2 Sheets--Sheet 1.

J. I. WILLIAMS.

Fore Plates for Rolling Mills.

No. 169,070. Patented Oct. 19, 1875.

Fig. 1.

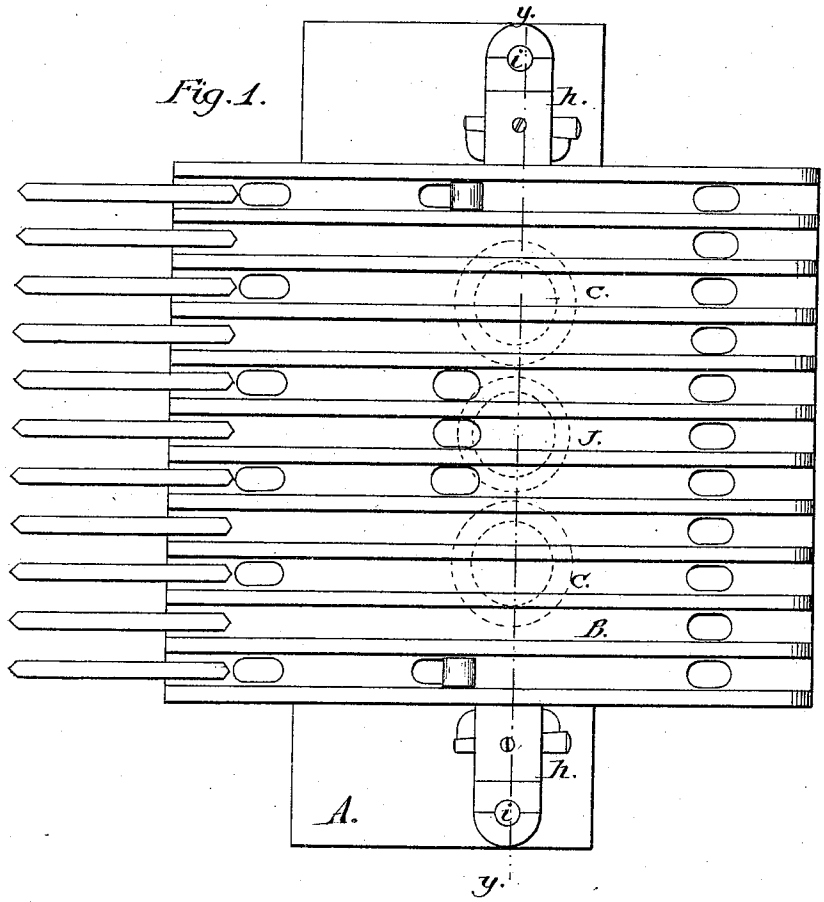
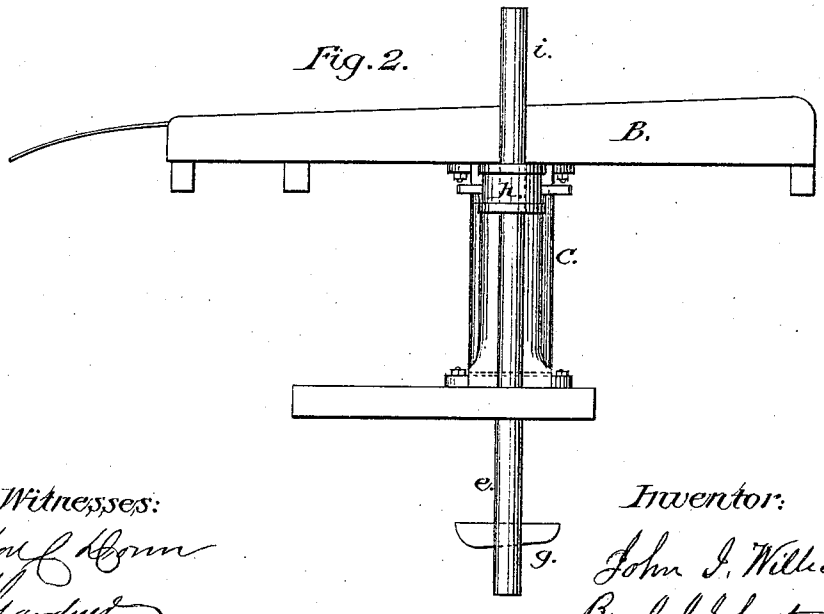


Fig. 2.



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2 Sheets--Sheet 2.

