

(No Model.)

3 Sheets—Sheet 1.

W. GOODMAN, Dec'd.

M. GOODMAN, Administratrix.

PISTON PACKING.

No. 525,073.

Patented Aug. 28, 1894.

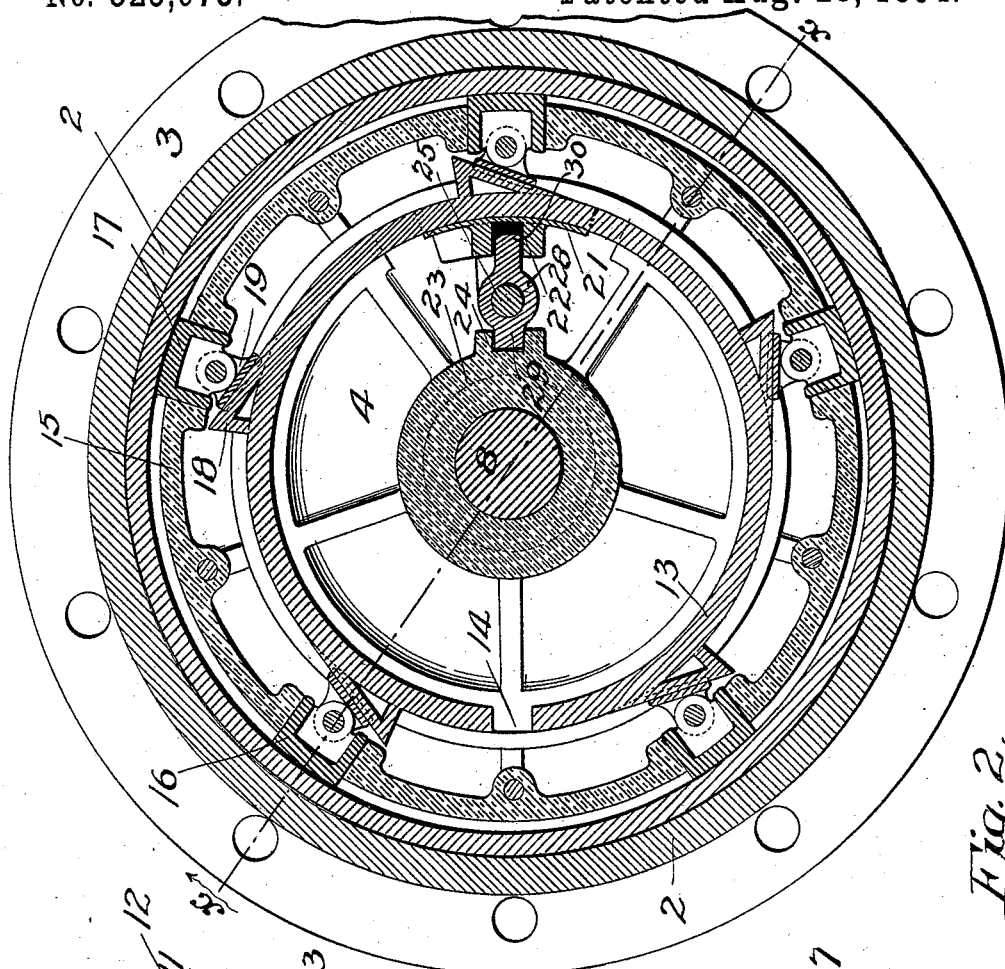


Fig. 2.

