATENT OFFICE.

REINHOLD HERMAN, OF CRAFTON, PENNSYLVANIA.

PISTON-CYLINDER.

SPECIFICATION forming part of Letters Patent No. 763,285, dated June 21, 1904.

Application filed June 3, 1903. Serial No. 159,977. (No model.)

To all whom it may concern:

Be it known that I, REINHOLD HERMAN, a citizen of the United States of America, residing at Crafton, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Piston-Cylinders, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in piston-cylinders, and particularly to such contrivances when designed to have the air or liquid in the cylinder flow from one side to the other of the piston—such, for instance, as where the cylinder and piston are employed as a buffer or dash-pot or for the purpose of offering increasing and diminishing resistance to the operation of other devices connected to the piston.

My invention is particularly adapted though by no means confined to use in connection with signaling mechanism such as is shown and described in Letters Patent issued to me September 24, 1901, No. 683,397, July 29, 1902, No. 705,584, and March 18, 1902, No. 695,723, in which inventions I have shown a dash-pot or cylinder adapted to steady and partially retard the movement of the sector employed in the signaling mechanism.

The object of the present invention is to provide means whereby a differential speed may be obtained at a predetermined time, and the particular construction of device whereby this result is attained will be hereinafter more specifically described and then pointed out in the claims.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, and wherein like numerals of reference indicate like parts throughout the several views, in which—

Figure 1 is a side elevation of my improved dash-pot or piston-cylinder applied in position for use in connection with signal mechanism. Fig. 2 is a vertical sectional view of my improved dash-pot or cylinder. Fig. 3 is a developed or plan view of the body portion of my improved dash-pot or piston-cylinder. Fig. 4 is a vertical sectional view of the valve employed therein. Fig. 5 is a cross-section of my improved dash-pot or piston-cylinder, and Fig. 6 is a cross-section taken on the line 6 6 of Fig. 4 of my improved valve.

The improvement, as shown and described, is in connection with the semaphore type of signal; but it is obvious that I do not care to limit myself to applying this improvement to this type or style, as the same may be employed on any signal where dash-pots are used, each of which may be independently operated or simultaneously operated, as it is desired.

In illustrating my invention I have employed the ordinary form of standards and general operating mechanism as previously described and illustrated in the above-mentioned patents, and in carrying out my invention it is the object to provide a dash-pot or cylinder which may be employed upon any signal where a dash-pot or cylinder is required.

In Fig. 1 of the drawings I have illustrated my improved dash-pot in connection with the operating mechanism, the locking mechanism, and the semaphore-arm, the support of which is not shown in the accompanying drawings. Heretofore in the ordinary form of dash-pot employed a "drifting" or "slow" movement of the semaphore has resulted, and it is the object of my improved dash-pot to provide means whereby a differential speed may be obtained at predetermined times, and, as illustrated in Fig. 2 of the drawings, which shows a vertical section of my improved dash-pot, the determined movements correspond to the three positions which are assumed by the semaphore-arm.

The reference-numeral 1 represents the cylindrical casing or body portion of my improved dash-pot, the upper end of which is slightly enlarged or carries an annular shoulder 2, the interior of which is screw-threaded, as indicated at 3, to receive a cap 4, which carries the ordinary form of stuffing-box 5, and through said stuffing-box and cap is passed the rod or stem 6, which is connected by a yoke 7 to the sector 8 of the signal mechanism. This sector is mounted upon a central operating-

shaft 9, journaled between the standards, one of said standards, as shown, being indicated by reference-numeral 10. This sector has connected to it by a yoke 11 the rod 12, which is connected at its upper end to the semaphore-arm 14. The sector upon its periphery carries the notches 15 and 16, which are adapted to be engaged by the locking mechanism 17, which locks the signal mechanism, as has been illustrated and described in previous patents obtained by me. The lower end of the cylindrical dash-pot or cylinder is adapted to be journaled between the standards 10 by a pin or bolt 18, which is passed through the aperture 19, formed in the contracted end 20 of the dash-pot 1. Upon the interior circumference of the dash-pot I provide a plurality of ports 21, said ports comprising a plurality of grooves which are formed in a spiral path, as indicated by the reference-numeral 22 and illustrated in Figs. 2 and 3 of the drawings. At each end of the dash-pot and centrally thereof I provide the raised portions 23, 24, and 25, respectively, the object of which will be hereinafter more fully described.

Secured by means of screw-threads 25 to the end of the rod or stem 6 is a valve comprising an annular shell 27, and mounted centrally therein and connected to said shell is the sleeve 28, in which is secured the stem 6. This sleeve 28 is connected to the annular shell 27 by means of the annular web 29, and formed in said annular web is a plurality of ports 30. The sleeve 28 is provided with ports 31 32, establishing communication between the chamber in the sleeve and the cylinder-chamber, and within the sleeve is an interior annular shoulder 33. The opening 34, leading through the sleeve from the shoulder to the lower end of said sleeve, is of less diameter than the opening 35 above the shoulder, in which latter opening the stem 6 engages. A hollow valve-stem is fitted in the opening 34 and carries a valve 35′ on its lower end, the stem being held in the sleeve by means of a screw 36, passed through the stem, with its head resting on the annular shoulder 33. A port 37 extends from end to end of this screw whereby to establish communication between the chambers above and below the piston.

