No. 751,905. PATENTED FEB. 9, 1904.

J. T. FITE.

PISTON TRAVEL REGULATOR.

APPLICATION FILED APR. 30, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

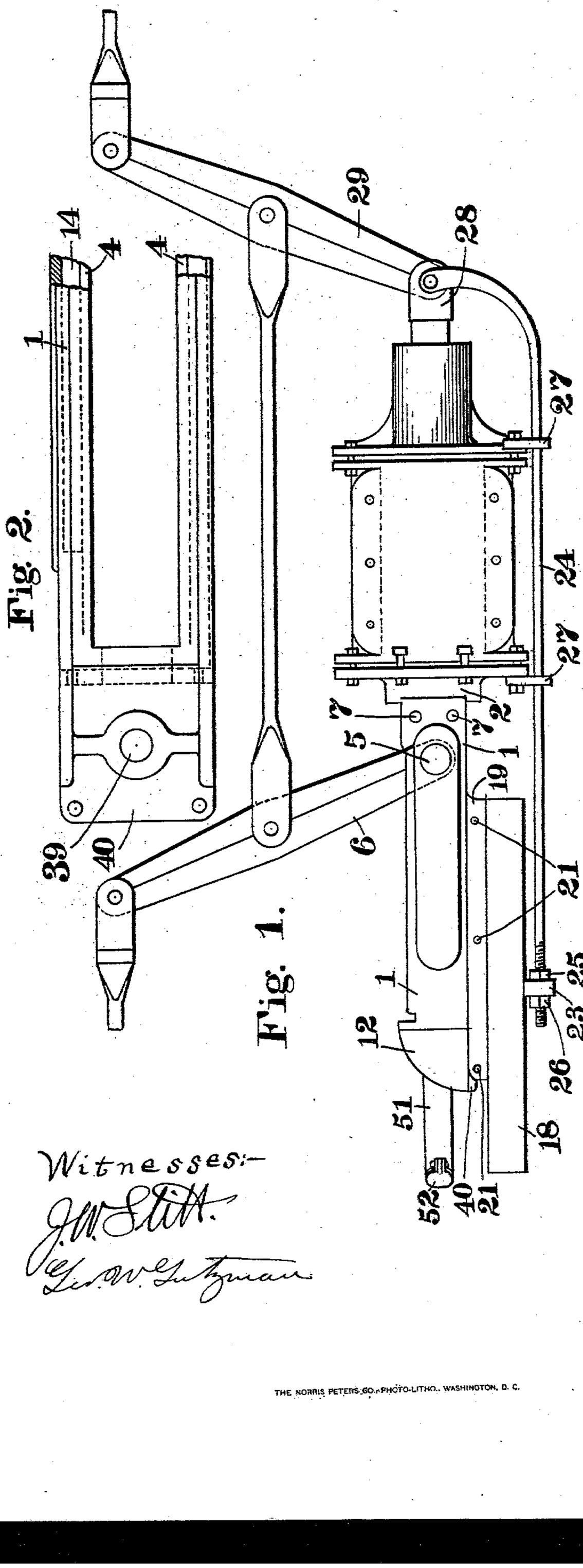

Fig. 1.

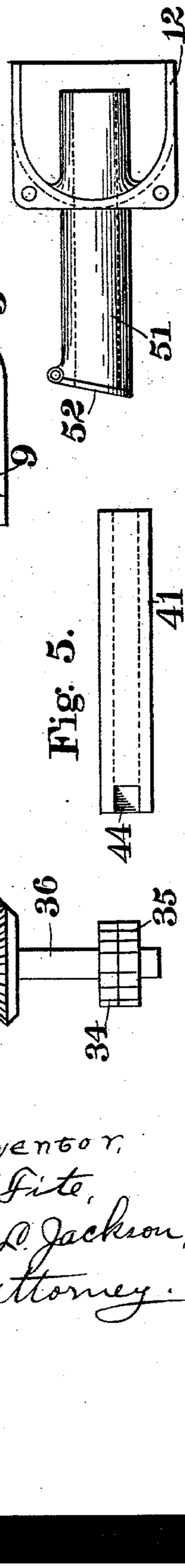

Fig. 4.

