No. 761,339. PATENTED MAY 31, 1904.

E. E. THOMAS.

STEAM FEED CYLINDER.

APPLICATION FILED DEC. 19, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

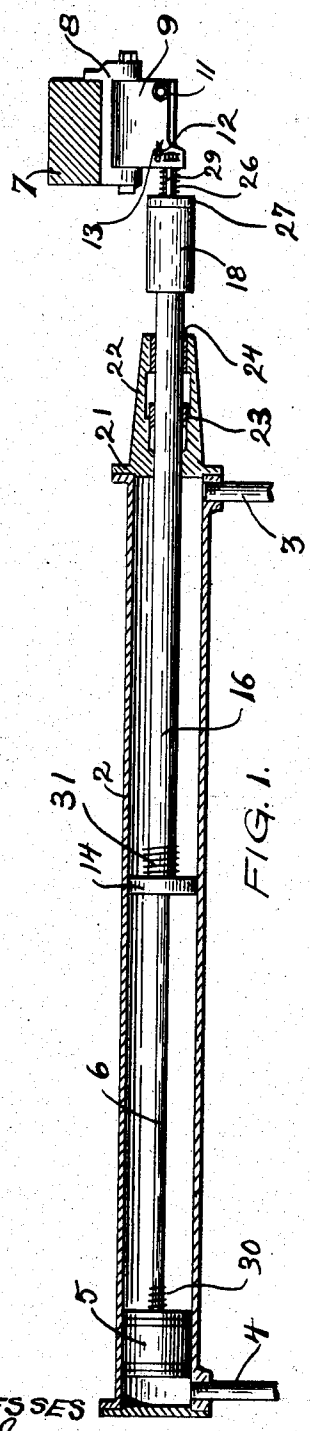


FIG. 1.

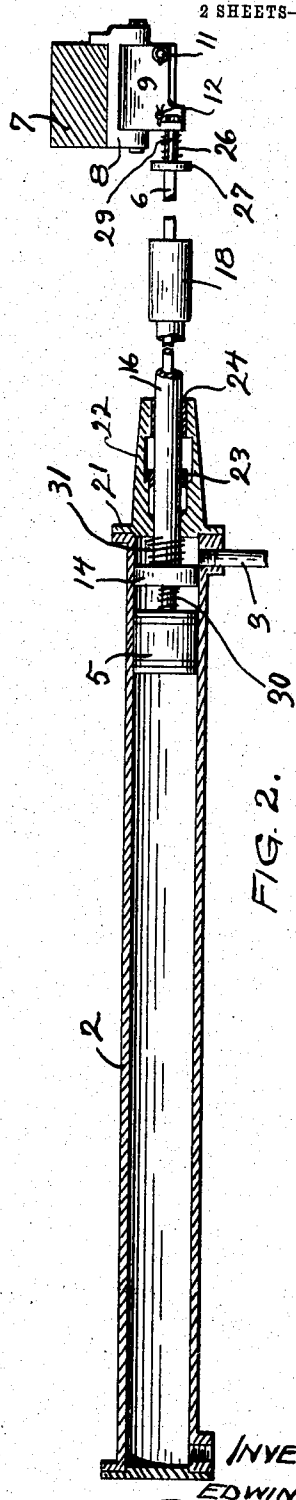


FIG. 2.

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NO MODEL. 2 SHEETS—SHEET 2.

