

No. 713,850.

Patented Nov. 18, 1902.

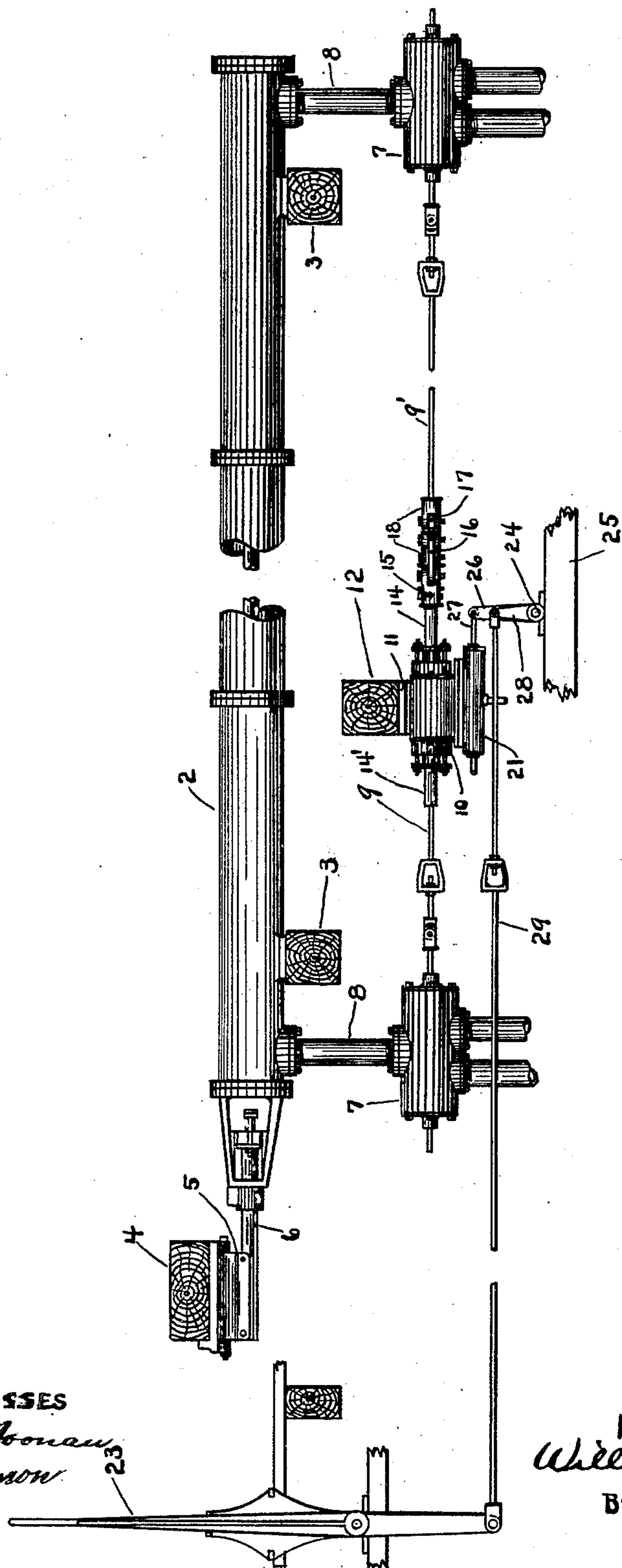
W. B. BURROWS.

ATTACHMENT FOR STEAM FEED CYLINDER VALVES.

(Application filed Apr. 3, 1902.)

(No Model.)

3 Sheets—Sheet 1.



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FIG 2.