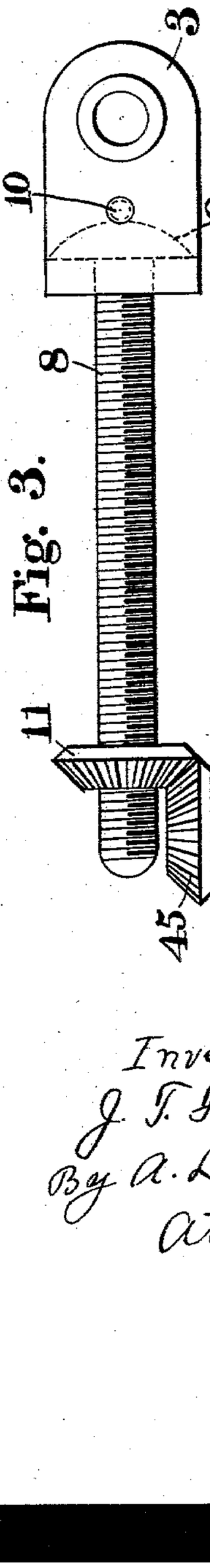

Fig. 3.

Fig. 5.

Witnesses:-
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J. T. FITE.

PISTON TRAVEL REGULATOR.

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NO MODEL. 2 SHEETS—SHEET 2.

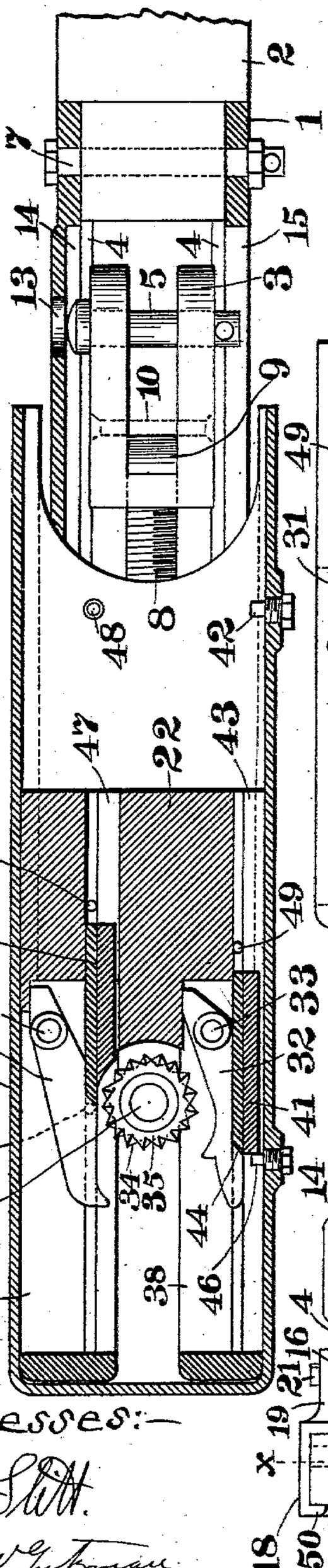

Fig. 6.

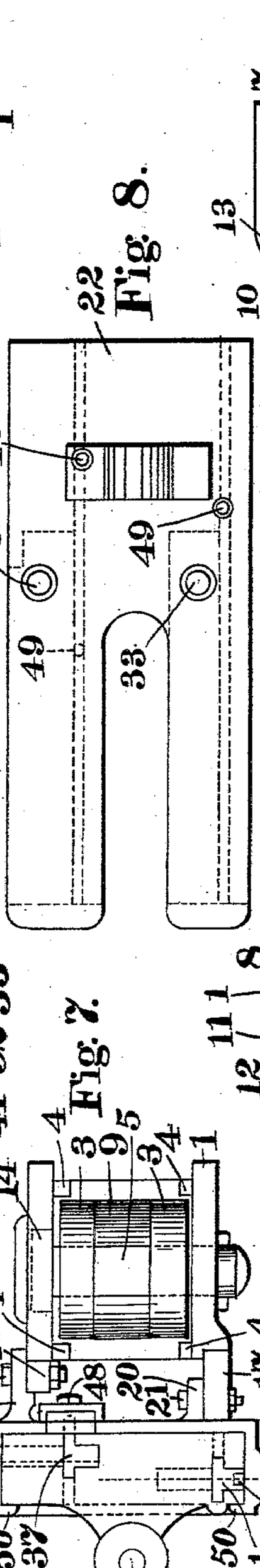

Fig. 8.