A liquid similar to oil of a medium weight is adapted to be held within the dash-pot and govern the movement of the valve, whereby a differential speed at determined times may be given through the sector and the operating mechanism to the semaphore-arm. As illustrated in Fig. 2 of the drawings, the valve is shown in an open position and about to leave the enlarged portion or annular seat 24, formed centrally within the dash-pot, and when the valve is descending in the dash-pot the oil or liquid passes around the valve in the spiral grooves or ports 21, whereby the valve and stem or rod 6 will descend at a greater speed than when the piston is passing the annular seat 24, at which latter time the shell engaging with the seat shuts off the passage of liquid around the piston of the cylinder. Upon the piston reaching the bottom of the dash-pot the valve 35′ will be seated against the base of the shell 27, whereby the ports 30 will be closed. I will now assume that the piston is above the central portion or enlarged seat 24 and just about to enter into engagement with the same. Upon the valve-head 35′ and the shell 27 entering the enlarged annular portion 24 the resistance formed by the liquid will cause the valve-head 35′ to be seated against the lower edge of shell 27, and the downward movement of the piston and stem 6 will be retarded to the extent of the amount of liquid passing through the central port 37, formed in the screw 36, and out through the ports 31 and 32, formed in the sleeve 28. This retarded movement will take place until the piston has passed down and out of engagement with the annular portion 24, when the liquid will surge or pass around the piston through the spiral ports formed upon the interior circumference of the dash-pot casing 1. One of the particular features and objects of my improved dash-pot is in the novel manner in which these ports are formed upon the interior circumference of the dash-pot casing. Heretofore the ports have been formed in vertical alinement with the valve and the stem 6, whereby considerable wear is imposed upon the periphery of the valve. Sometimes the wearing of the valve-shell is so considerable that it must be removed and replaced by a new shell. With my improved spiral ports the wear upon the piston is equally divided upon all surfaces of the piston-shell, whereby the life of the piston is longer than were the ports formed vertically in the cylinder.

It will be seen from this construction and operation that a differential speed may be obtained at predetermined time, whereby the semaphore-arm will have a direct movement instead of drifting, as heretofore experienced.

It will be obvious that various slight changes may be made in the details of construction without departing from the general spirit of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a cylinder having spiral ports therein, a piston carrying a valve operating in said cylinder and means whereby a gradual movement of said piston is obtained at predetermined periods, substantially as described.

2. The combination of a cylinder having interior spiral ports, with a piston working in the cylinder, said ports extending exteriorly of the said piston whereby a rapid movement of the piston is obtained.

3. The combination of a cylinder having spi-

ral ports formed therein at the upper and lower ends thereof, and a piston carrying a valve, substantially as described.

4. The combination of a spirally-grooved cylinder forming ports at the upper and lower ends thereof, a piston having ports formed therein and an automatic valve to control said ports, substantially as described.

5. A cylinder provided on its interior with spirally-arranged grooves, in combination with a reciprocating piston working in said cylinder, substantially as and for the purpose set forth.

6. A cylinder having closed ends and provided intermediate its ends with an interior annular seat, and having spirally-arranged grooves on its interior above said seat, substantially as and for the purpose set forth.

7. A cylinder having closed ends and provided intermediate its ends with an interior annular seat, and having spirally-arranged grooves on its interior below said seat, substantially as and for the purpose set forth.

8. A cylinder having closed ends and provided intermediate its ends with an interior annular seat, and having spirally-arranged grooves above and below said seat, substantially as and for the purpose set forth.

9. A cylinder provided adjacent each end and centrally of its chamber with interior annular seats, and having interior spirally-arranged grooves between the central and end seats, substantially as described.

10. A cylinder provided with interior annular seats adjacent each end and an interior annular seat intermediate the end seats and having grooves in its interior walls between the intermediate and the end seats, substantially as described and for the purpose set forth.

11. In combination with a cylinder having passages in its interior walls, a piston having a port therethrough, and means whereby fluid in the cylinder is caused to pass through the port in the piston during certain positions of the latter in the cylinder and through the passages in the cylinder-walls around the piston at other positions of the latter in the cylinder, substantially as described, and for the purpose set forth.

12. The combination with a piston carrying a valve having movement independently of the piston and provided with a port extending through the valve, and a movable member connected to the stem of the piston, of means in the interior of the cylinder for causing fluid to flow through the port in the valve at certain positions of the piston in the cylinder and around the piston at other positions of said piston in the cylinder during the stroke of the piston in one direction to obtain a differential speed of said piston during its travel in the cylinder, substantially as described.

13. A cylinder provided adjacent each end with an interior annular seat, and an interior annular seat intermediate said first-named seats, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

REINHOLD HERMAN.

Witnesses:

K. H. BUTLER,

H. C. EVERT.