J. I. WILLIAMS.

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Fig. 3.

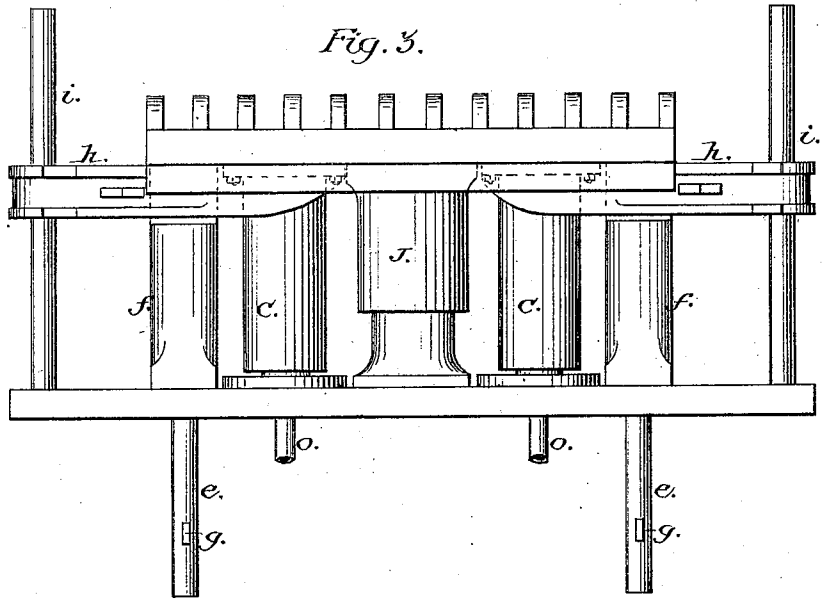
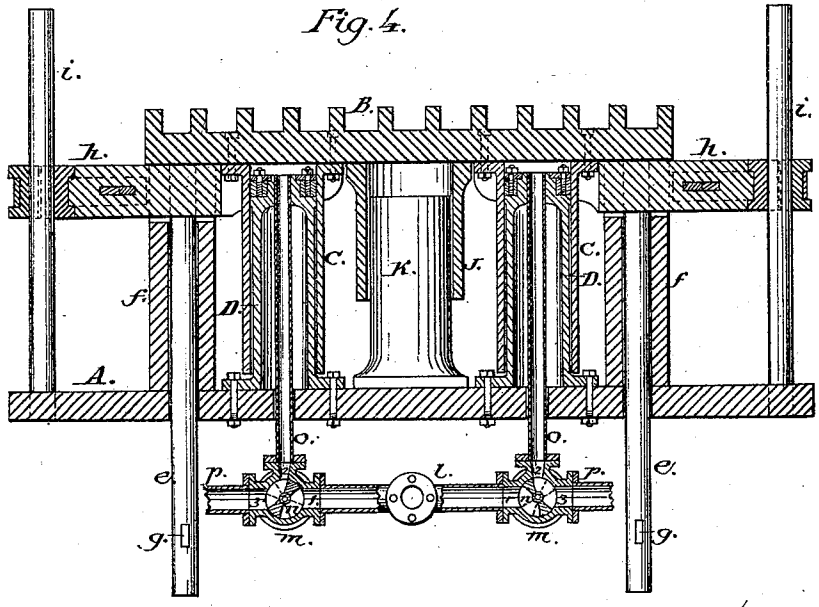


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN I. WILLIAMS, OF MILLVALE, PENNSYLVANIA.

IMPROVEMENT IN FORE-PLATES FOR ROLLING-MILLS.

Specification forming part of Letters Patent No. **169,070**, dated October 19, 1875; application filed November 19, 1874.

CASE A.

To all whom it may concern:

Be it known that I, JOHN I. WILLIAMS, of Millvale, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Steam-Lift for the Fore-Plate of Plate or other Rolls; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

My invention relates to an improvement in steam-lift for the fore-plate of plate or other rolls; and consists in attaching to the under side of it a cylinder or cylinders, which move upon stationary pistons, through which steam is admitted to the under side of the fore-plate, whereby it may be elevated or depressed at the will of the operator. My invention also consists in combining with the steam-cylinders, secured to the under side of the fore-plate, a device for forming an air-cushion for the purpose of avoiding a jarring or violent action in the operation of depressing the fore-plate. My invention further consists in combining with the steam-cylinders, on the under side of the fore-plate, guides and stops for the purpose of determining the travel of the fore-plate and holding it horizontal in its vertical movements.