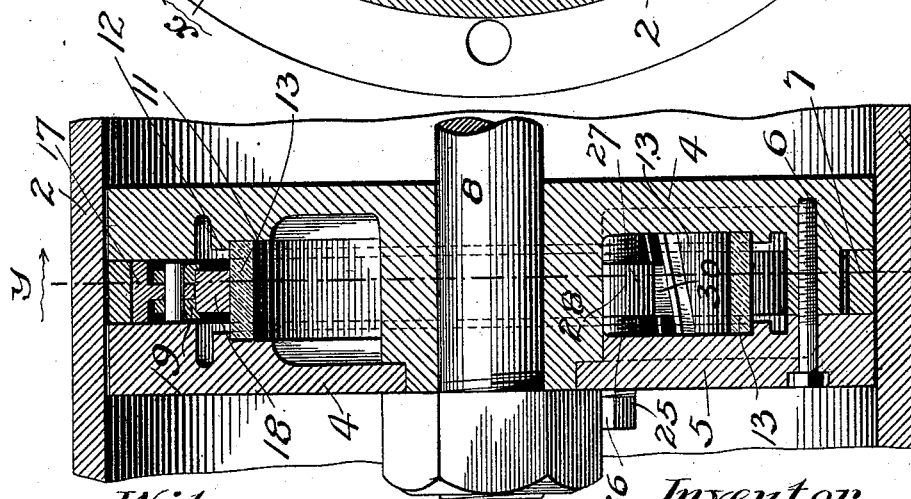


Fig. 1.

Witnesses.

C. E. Van Doren.

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Inventor:

William Goodman.

By *Paul & Hawley*  
his Attorneys.

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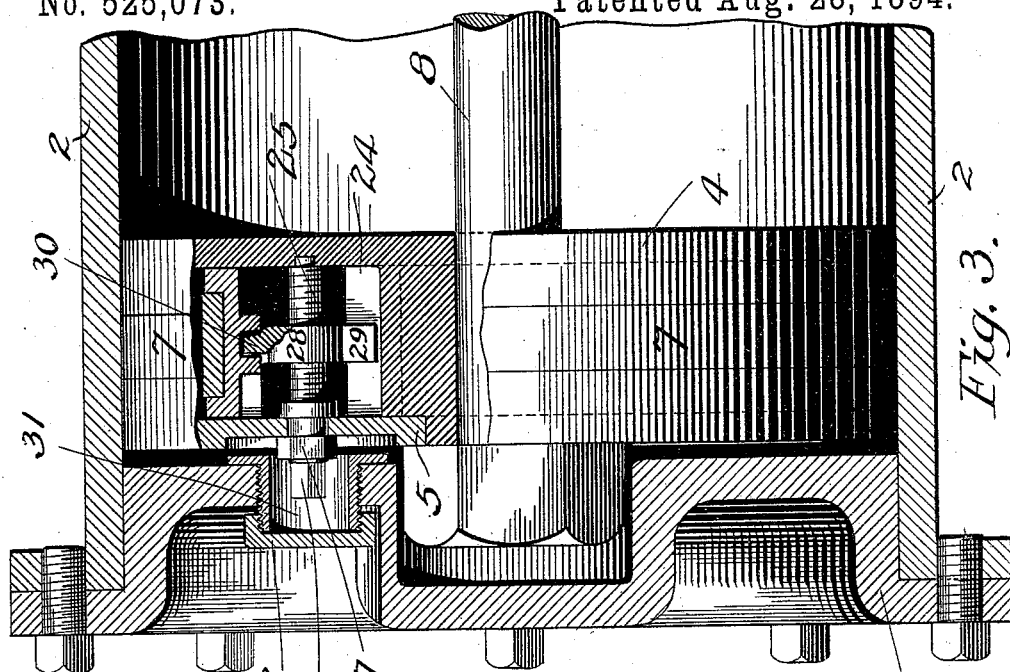


Fig. 3.