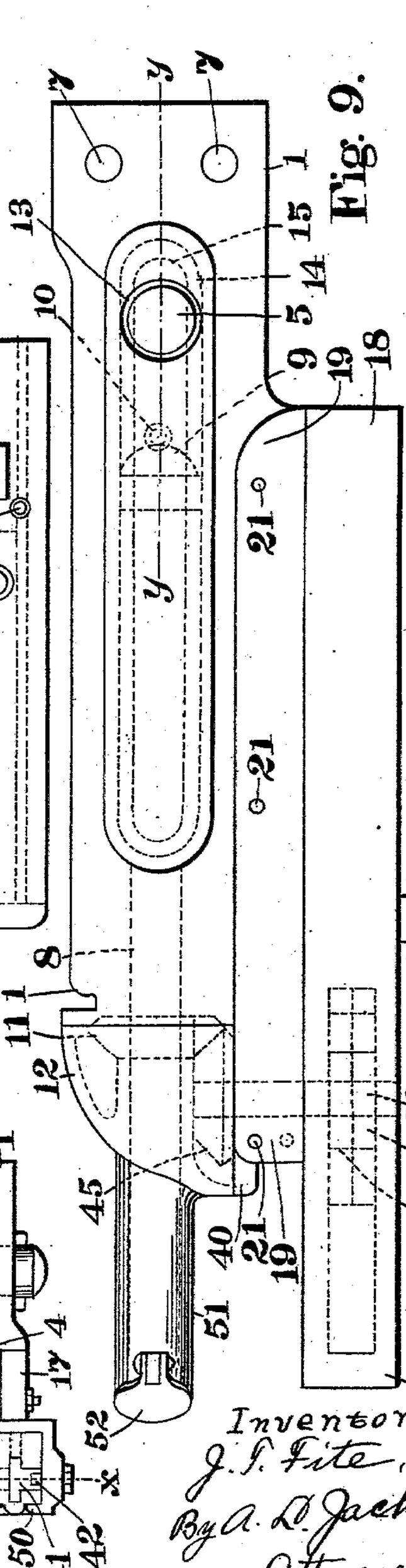

Fig. 9.

Fig. 7.

Witnesses:—

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No. 751,905. Patented February 9, 1904.

UNITED STATES PATENT OFFICE.

JEREMIAH THOMAS FITE, OF CHILDRESS, TEXAS.

PISTON-TRAVEL REGULATOR.

SPECIFICATION forming part of Letters Patent No. 751,905, dated February 9, 1904.

Application filed April 30, 1903. Serial No. 155,044. (No model.)

To all whom it may concern:

Be it known that I, JEREMIAH THOMAS FITE, a citizen of the United States, residing at Childress, in the county of Childress and State of Texas, have invented a Piston-Travel Regulator, of which the following is a specification.

My invention relates to mechanism for automatically adjusting the pistons of air-brake cylinders; and the object is to provide a regulator which will shorten the stroke of the piston when the piston commences to make too long a stroke, as when the brake-shoes have been worn, and to let out the stroke of the piston when the stroke has been shortened.

A piston is set to travel just so many inches—usually eight inches—in an air-brake cylinder. The stroke frequently becomes longer than eight inches and must be adjusted. The stroke sometimes becomes shorter than the eight inches. It is the desire of the operators to have a constant stroke. I have provided mechanism which will maintain a constant stroke. If eight-inch travel of the piston is desired, my regulator will maintain an eight-inch travel. If a five-inch travel is desired, my regulator will maintain a five-inch travel.

Other objects and advantages will be fully explained in the following description, and the invention will be more particularly pointed out in the claims.

Reference is had to the accompanying drawings, which form a part of this application and specification.