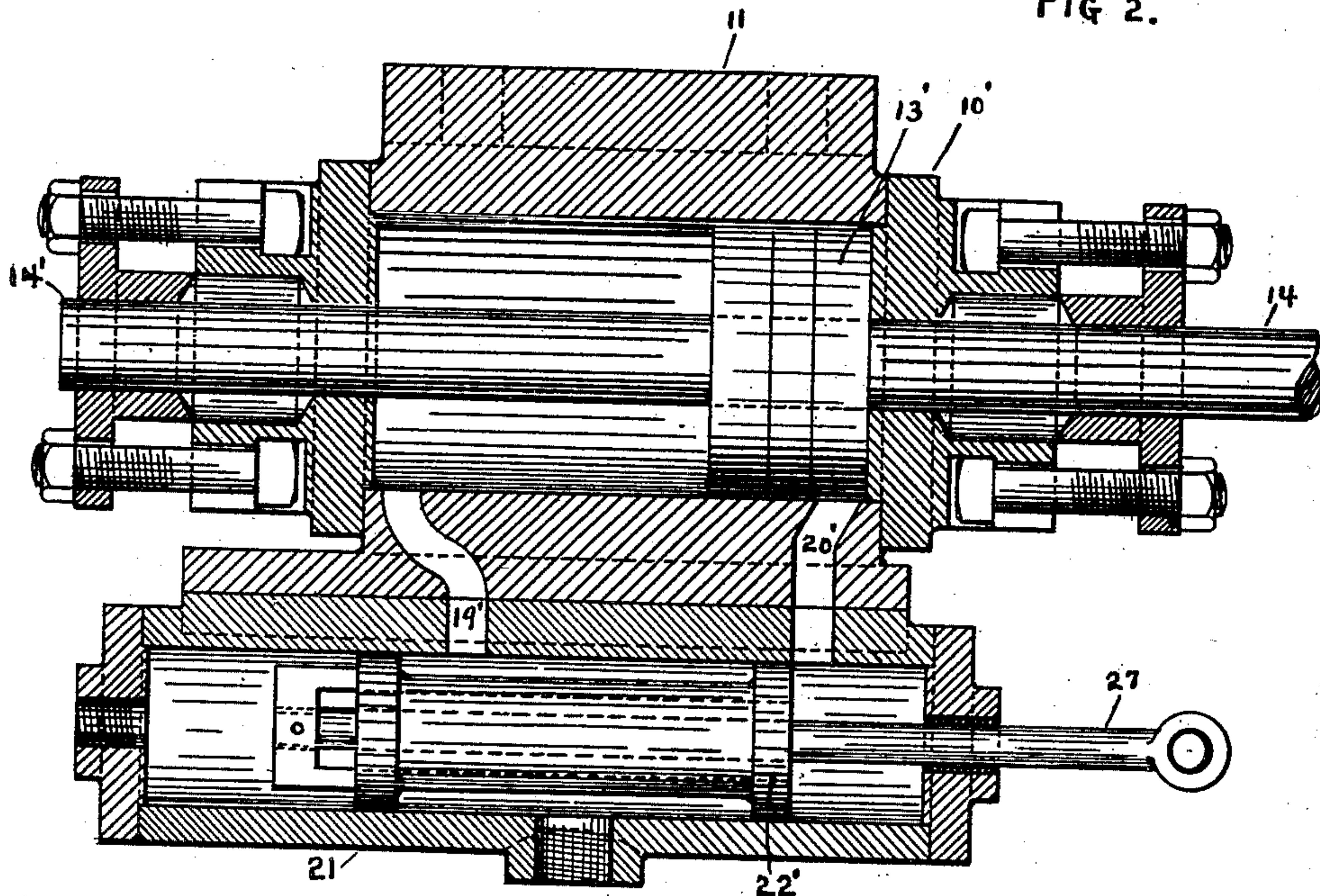