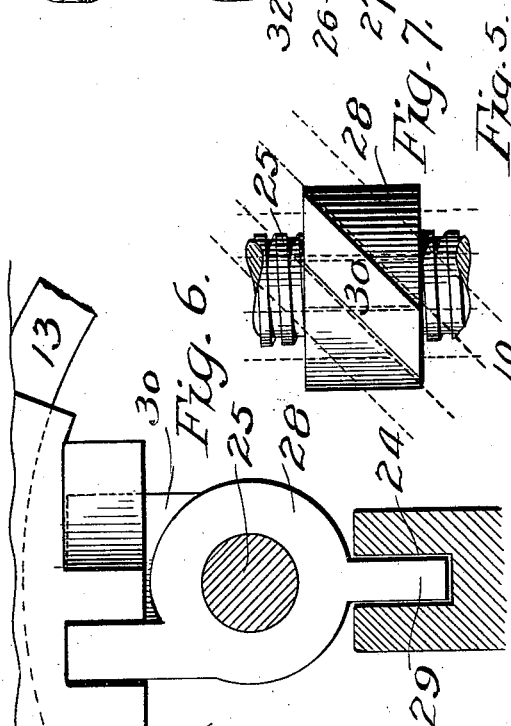


Fig. 6.

Fig. 5.

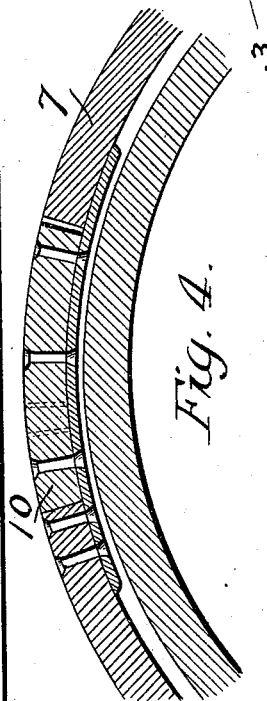
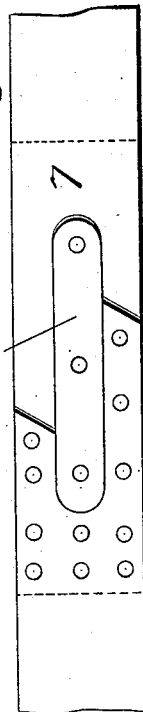


Fig. 4.

Witnesses.  
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(No Model.)

3 Sheets—Sheet 3.

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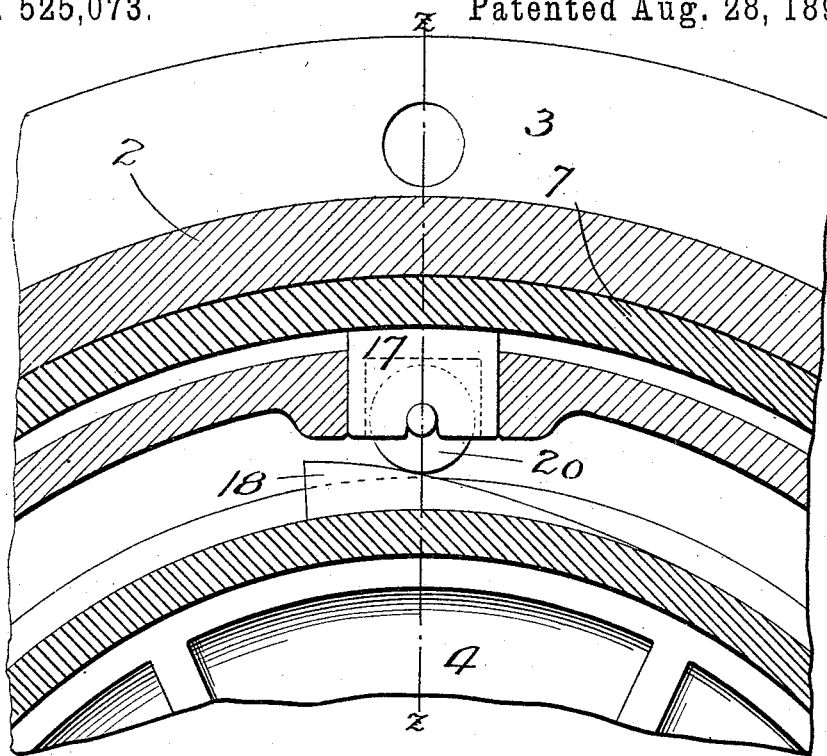


Fig. 9.