Figure 1 is a plan view showing an air-brake cylinder and my regulator applied thereto. Fig. 2 is a broken side elevation of the fulcrum-block guide. Fig. 3 is a plan view of the gearing which moves the fulcrum-block back or forth when this block has been drawn either way out of its normal position, this gearing operating to replace the fulcrum-block in its normal position. Fig. 4 is a side elevation of the cap for covering the gearing. Fig. 5 is a plan view of one of the T-blocks for causing the dogs to engage the ratchet-gearing. Fig. 6 is a longitudinal vertical section of the cross-head and its guide along the line *x x* of Fig. 7 and a similar sectional view of the fulcrum-block guide along the line *y y* of Fig. 9 and showing a part of the block connected to the piston of air-brake cylinder. Fig. 7 is an end elevation of the entire mechanism looking toward the right end of Fig. 9. Fig. 8 is a side elevation of the cross-head which carries the dogs for operating the gearing. Fig. 9 is a plan view of the entire mechanism, except the rod for moving the cross-head is broken away.

Similar characters of reference are used to indicate the same parts throughout the several views.

This invention is applied to an air-brake cylinder in the manner shown in Fig. 1. The fulcrum-block guide 1 is attached to the cylinder-head 2. The fulcrum-block 3 is moved back and forth in this guide 1. The sides of this guide are cut away, as shown by Figs. 2 and 6 and 7, the block being held in place by the lips 4. The brake-lever 6 is held between the jaws of the fulcrum-block by means of a bolt 5. The guide 1 is attached to the cylinder-head 2 by means of bolts 7. The adjusting-screw 8 has a head 9, that is flat on two sides to conform to the bifurcation in the fulcrum-block 3, and the screw is inserted in the fulcrum-block before the bolts 5 and 10 are put in the fulcrum-block. The bolt 10 holds the screw 8 properly adjusted in the fulcrum-block 3. On the forward end of the screw 8 is mounted a nut 11, which is held against travel by the guide-frame 1 and the cap 12. The frame 1 has an aperture 13 for inserting the bolt 5 and has a longitudinal groove 14 in the upper part thereof for the movement of the head of bolt 5 and a longitudinal slot 15 in the bottom part thereof for the end of bolt 5. The guide 1 has lips 16 and 17 for mounting the cross-head guide 18. The cross-head guide 18 has lips 19 and 20, which are attached to the lips 16 and 17 of the guide 1 by means of bolts 21. The cross-head 22 has a longitudinal motion in the guide 18. This cross-head has a boss 23 or lug 23, which is engaged by a brake-lever rod 24, which is adjusted in the boss 23 by means of nuts 25 and 26. At or near the other end of this rod are guides 27, attached to the air-brake-cylinder head, through which the rod 24 passes. This rod is then curved and pivotally connected to the piston-

rod 28. The cross-head 22 carries a dog 30, pivotally mounted therein by a bolt 31, and a dog 32, pivotally mounted therein by a bolt 33. The dogs 30 and 32 are for operating ratchet-wheels 34 and 35, respectively. These ratchet-wheels are mounted on the shaft 36. A T-shaped block 37 normally holds the dog 30 out of engagement with the ratchet-wheel 34. The cross-head 22 is bifurcated, so that the forward end of this cross-head will pass the shaft 36, the slot being made horizontally. Besides this horizontal bifurcation the cross-head has vertical slots 38 for the movement of the dogs 30 and 32. The shaft 36 is journaled in the sides of the cross-head guide 18 and in the bearing 39 in the forward-extending flange 40 on the fulcrum-block guide 1. The dog 32 is made to engage the ratchet 35 by a T-shaped block 41. In the normal condition—that is, when there is no disarrangement of the piston travel—the block 41 and the dog 32 do not change their positions relative to each other. An upstanding pin 42, inserted in the casing or cross-head guide, projects in the path of the block 41 and limits the backward movement of the block 41. A T-shaped groove 43 is made in the cross-head 22 for the block 41, and this groove terminates in the slot 38. The pin 42 marks the backward movement of the block 41. This pin does not affect the movement of the block except when the stroke of the piston is becoming too long. When the stroke of the piston needs taking up, the cross-head 22 goes farther backward than it normally does. Consequently the block 41 will strike the pin 42 and be arrested thereby, and the dog 32 will slide up on the block 41 and engage the ratchet 35, the block 41 being beveled at 44, so that the dog will easily slide up on the block. When the cross-head next goes forward, the dog 32 will rotate the ratchet 35, and thus rotate the shaft 36. A beveled gear-wheel 45 is rigidly mounted on the shaft 36 and engages the beveled cogs on the nut 11. Consequently when the dog 32 rotates the ratchet 35 the nut 11 is screwed on the adjusting-screw 8, and as the nut cannot travel the screw must travel and draw the fulcrum-block forward, and thus take up the travel of the piston through the brake-levers 6 and 29. This operation will continue until the piston travel is taken up the necessary amount. An upstanding pin 46, inserted in the guide 18, limits the forward movement of the block 41, so that the dog 32 will be lowered, so that it will not engage the ratchet 35 on the backward movement until the block 41 strikes the pin 42 and the dog 32 again rises up on the block 41. The dog 30 engages the ratchet 34 to rotate the shaft 36 in the opposite direction from the rotation by dog 32.

