

No. 632,950.

Patented Sept. 12, 1899.

W. SPENCE & J. NOLAN.

PISTON.

(Application filed Apr. 12, 1899.)

(No Model.)

Fig. 2.

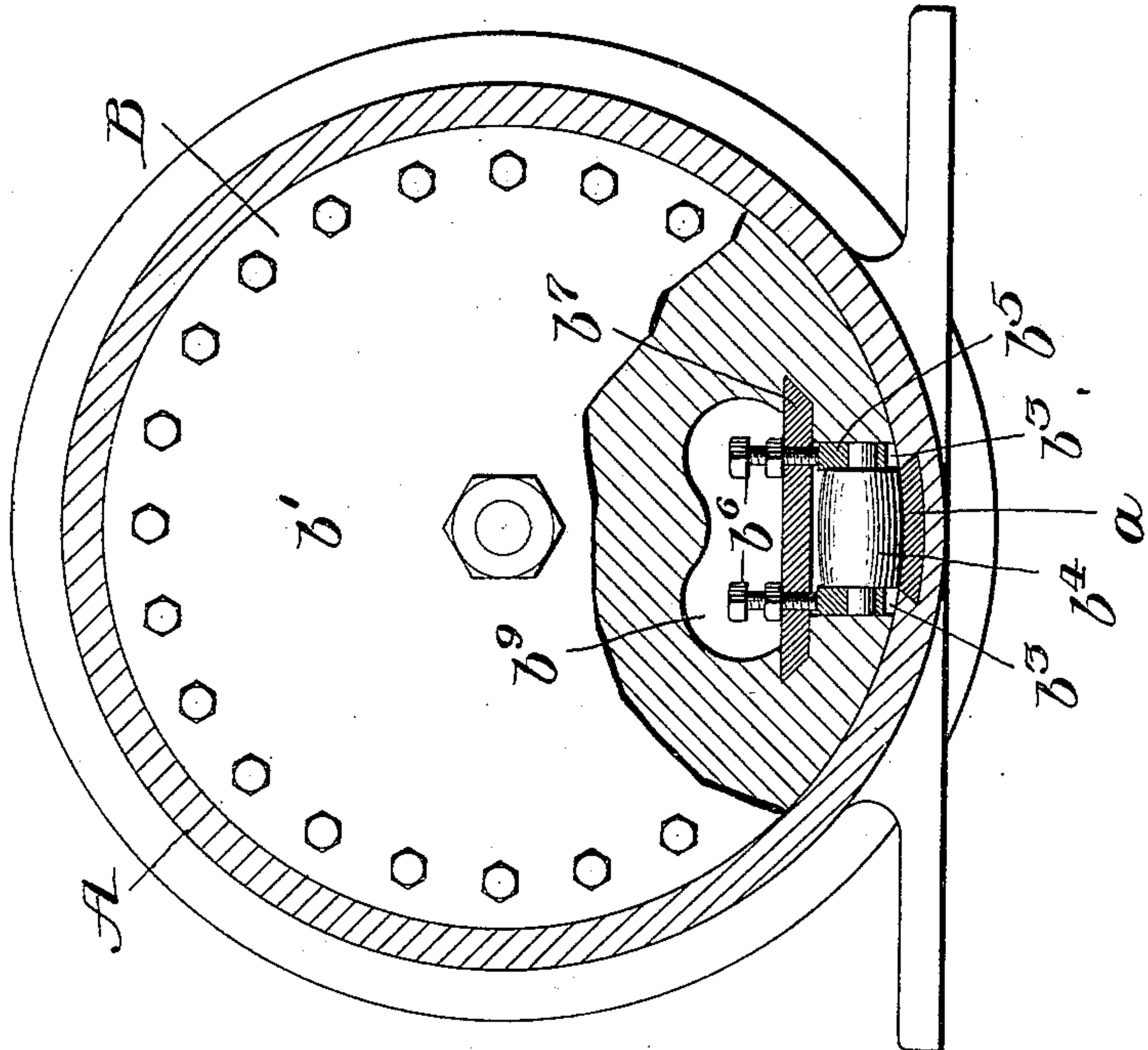
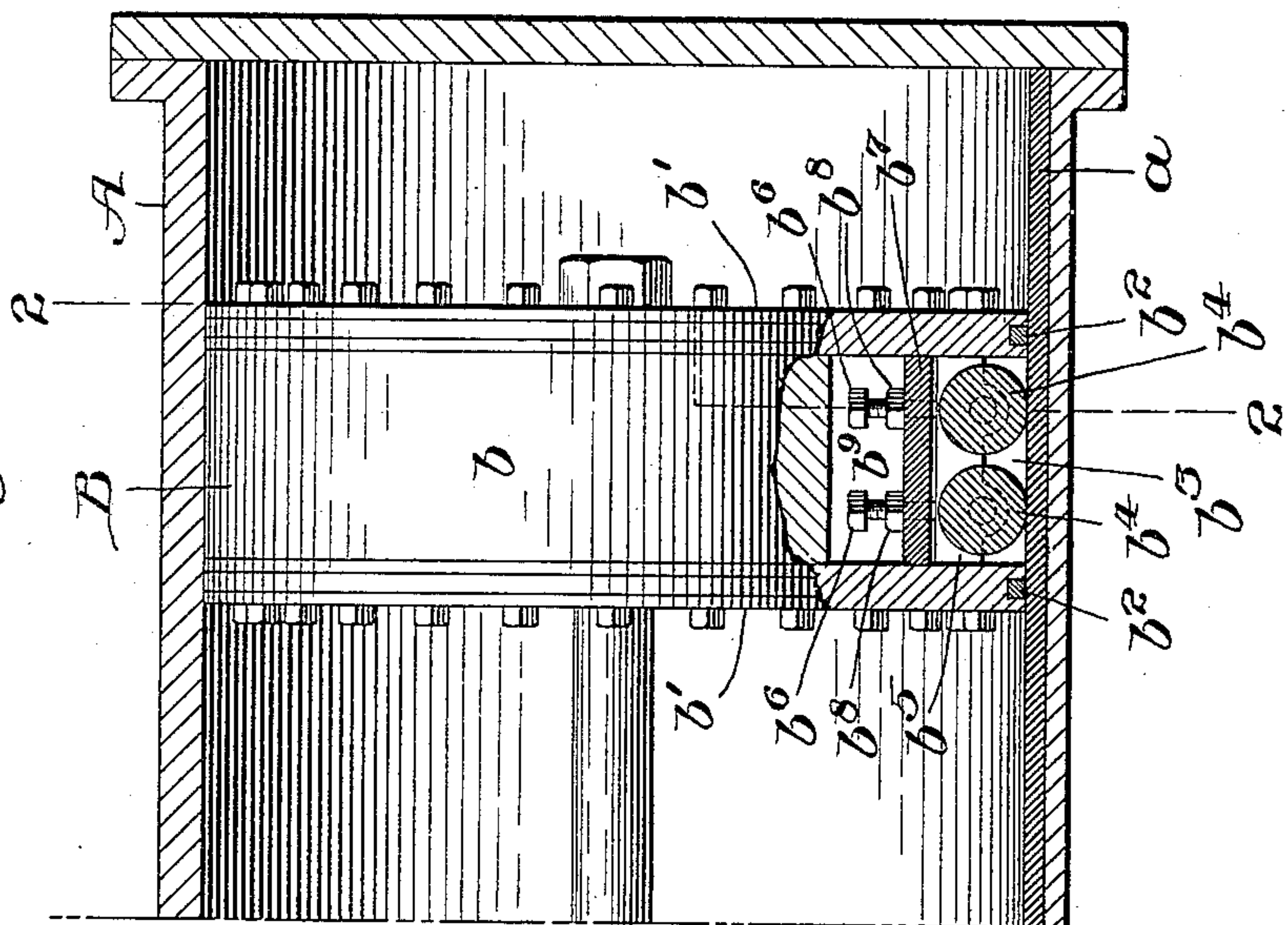