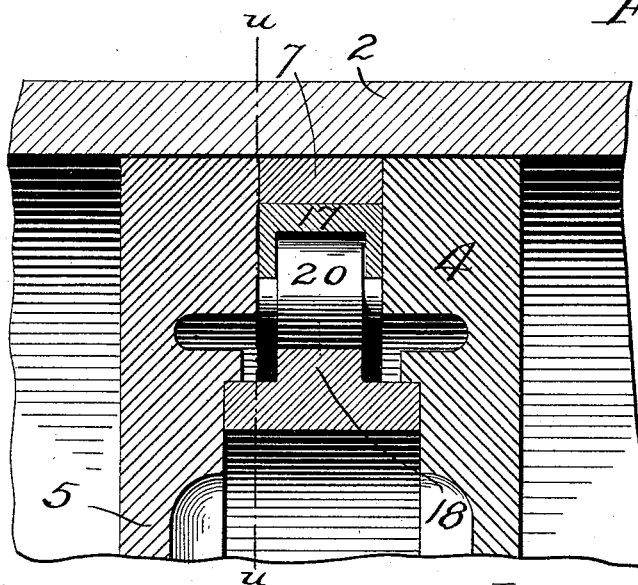


Fig. 8.

Witnesses.

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# UNITED STATES PATENT OFFICE.

WILLIAM GOODMAN, OF MINNEAPOLIS, MINNESOTA; MARGARET GOODMAN  
ADMINISTRATRIX OF SAID WILLIAM GOODMAN, DECEASED.

## PISTON-PACKING.

SPECIFICATION forming part of Letters Patent No. 525,073, dated August 28, 1894.

Application filed September 7, 1893. Serial No. 484,989. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM GOODMAN, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Piston-Packing, of which the following is a full, clear, and exact specification.

My invention relates to a piston packing for the pistons of steam engines and the object of my invention is to provide a piston packing, which will be perfectly steam tight, which exactly fit the cylinder without excessive pressure against the walls thereof, which may be nicely adjusted without removing the follower or side of the piston, and a further object of my invention is to so construct and arrange the adjusting parts that the packing may be adjusted without even removing the cylinder head.

To these ends my invention consists in general in the constructions and combinations hereinafter described and particularly pointed out in the claims, which will be more readily understood by reference to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a longitudinal section on the line  $x-x$  of Fig. 2. Fig. 2 is a transverse section on the line  $y-y$  of Fig. 1. Fig. 3 is a longitudinal section of the cylinder showing the arrangement for adjustment from the outside, parts of the piston being also in section. Figs. 4 and 5 are detail views showing the construction of the packing rings. Fig. 6 is an enlarged detail of the adjusting wedge or feather device. Fig. 7 is a plan view thereof. Fig. 8 is a longitudinal detail section showing a modified form of the extending device, the section being taken on the line  $z-z$  of Fig. 9. Fig. 9 is a transverse sectional detail on the line  $U-U$  of Fig. 8.

As shown in the drawings, 2 represents the cylinder, and 3 one of the heads thereof. The piston is composed of the main part 4 and the usual follower 5, securely bolted thereon an annular groove 6 being provided in the periphery of the piston to receive the packing ring 7.

8 represents the piston rod. The packing ring is made so as to just fit the inside of the cylinder and has barely enough spring to hold

itself in place against the walls thereof. The ends of the ring are joined by a slip joint 10 as shown in Figs. 4 and 5. Inside of the piston is a large annular space and both the main and follower part of the piston are provided with annular surfaces 11 terminating in annular ribs 12, which ribs limit the outward movement of a spring metal ring 13, which is cut as shown at 14 (Fig. 2). Between the interior chamber or space and the channel for the packing ring is the annular wall 15 and this wall is provided with a number of preferably rectangular slots adapted to accommodate the plungers or heads 17, which are adapted to slide therein freely.