The sliding block 37 is mounted in a T-shaped groove 47 in the cross-head 22, which groove terminates in the slot 38. The backward movement of the block 37 is limited by a pin 48, inserted in the guide 18. Normally the block 37 strikes the pin 48 on every backward stroke, so that the dog 30 is raised up on the block 37, so that this dog will not engage the ratchet 34 on the forward stroke or movement of the cross-head 22. When the stroke of piston in the air-brake cylinder has become too short, the block 37 will fail to reach the pin 48, and consequently this block is not arrested in its backward movement and the dog 30 is not raised up by the block. The dog 37 not having been raised up out of reach of the ratchet 34 will engage this ratchet and rotate the shaft 36 and ultimately the nut 11. This operation will shove the adjusting-screw 8 back toward the air-brake cylinder and carry the fulcrum-block 3 toward the cylinder-head, and thus let out the stroke of the piston through the brake-levers 6 and 29. This operation will continue until the stroke of the piston in the air-brake cylinder has been let out to the required length. When this is done, the block 37 will commence to strike the pin 48 and raise the dog 30, so that this dog will cease to rotate the shaft 36. Two pins 49 are inserted in the cross-head to prevent the blocks 37 and 41 from coming out of the cross-head. The back ends of the dogs 30 and 32 rest up against the upper walls of the slots 38, so that the forward ends of these dogs will not press heavily on the blocks 37 and 41. One side of the casing or guide 18 is cut away from the forward side of the boss 23 backward, so that the cross-head will have freedom of movement backward and forward. Lips 50 are left at the upper and lower edges to prevent the cross-head from working out at the side. The cap 12 has a forward-projecting tubular extension 51, so that the screw 8 can pass on through if necessary for any purpose, and a door 52 is pivotally attached to end of the extension 51, so that the screw can open the door, and the door will be closed by gravity.

Various changes may be made without departing from my invention.

Changes must be made to adapt this piston-regulator to differences in the shape and construction of the air-brake cylinders.

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

1. A piston-travel regulator comprising a movable fulcrum-block, an adjusting-screw connected to said block, piston-actuated gearing for driving said screw backward or forward, and suitable supporting mechanism.

2. A piston-travel regulator comprising a movable fulcrum-block, an adjusting-screw attached to said block, a nut having beveled cogs for operating said screw and held against forward or backward movement, a suitable casing for said nut and block, and a beveled gear-wheel for driving said nut.

3. In a piston-travel regulator for air-brakes, a movable fulcrum-block, an adjusting-

screw attached thereto, and gravity-controlled gearing for moving said screw either backward or forward whereby the piston-stroke may be shortened or lengthened.

4. In a piston-travel regulator, a movable fulcrum-block, an adjusting-screw attached thereto, beveled gearing for moving said screw forward or backward, and means actuated by said piston for driving said gearing.

5. In an air-brake cylinder provided with a suitable piston; means for regulating the travel of said piston consisting of a fulcrum-block, an adjusting-screw attached thereto, beveled gear for operating said screw, and operating means connected to said piston for driving said gear.