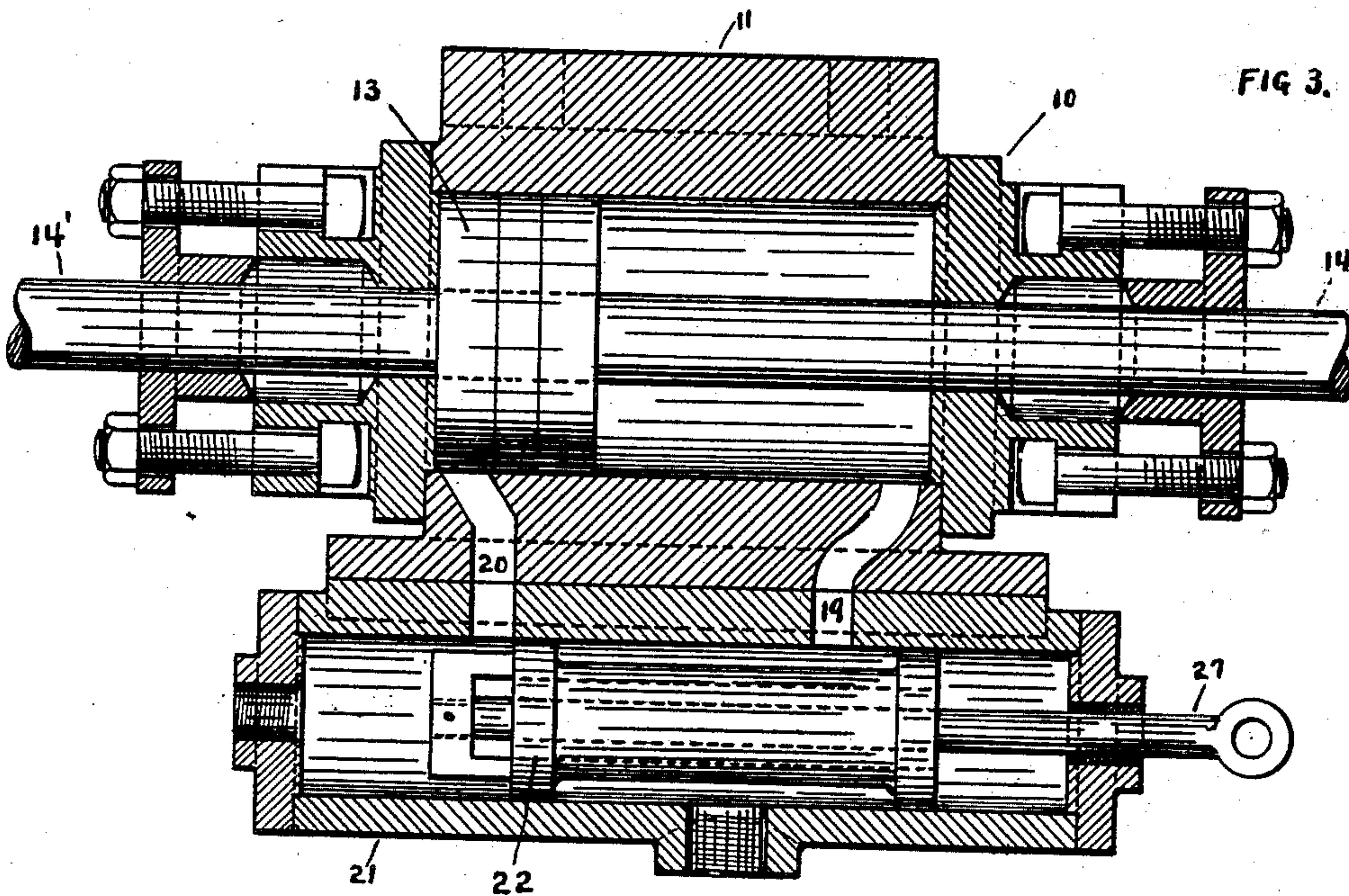