To enable others skilled in the art with which my invention is most nearly connected to construct and use it, I will proceed to describe more fully its construction and operation.

In the accompanying drawings, which form part of my specification, Figure 1 is a top view or plan of my improvement in steam-lift for the fore-plate of plate or other rolls. Fig. 2 is a side elevation of the same. Fig. 3 is a front elevation of the same. Fig. 4 is a vertical section at lines *y* of Figs. 1 and 2.

In the drawings, A represents the base or bed plate. B represents the fore-plate, to the under side of which are attached cylinders C, which move upon hollow pistons D, attached to the bed-plate A. To the under side of the fore-plate B are attached rods or bars *e*, which move in guides *f*, attached to the bed-plate A, the lower ends of the rods or bars *e* being provided with keys *g*, which pass through the rods at right angle, as indicated in Fig. 2. The rods or bars *e* and guides *f*, in combination with the keys *g*, or their equivalent, are used for the purpose of determining the upward travel of the fore-plate. To the under side of the fore-plate B is attached guides *h*, which move upon vertical slides *i*. The guides *h* and slides *i* are used for the purpose of holding the fore-plate B in a horizontal position in its vertical movements. To the under side of the fore-plate B is also attached a cylinder, J, and to the base-plate A is attached a piston, *k*, the axis of which is concentric to the bore of the cylinder J. The cylinder J, and its piston *k*, are for the purpose of forming an air-cushion for the purpose of avoiding a jarring or violent action in the operation of depressing the fore-plate. *l* represents the steam-supply pipe, to the ends of which are attached valve-chambers *m*, furnished with rotary valves *n*, which may be rotated through the medium of connecting-rods and levers. To the upper side of the valve-chambers are attached pipes *o*, which pass up through the pistons D, for the purpose of conveying steam to the under side of the fore-plate B. To the side of the valve-chambers *m* are attached exhaust-pipes *p*. It will be observed that the valve-chambers *m* are provided with openings 1, 2, and 3, the openings 1 and 2 being used for the purpose of admitting steam to the under side of the fore-plate B, when the valve *n* is in the position indicated by the dotted lines shown in Fig. 4. When the valves *n* are in the position represented in Fig. 4, the openings 2 and 3 are used for the purpose of allowing the steam to escape after it has performed the office of elevating the fore-plate.

From the foregoing description, and by reference to the accompanying drawings, the skilled mechanic will readily understand the construction and arrangement of the several parts and their relation to each other. I will, therefore, proceed to describe briefly the operation, which is as follows: The operator, through the medium of suitable levers and rods, rotates the valves *n* so as to give them the position represented by the dotted lines

shown in Fig. 4, which will allow the steam to pass through the openings 1 and 2 into the pipes *o*, and up through them into the cylinder C, and acting against the under side of the fore-plate B and the upper end of the pistons D, will cause the fore-plate to move upward, its travel being determined through the medium of the stops and guides hereinbefore described. When the operator desires to depress the fore-plate B, he turns the valves *n* into the position shown in Fig. 4, which will allow the steam, after it has performed its office of lifting the fore-plate B, to pass out through pipe *o*, through openings 1 and 2, into the exhaust-pipes *p*, and with the escape of steam, the fore-plate, with its cylinders C and J, will descend of their own gravity. The cylinder J, passing over the piston *k*, will compress the air in the cylinder J, thereby forming a cushion of air, which will prevent any jarring or violent action in the descent of the fore-plate.

Through the medium of my improvement in steam-lifts for fore-plates, hereinbefore described, the chains or rods heretofore used above the fore-plate in connection with steam-lifts, are dispensed with, leaving the fore-plate free and unencumbered. The encumbrance of such chains and rods, and the danger attendant upon the breaking of them are entirely avoided.

Having thus described the nature, construction, and operation of my improvement, what I claim as of my invention, is—

1. The fore-plate B, constructed as described, in combination with its attached cylinder or cylinders C, and hollow piston or pistons D, substantially as herein described and set forth.

2. The fore-plate B, the under side of it being provided with the cylinders C, C, and J, in combination with the pistons D, D, and *k*, substantially as herein described, and for the purpose set forth.

3. The fore-plate B, having steam-cylinders C and air-cylinder J attached to the under side of it, in combination with the pistons D, D, and *k*, and stops and guides, substantially as herein described, and for the purpose set forth.

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Witnesses:

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