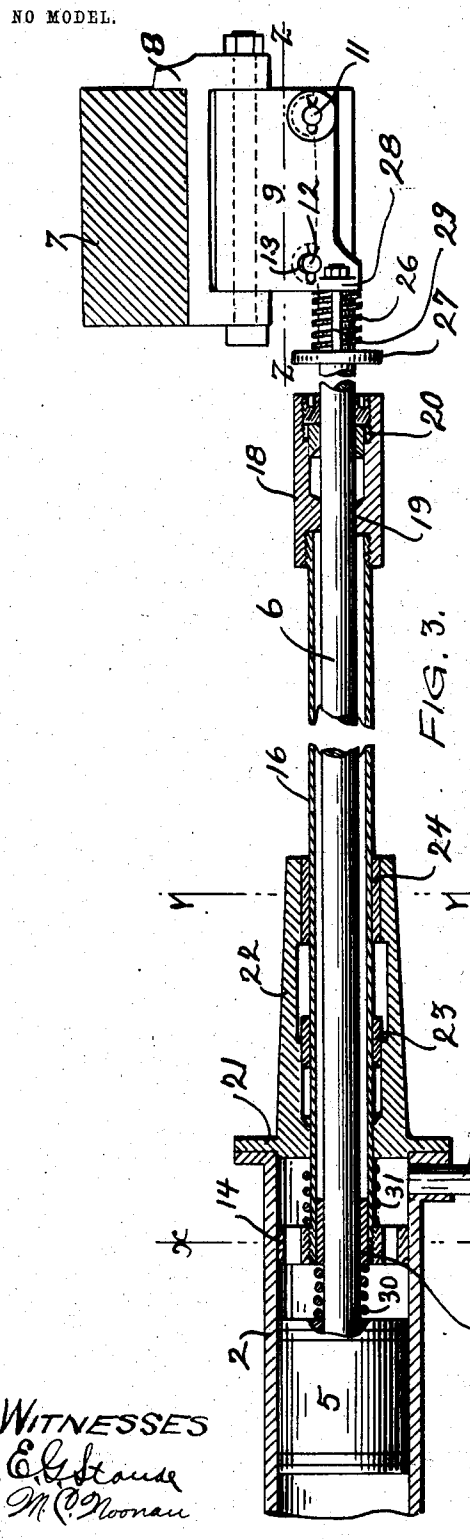


FIG. 3.

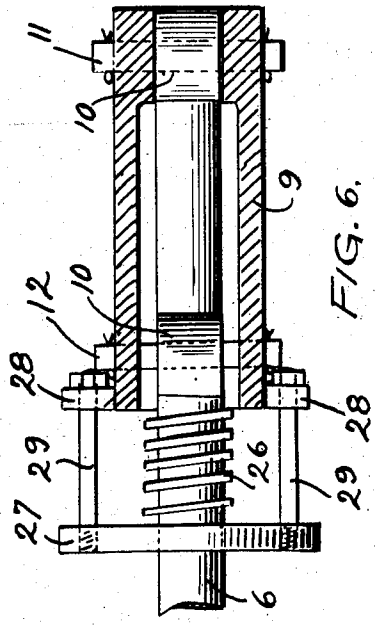


FIG. 6.

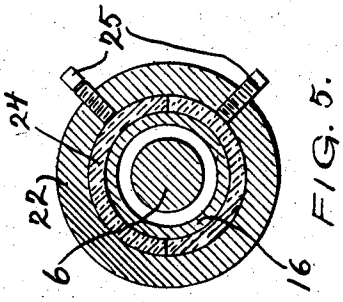


FIG. 5.

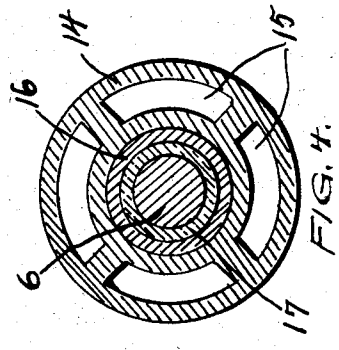


FIG. 4.

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No. 761,339. Patented May 31, 1904.

UNITED STATES PATENT OFFICE.

EDWIN E. THOMAS, OF ST. PAUL, MINNESOTA, ASSIGNOR TO PUGET SOUND DRY DOCK & MACHINE COMPANY, OF TACOMA, WASHINGTON, A CORPORATION OF WASHINGTON.

STEAM-FEED CYLINDER.

SPECIFICATION forming part of Letters Patent No. 761,339, dated May 31, 1904.

Application filed December 19, 1901. Serial No. 86,524. (No model.)

To all whom it may concern:

Be it known that I, EDWIN E. THOMAS, of St. Paul, Ramsey county, Minnesota, have invented certain new and useful Improvements in Steam-Feed Cylinders for Sawmill-Carriages, of which the following is a specification.

The steam-feed cylinders of sawmill-carriages correspond substantially in length to the distance the carriage travels and frequently extend from sixty to eighty feet parallel with the direction of movement thereof. The rod connecting the piston to the carriage must be of greater length even than the cylinder, and it often happens that the strain thereon or its own weight will cause it to buckle or sag sufficiently to strike and damage the walls of the cylinder and sometimes break in pieces, allowing the piston to fly out through the end of the cylinder, causing a great deal of damage and loss of time in the operation of the mill.

The object, therefore, of my invention is to provide means for supporting the rod during its travel, to the end that sagging and buckling thereof will be prevented.

Other objects of the invention will appear from the following detailed description.