FIG 3.



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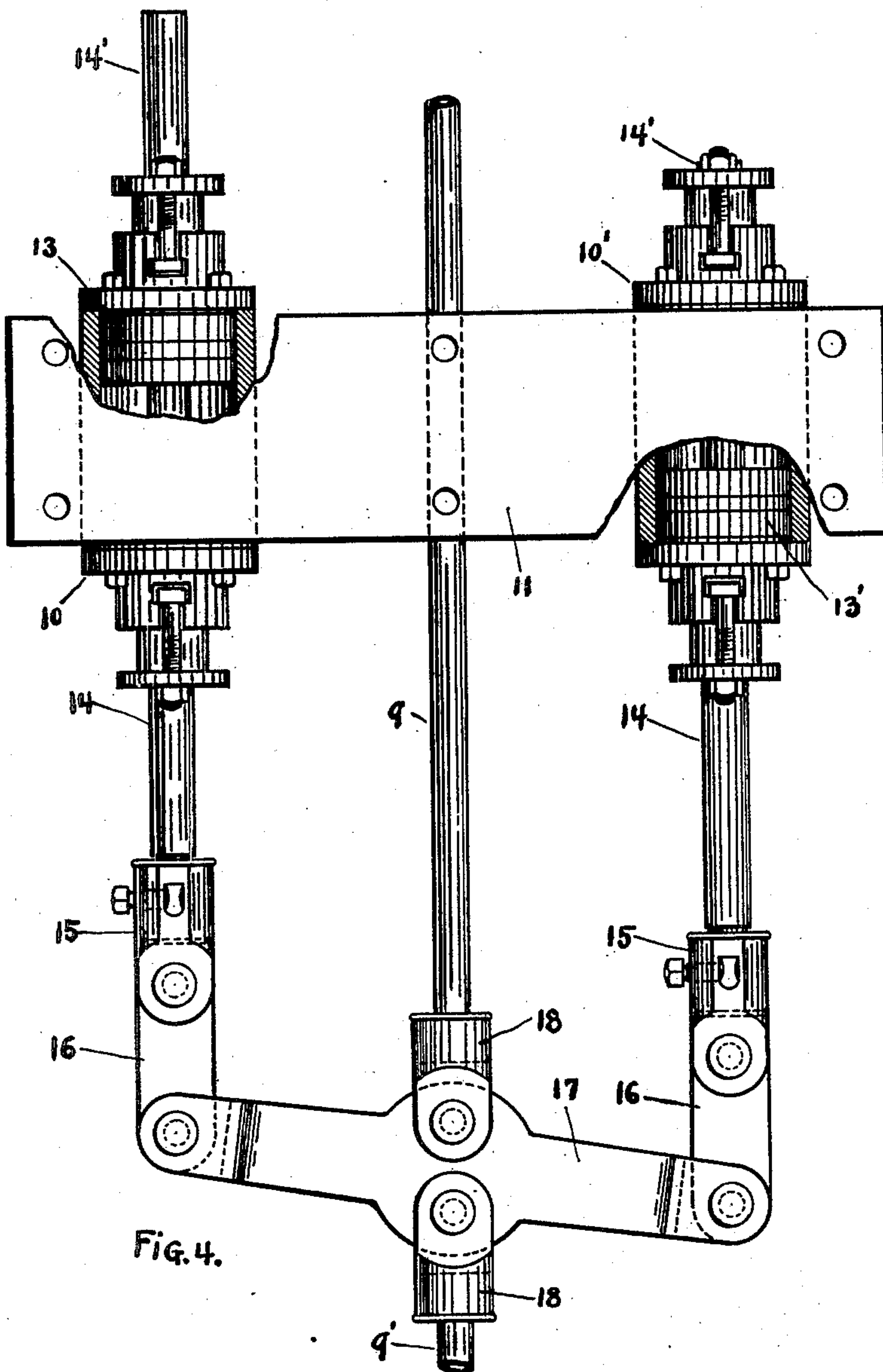


Fig. 4.