6. In an air-brake cylinder provided with a suitable piston; means for regulating the travel of said piston consisting of a fulcrum-block and means operatively connected to said piston and to said fulcrum-block for moving said block from or toward said cylinder for shortening or lengthening the stroke of said piston.

7. In an air-brake cylinder provided with a suitable piston; means for regulating the travel of said piston consisting of a movable fulcrum-block, a casing for said block, an adjusting-screw connected to said block, a beveled gear-wheel threaded interiorly to engage said screw and held against forward or backward movement in said casing, and means operatively connected to said piston for driving said gear-wheel.

8. In an air-brake cylinder provided with a suitable piston; a fulcrum-block, a casing for said block connected to said cylinder, an adjusting-screw attached to said block, a beveled gear-wheel interiorly threaded to engage said screw and held against forward or backward movement in said casing, a cross-head guide attached to said casing, a cross-head mounted for reciprocatory motion in said guide, ratchet-gearing mounted in said cross-head, a shaft journaled in said guide and said casing, a beveled gear-wheel mounted rigidly on said shaft and meshing with said first-named gear-wheel, and means carried by said cross-head for driving said ratchet-gearing.

9. In an air-brake cylinder provided with a suitable piston; means for regulating the travel of said piston comprising a movable fulcrum-block, an adjusting-screw attached to said block, a beveled gear-wheel interiorly threaded to engage said screw, a casing for said screw and fulcrum-block, a cross-head guide attached to said casing, a cross-head movable in said guide, a shaft journaled in said casing and in said guide, a beveled gear-wheel mounted on said shaft and meshing with said first-named gear-wheel, ratchet-wheels mounted on said shaft within said cross-head, dogs pivotally mounted in said cross-head, and means carried by said cross-head for actuating said dogs.

10. In an air-brake cylinder provided with a piston and a movable fulcrum-block attached to said piston; ratchet-gearing operatively connected to said fulcrum-block, a reciprocating cross-head carrying dogs for actuating said ratchet-gearing, and means for controlling the operation of said dogs.

11. In an air-brake cylinder provided with a piston and a movable fulcrum-block attached to said piston; ratchet-gearing operatively connected to said fulcrum-block for moving said fulcrum-block backward or forward, a reciprocating cross-head connected to said piston and carrying means for operating said ratchet-gearing.

12. In an air-brake cylinder provided with a piston and a movable fulcrum-block connected to said piston; a screw connected to said fulcrum-block, beveled gearing for moving said screw forward or backward, ratchet-gearing for driving said beveled gearing, and a reciprocating cross-head connected to said piston and carrying means for operating said ratchet-gearing.

13. In an air-brake cylinder provided with a piston and a movable fulcrum-block connected to said piston; means for lengthening or shortening the stroke of said piston in said cylinder operatively connected to said piston and to said fulcrum-block.

14. In an air-brake cylinder provided with a piston and a movable fulcrum-block connected to said piston; gearing for moving said fulcrum forward or backward, a reciprocating cross-head carrying dogs for operating said gearing and carrying means for operating said dogs, and suitable guides for said fulcrum-block and said cross-head.

15. In an air-brake cylinder provided with a piston and a movable fulcrum-block connected to said piston; gearing for moving said fulcrum-block forward or backward as the stroke of said piston needs taking up or letting out, and a reciprocating cross-head carrying means for operating said gearing and also carrying means for determining which way said fulcrum-block must be moved.

16. In an air-brake cylinder provided with a piston and a movable fulcrum-block connected to said piston; gearing for moving said fulcrum-block forward or backward as the stroke of said piston needs shortening or lengthening, a cross-head carrying dogs for operating said gearing, a casing for said cross-head, sliding blocks mounted in grooves in said cross-head for causing said dogs to engage said gearing, and pins mounted in said casing and projecting in the path of said blocks.

In testimony whereof I set my hand, in the presence of two witnesses, this 6th day of April, 1903.

JERRY THOMAS FITE.

Witnesses:
J. H. HANKINS,
GEO. A. KECK.