Fig. 1.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

WATSON SPENCE AND JOHNSTON NOLAN, OF PHILADELPHIA,  
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## PISTON.

SPECIFICATION forming part of Letters Patent No. 632,950, dated September 12, 1899.

Application filed April 12, 1899. Serial No. 712,711. (No model.)

*To all whom it may concern:*

Be it known that we, WATSON SPENCE and JOHNSTON NOLAN, citizens of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Pistons, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to pistons for horizontal steam-cylinders, and has for its object to provide a simple and efficient construction whereby the undue wearing of the cylinder and the piston incident to the weight of the  
15 latter, particularly in large steam-engines, shall be materially reduced.

To this end the invention, as generally stated, consists in the combination, with the cylinder, of a piston having therein a novel  
20 construction and arrangement of supporting-rollers, together with certain adjuncts, which will be hereinafter particularly described and claimed.

25 In the drawings, Figure 1 is a sectional elevation of a piston and a portion of a cylinder embodying our invention. Fig. 2 is a full transverse section on the line 2 2 of Fig. 1.

A is a horizontal cylinder, and B the reciprocative piston therein. This piston comprises the body *b*, with circular end heads *b'* detachably bolted thereto. The heads are peripherally grooved for the reception of appropriate packing-rings *b<sup>2</sup>*. The lower peripheral portion of the piston-body is transversely recessed, as at *b<sup>3</sup>*, for the reception  
35 of antifriction-rollers *b<sup>4</sup>*, that are suitably mounted therein, so as to bear upon the floor of the cylinder, and thus afford a rolling support for the piston in its traverse. One or  
40 more rollers may be employed, as the size and weight of the piston may determine. In the present instance two rollers are illustrated. These rollers are journaled in lateral bearing-blocks *b<sup>5</sup>*, which are fitted within the recess, so as to be vertically adjustable  
45 therein within limits, suitably-disposed set-screws *b<sup>6</sup>* being provided to permit the vertical adjustment of said blocks and the rollers in respect to the cylinder and piston, and  
50 thus insure the efficient working of the latter. In this case a plate *b<sup>7</sup>* is arranged within

the piston directly above the rollers, and the set-screws are fitted in the plate in positions to act upon the respective bearing-blocks and serve as determinate stops therefor. These  
55 screws are provided with jam-nuts *b<sup>8</sup>* to lock the screws in their positions of adjustment. The piston-body is of course appropriately recessed above the plate, as at *b<sup>9</sup>*, to permit the screws to be readily manipulated when  
60 one of the heads *b'* is removed.

By the foregoing-described construction it will be seen that the reciprocations of the piston are attended with the minimum of friction between the same and the cylinder and that  
65 therefore the otherwise undue wearing action between the piston and the floor of the cylinder is materially reduced and the efficiency of the engine correspondingly increased. It will also be seen that the rollers are  
70 entirely concealed within the piston, and consequently not subjected to the direct action or pressure of the steam within the cylinder; further, that to apply, detach, or adjust the rollers it is not necessary to remove the piston  
75 from the cylinder, inasmuch as one of the heads of the piston may be unbolted and detached while the piston is within the cylinder and access to the rollers and their adjuncts be thereby readily effected.  
80

We preferably arrange in the floor of the cylinder and flush therewith a plate *a*, of phosphor-bronze or like metal, upon which run the supporting-rollers in the piston, which plate in the present instance is dovetailed  
85 in the cylinder, so that it (the plate) may be removed and replaced should need require.

We claim as our invention—

1. The combination with a cylinder, of a piston having a recess formed therein and  
90 opening upon the working surface of said cylinder, detachable means for closing said recess, and an antifriction-roller adjustably mounted within said recess and adapted to bear upon the working surface of the cylinder, substantially as described.  
95

2. The combination with a cylinder, of a piston having a recess in its lower portion and opening upon the floor of said cylinder, a detachable packing-head for closing said  
100 recess, and an antifriction-roller adjustably mounted in said recess and adapted to bear



upon the floor of the cylinder, substantially as described.

3. The combination with a cylinder, of a piston having a recess in its lower portion and opening upon the floor of said cylinder, detachable means for closing said recess, adjustable bearing-blocks arranged in said recess and retained therein by said closing means, an antifriction-roller journaled in said blocks, and means for vertically adjusting said blocks, substantially as described.

4. The combination with a cylinder, of a piston having a recess in its lower portion and opening upon the floor of said cylinder, detachable means for closing said recess, bearing-blocks arranged in said recess and retained therein by said closing means, an antifriction-roller journaled in said blocks, and set-screws bearing upon the blocks for purposes of adjustment, substantially as described.

5. The combination with a cylinder, of a piston therein having a recess or opening in its lower peripheral portion and having detachable packing-heads inclosing the ends of said recess or opening, adjustable bearing-blocks in said recess or opening, an antifriction-roller journaled in said blocks, and means for vertically adjusting said blocks, substantially as described.

6. The combination, with a cylinder, of a

piston therein having in its lower portion the recesses  $b^3$ ,  $b^9$ , the interposed plate,  $b^7$ , the bearing-blocks fitted within the recess  $b^3$ , the roller or rollers journaled in said blocks, and the set-screws fitted in said plate and adapted to act upon the respective blocks, substantially as described.

7. The combination with a cylinder having in and flush with the floor thereof a longitudinal bearing-plate, of a piston having a recess in its lower portion, and an antifriction-roller adjustably mounted in said recess and adapted to roll upon said bearing-plate during the travel of the piston, substantially as described.

8. The combination with a cylinder having in and flush with the floor thereof a longitudinal bearing-plate, of a piston having a recess in its lower portion, adjustable bearing-blocks arranged in said recess, an antifriction-roller journaled in said blocks and adapted to roll upon said bearing-plate during the travel of the piston, and means for adjusting said blocks, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

WATSON SPENCE.  
JOHNSTON NOLAN.

Witnesses:

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