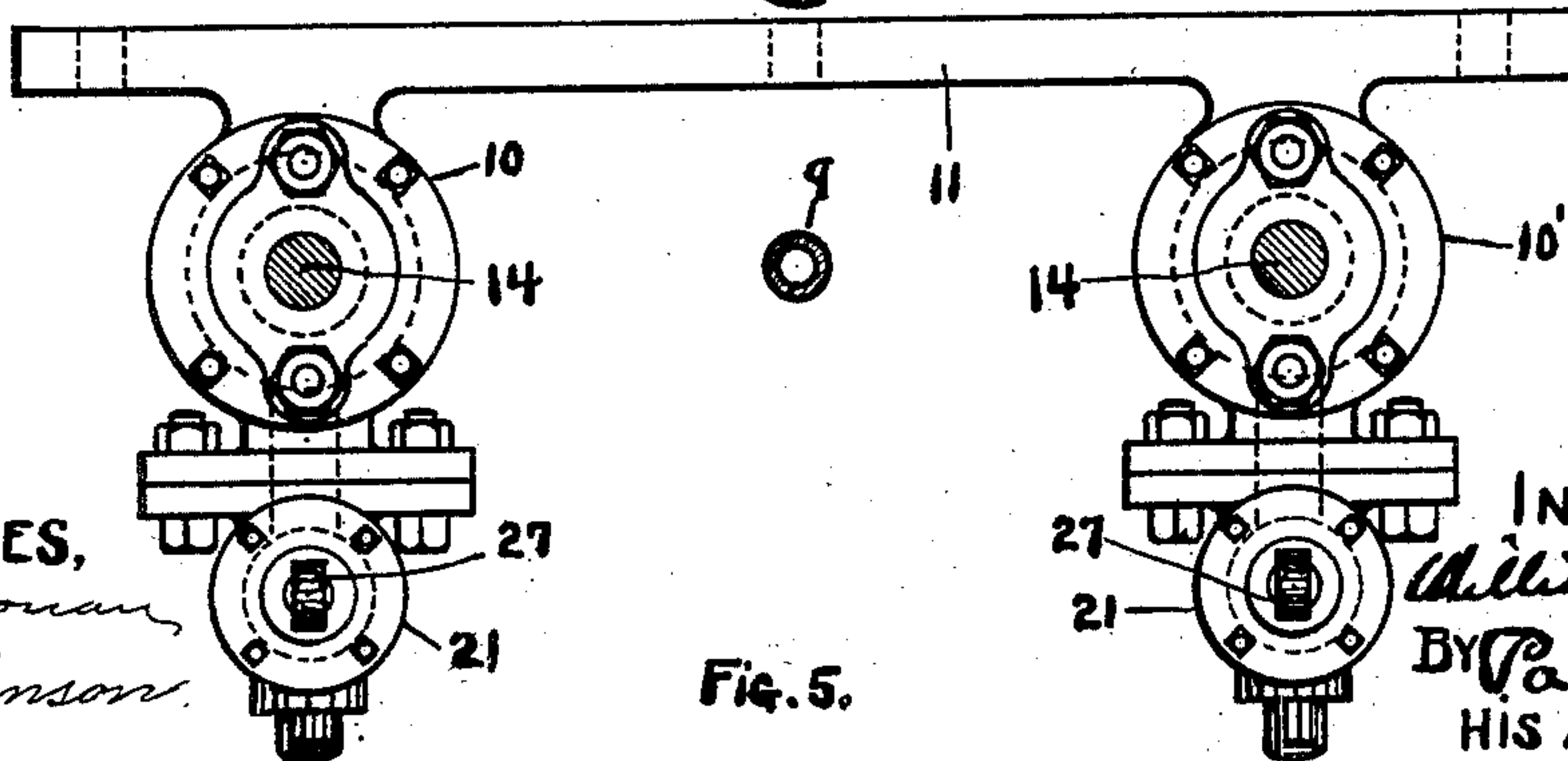


Fig. 5.

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UNITED STATES PATENT OFFICE.

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ATTACHMENT FOR STEAM-FEED-CYLINDER VALVES.

SPECIFICATION forming part of Letters Patent No. 713,850, dated November 18, 1902.

Application filed April 3, 1902. Serial No. 101,148. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. BURROWS, of Minneapolis, Hennepin county, Minnesota, have invented certain new and useful Improvements in Attachments for Steam-Feed-Cylinder Valves, of which the following is a specification.