The invention consists generally in a steam-feed-cylinder piston-rod provided with an automatically-adjustable support within the cylinder.

Further, the invention consists in means for causing said head to follow the piston in one direction at a certain predetermined distance therefrom and for limiting its travel or movement in the other direction.

Further, the invention consists in means for securing the piston-rod to the carriage.

Further, the invention consists in various constructions and combinations, all as hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a longitudinal section of the steam-feed cylinder with my invention applied thereto, showing the piston at one end of the cylinder. Fig. 2 is a similar view showing the piston at the free end of the cylinder. Fig. 3 is a detail of the right-hand end of Fig. 2. Fig. 4 is a section on the line $x\ x$ of Fig. 3. Fig. 5 is a section on the line $y\ y$ of Fig. 3. Fig. 6 is a section on the line $z\ z$ of Fig. 3.

In the drawings, 2 represents a steam-feed cylinder, which may be of suitable length, according to the desired travel of the carriage.

3 and 4 are steam-pipes through which steam is alternately admitted and exhausted from the cylinder, and 5 is the cylinder-piston provided with a rod 6, to the outer end of which the cross-timber 7 of the log-carriage is connected by means of a bracket 8 and a casting 9, hinged thereon. The rod is provided with lugs 10, having holes to receive pivot-pins 11 and 12, which also pass through said casting, the pin 12 being adapted to oscillate within slots 13 therein. This pin 12 aids in supporting the rod and at the same time permits it to swing on the pivot 11 and automatically adjust itself to the different positions of the carriage. Within the cylinder I provide a disk or head 14, having a series of holes or openings 15 and secured upon a tube 16, that is concentric with the piston-rod and incloses the same. A bearing 17 is provided between the inner end of the tube 16 and the rod, and at the outer end of said tube is a block 18, having a bearing 19 near one end for said rod and a suitable packing-box 20 at its free end that is flush with the end of said block. The block 18, with the head 14 and the tube connecting them, slides freely on the opposite rod as the same is reciprocated within the cylinder. The cylinder-head 21 is provided with an extension 22, having a bearing 23 for the tube 16, and I also prefer to provide adjustable semicircular bearing-plates 24 at the outer end of the extension 22, said plates being normally held in position by set-screws 25. By loosening these screws the bearing-plates may be moved around the tube 16 to present new bearing-surfaces thereto and being made in sections can be readily removed for the purpose of repair or removal. Upon the piston-rod near its connection to the casting 9 I provide a coil-spring 26 and a sliding

disk 27, that is connected to lugs 28 on said casting by sliding bolts 29. This disk is adapted to engage the end of the block 18 when the carriage reaches a certain predetermined point in its movement toward the cylinder, and I have preferred to countersink the packing-box in the end of said box, so that it will not be injured by the impact of said disk. A spring 30 is arranged on the piston-rod near the piston, and a similar spring 31 is provided on the tube 16 between the disk 14 and the head 21.

As shown in Fig. 1, I have made the tube 16 of sufficient length so that the disk or head 14 will follow the piston at a distance therefrom substantially equal to one-half the length of the cylinder; but this distance may of course be varied, according to the length of the cylinder and the strain to which the piston-rod is subjected, the object being to provide a support for the rod sufficiently near the piston to prevent all danger of buckling or sagging of the rod in either direction during its reciprocation.

The operation of my invention is as follows: Assuming the piston to be in the position shown in Fig. 1, steam is admitted to the cylinder, and the piston moving toward the right end of the cylinder will engage the sliding head and drive the same forward until it reaches the position shown in Fig. 2, the shock of the piston striking the sliding head and of the head engaging the end of the cylinder being taken up by the springs 30 and 31. During this movement of the sliding head or disk the tube 16 and the block 18, extending out beyond the end of the cylinder, will support and brace the rod and prevent any tendency to buckle or sag. As soon as steam is admitted to the free end of the cylinder the piston will start back, while the sliding head will remain stationary until the block 18 is struck by the disk 27, when the sliding support will follow the piston until the carriage reaches the limit of its travel, and on the return stroke of the piston the previous operation is repeated. In this way an automatically-adjustable support is provided for the piston-rod during its reciprocation, and this support in no way interferes with the operation of the piston or carriage and will almost entirely obviate the danger of breaking, buckling, or sagging of the rod. The sliding disk or head having on one side an area exposed to the steam that is greater by the end of the area 16 than its opposite side will remain normally in the right-hand end of the cylinder in position to be driven forward toward the piston when engaged by the log-carriage.