The inside ring 13 is provided with a series of offset inclined or cam parts 18 arranged to operate back of the several heads 17 and the heads are provided with pivoted foot pieces 19 or as shown in Figs. 8 and 9 with small rollers 20 adapted to rest upon the inclines and to move freely thereon so that upon revolving the ring with respect to the rest of the piston the heads are either forced out or allowed to move in according to the direction in which the ring 13 is moved. The surfaces of the inclines may be straight or slightly crowning as shown in Fig. 9 and the strength of the ring 13 is such as to firmly hold the heads out and therefore hold the packing ring snugly against the walls of the cylinder, while at the same time permitting sufficient movement of the ring in or out to take up wear in different parts in the stroke. For rotating the inner ring I provide the same with a block 21 extending from the inside thereof and provided with the groove 22 inclined with respect to the axis of the piston.

In the sleeve 23 of the piston is a groove 24 which is parallel with the axis. A screw 25 extends in line with the latter groove and has surfaced parts and bearings in the main and follower parts of the piston, being further provided with a square head 26 and a threaded part next to the same adapted to receive a locking nut 27, which when turned against the follower prevents the screw from turning. On the screw is a burr or collar 28 also threaded and having a wing or lug 29 to extend into the groove 24 and on the opposite side an inclined wing or feather 30 extending into the

inclined slot on the inner ring 13. By turning the screw and thus drawing forward or moving back the collar 28 the ring will be revolved to increase or decrease the pressure on the packing ring. In the cylinder head I provide an opening 31 which permits the piston to closely approach the same without the head and the screw 25 striking the cylinder head; this opening may be in the form of a simple recess, but I prefer to arrange a cap 32 therefor upon the removal of which a wrench may be applied thereto to adjust the packing ring without taking out the cylinder head, thus the work may be done in a moment for which hours have been required heretofore.

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

1. The combination, with the piston having an annular groove, of a packing ring arranged in said groove, an inner spring ring, plungers interposed between said spring ring and said packing ring, guides for the plungers, said spring adapted to yield inwardly, means for revolving said spring ring, and means of engagement between said spring ring and said plungers whereby as said spring ring is revolved the tension upon said packing ring is increased or decreased, substantially as described.

2. The combination, with the piston, having an annular groove, of a packing ring arranged in said groove, an interior wall of the piston, openings therethrough, plungers arranged in said openings to engage said packing ring, an inner spring ring adapted to yield inwardly and having eccentric parts to engage said plungers, and means for revolving said spring ring to increase or decrease the tension upon said packing ring, substantially as described.

3. The combination, with the piston, composed of main and follower parts and having an interior cavity, of a packing ring arranged about said piston, an interior wall, openings through said wall, plungers acting through said openings and against said packing ring, anti-friction footings for said plungers, an inner spring ring adapted to yield inwardly

and having eccentric parts to engage said footings, and means for revolving said ring without removing said follower, substantially as described and for the purpose specified.

4. The combination, of the cylinder, with the piston to operate therein and provided with an annular groove, a packing ring arranged in said groove, an interior ring, radial plungers arranged between said packing ring and eccentric parts upon the inner ring, a revoluble shaft or screw for revolving said inner ring, said shaft projecting through the side of the piston, the cylinder head provided with an opening to receive the end of said shaft or screw, and a cap for closing said opening and adapted to be removed to permit access to said shaft, substantially as described.

5. The combination, with the piston provided with an annular groove, of a packing ring arranged in said groove, said piston having an interior cavity, heads or plungers extending therefrom into engagement with said packing ring, an inner split ring having eccentric parts to engage and force out said heads when said ring is revolved, and means for revolving the same, substantially as described.

6. The combination, with the piston, having an annular groove, of a packing ring arranged therein, an inner ring arranged within the piston and having eccentric parts arranged to act upon said inner split ring, a groove or channel on the inside of said inner ring, a screw shaft and an inclined wedge or feather threaded to fit said screw and held from revolving thereon, the wedge entering the groove or channel of the inner ring whereby said screw is turned, said ring is revolved to increase or decrease the pressure on the packing ring, substantially as described.

In testimony whereof I have hereunto set my hand this 16th day of August, 1893.

WILLIAM GOODMAN.

In presence of—

C. G. HAWLEY,  
F. S. LYON.