The valves employed in connection with steam-feed cylinders, generally known as "sawyer's" valves, must be large enough to allow the formation of steam-passages of the proper size therein, and said valves must move with sufficient freedom to enable the sawyer to have quick and accurate control of the cylinder-piston. Ordinarily there is considerable leakage and waste of steam around such valves, owing to the fact that it is practically impossible to provide steam-tight joints between the valves and their casings and at the same time render the valves easily operable by the movement of the sawyer's lever.

The object, therefore, of my invention is to prevent any unnecessary waste of steam and at the same time render the sawyer's lever even easier of operation than heretofore, while giving the sawyer absolute and quick control over the cylinder-feed valves.

The invention consists generally in providing motors having suitable connections with the sawyer's valves and operable connections provided between said motors and the sawyer's lever.

Further, the convention 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 side elevation of a steam-feed cylinder, the sawyer's valves connected therewith, and my invention connected to said valves and to the sawyer's lever. Fig. 2 is a longitudinal section of one engine for operating the sawyer's valves. Fig. 3 is a similar view of the other engine. Fig. 4 is a plan view showing the connection between the sawyer's valves and the engine for operating the same. Fig. 5 is an end view of the valve-operating engines.

In the drawings, 2 represents a steam-feed

cylinder supported on timbers 3, 4 a portion of the sawmill-carriage carrying the bracket 5, to which the piston-rod 6 is connected in the usual way. 7 represents the valves controlling the admission of steam to the ends of the cylinder, these valves being under the control of the sawyer and generally known as the "sawyer's" valves. Their casings are connected by the pipes 8 with the ends of the cylinder, and the reciprocation of the valves alternately admits steam to one side of the piston and exhausts the opposite side. Suitable live-steam and exhaust pipes lead into these casings, as shown in Fig. 1. The pistons of the sawyer's valves are provided with the usual rods 9 and 9'.

Between the sawyer's valves upon opposite sides of the connecting-rod I provide cylinders 10 and 10', secured to a casting 11, that is bolted to the under side of a cross-timber 12. These cylinders are provided with pistons 13 and 13', having rods 14, that are provided with couplings 15, connected to links 16, that are pivoted, respectively, near the opposite ends of a bar 17, which at a point near the middle thereof is pivotally connected by suitable couplings 18 with the abutting ends of the connecting-rods 9 and 9', the usual single rod being formed in two parts to permit this form of connection. Each piston is provided with a rod 14' on the opposite side of the piston from the rod 14 and slidable in the opposite end of the cylinder. These rods 14' cause the same area to be exposed to the steam on one side of the piston as on the other and permit balancing of the same. The cylinders 10 and 10' are provided with ports 19 and 19' and 20 and 20', communicating with the ends of the cylinders, respectively, and with valve-casings 21, that are provided with suitable steam inlet and exhaust openings and with sliding piston-valves 22 and 22', which are adapted to alternately open and close the communicating passages between said ports and the steam inlet and exhaust openings. The piston-valves have longitudinal openings to permit the communication of the ports 19 and 20' with the exhaust.