I do not wish to be confined to the particular bearing means shown or the manner of operating the sliding support from the carriage, as the same is capable of considerable modification, the essential feature of the invention being the sliding support within the cylinder that is adapted to automatically adjust itself with respect to the position of the piston.

I claim as my invention—

1. A horizontal steam-feed-cylinder piston-rod provided with an automatically-adjustable support operable lengthwise thereof within the cylinder.

2. A horizontal steam-feed-cylinder piston-rod provided with a slidable head adapted to support said rod to follow the piston a certain predetermined distance therefrom and to precede the piston in the opposite direction.

3. A steam-feed-cylinder piston-rod provided with a perforate disk slidingly arranged on said rod and adapted to follow the piston in one direction a certain predetermined distance therefrom and to precede the piston in the opposite direction.

4. A steam-feed-cylinder piston-rod provided with a movable support within the cylinder, and means operated by the carriage to cause said support to follow the piston at a certain predetermined distance therefrom, whereby sagging and buckling of the rod will be prevented.

5. A steam-feed-cylinder piston-rod provided with a movable support within the cylinder, and means operated in one direction by the carriage to cause said support to follow the piston at a certain predetermined distance therefrom and said support being driven by the piston in the opposite direction, whereby sagging and buckling of the rod will be prevented.

6. The combination, with a horizontal engine having its piston-rod connected with a carriage, of an automatically-adjustable support for said rod operable lengthwise thereof within the engine-cylinder.

7. The combination, with a steam-feed-cylinder piston having its rod connected with the log-carriage, of a perforate head or disk slidably arranged on said rod, and means operated by the carriage for causing said head to follow said piston a certain predetermined distance therefrom.

8. The combination, with a steam-feed-cylinder and piston having its rod connected with a log-carriage, of a sliding support for said rod provided within said cylinder, a tube connected with said support and projecting through said cylinder-head in position to be actuated by said carriage, for the purpose specified.

9. The combination, with a steam-feed cylinder and piston having its rod connected with the carriage, of a sliding head provided on said rod within said cylinder, a tube connected with said head and projecting through one head of said cylinder, and a block having a packing-box provided on the end of said tube and adapted to be actuated by the movement of said carriage to slide said head on said rod.

10. The combination, with a steam-feed cylinder and piston having its rod connected

with a carriage, of a sliding perforate head provided on said rod within said cylinder, a sliding block having a packing-box and provided on said rod outside of said cylinder, a tube inclosing said rod and connecting said block and head, and springs provided between said sliding head and said piston and the cylinder-head.

11. The combination, with a steam-feed cylinder and piston having its rod connected with a carriage, of a sliding support for said rod provided within said cylinder, a tube connected with said support and projecting through said cylinder-head and inclosing said rod, and a rotatable adjustable bearing for said tube provided within said head.

12. The combination, with a cylinder 21 and the extension 22, of a tube 16 adapted to slide within said extension and the semicircular bearing-plates 24 inclosing said tube and the set-screws 25.

13. The combination, with a steam-feed cylinder and piston having its rod connnected with a carriage, of a support slidably arranged upon said rod within the cylinder, and means extending through the cylinder-head into the path of said carriage, whereby when said car riage is moving toward the cylinder said support will be actuated to follow said piston at a certain predetermined distance therefrom.

14. The combination, with a steam-feed cylinder and piston having its rod connected with the carriage, of a sliding perforate head provided within said piston on said rod, and means projecting through the cylinder-head into the path of the carriage moving toward said cylinder, whereby said head will be actuated to follow said piston, and said means projecting a sufficient distance beyond the head of said cylinder to cause said sliding head to follow said piston at a distance therefrom approximately equal to half the length of said cylinder.

15. The combination, with a steam-feed cylinder and piston having its rod connected with the carriage, of a sliding support provided on said rod within said cylinder, a sliding block having a stuffing-box and a long bearing-surface for said rod outside of said cylinder and in the path of said carriage to be actuated thereby, and means connecting said block with said support through said cylinder-head, whereby when said block is actuated said support will be moved along said rod to follow said piston.

16. A horizontal steam-feed-cylinder piston-rod provided with an adjustable support within the cylinder inclosing and bracing said rod against bending or buckling either laterally or vertically and means for operating said support to follow said piston.

In witness whereof I have hereunto set my hand this 16th day of December, 1901.

EDWIN E. THOMAS.

In presence of—
RICHARD PAUL,
M. C. NOONAN.