Any suitable connection may be provided

between the sawyer's lever 23 and the piston-valves; but I prefer to provide a rack-shaft 24, supported upon suitable timbers 25 and provided with arms 26, that are pivotally connected with the stems 27 of the valves 22 and 22'. A crank 28 is secured on said rock-shaft and is connected with the lower end of the sawyer's lever by a rod 29. Movement of the sawyer's lever will rock the shaft 24, oscillate the arms 26, and cause reciprocation of the piston-valves. Assuming that the piston-valves are in their normal position, as shown in Figs. 2 and 3, if the sawyer's lever be moved to slide said piston-valves toward the left the valve 22 after passing the port 19 will open the right end of the cylinder 10 to the exhaust and the port 20 to the live steam. The piston 13 will thereupon be set in motion toward the right-hand end of its cylinder, oscillating the bar 17 and moving the sawyer's valves. The piston-valves having corresponding connections to the same rock-shaft will move in unison, and therefore as the valve 22 moves toward the left hand to open the port 19 to the exhaust the valve 22' will be moved a corresponding distance; but the port 20' being already open to the exhaust and the port 19' being open to the live steam no change will take place as regards the piston 13', which will remain stationary in the right-hand end of its cylinder. If desired, the valve 22 may be moved along opposite the ports 19 and 20, so that both ports will be partially open to the steam, which, entering the cylinder 10 upon each side of the piston 13, will balance said piston wherever it may happen to be in its cylinder at that time. The movement of the valve 22 to produce this balancing of the piston 13 being toward the left, a corresponding movement will be imparted to the valve 22', but without any change as regards the opening or closing of the ports 19' and 20' to the live steam and exhaust. Consequently the piston 13' will remain stationary during such balancing of the piston 13.

We will now suppose that, the piston-valves being in the position shown in Figs. 2 and 3, the sawyer throws his lever in the other direction and moves the piston-valves toward the right. During such movement of the valve 22 the ports 19 and 20 will be open, respectively, to the steam and the exhaust and will continue to be so throughout the movement of the valve 22 toward the right. In moving the valve 22', however, toward the right the port 20' will shortly be opened to the live steam and the port 19' to the exhaust, and as soon as this occurs the piston 13' will begin to move toward the left-hand end of its cylinder, while the piston 13 will remain stationary in the corresponding end of its cylinder. When the piston 13 is being operated, the piston 13' will be held stationary by the pressure of steam behind it, and the bar 17 will swing on the pivot as a center that is at the end of said bar adjacent to the stationary piston, which

will act as a fulcrum for the bar or lever, and when the piston 13' is being moved said bar will swing on the pivot at its opposite end, while the stationary piston 13 will serve as a fulcrum therefor. During such movement of said bar one end will be stationary and its opposite end and middle portion reciprocated to move the connecting-rods lengthwise and actuate the sawyer's valves.

In moving the valve 22' toward the right a point will be reached where steam can be admitted to both sides of the piston 13' to balance it at any point in its cylinder, as described, with reference to the piston 13.

From the foregoing description it will be understood that movement of the sawyer's lever in one direction will cause one of the pistons to be actuated and movement of the lever in the other direction will produce a corresponding movement of the other piston, the particular piston moved as the lever is swung forward or back depending upon the manner of making the connections. The piston-valves have small area as compared with that of the sawyer's valves, and hence can be made to operate very easily, though forming close joints within their casings and permitting little or no leakage of steam.

The use of the two reciprocating engines, one upon each side of the connecting-rod, enables me by moving their pistons from one end of their cylinders to the other to determine the position of the sawyer's valves with respect to the feed-openings, and by the employment of these engines with the operating mechanism described I am able to have perfect control over the movement of the sawyer's valves and at the same time to construct them with such close-fitting joints that leakage and waste of steam is practically eliminated. I have shown my valve-operating mechanism employed in connection with two sawyer's valves, one at each end of the steam-feed cylinder; but it will be understood that this mechanism is also applicable for operating one valve, if desired.

I do not wish to confine myself to the means shown for connecting the reciprocating engines to the connecting-rods nor to the particular means employed for operating the sliding piston-valves from the sawyer's lever, as the same is capable of various modifications without departing from the spirit of my invention—

I claim as my invention—

1. The combination, with a steam-feed cylinder and its piston, of feed-valves for said cylinder, connecting-rods for said valves, a bar interposed between the abutting ends of said rods and pivoted centrally thereto, fluid-pressure motors provided near said rods and having their pistons pivotally connected with the ends of said bar, respectively, suitable valves for said motors, and operative connections provided between said valves and said sawyer's lever.

2. The combination, with a steam-feed cyl-

inder and its piston, of the cylinder feed-valves, connecting-rods for said valves, a bar pivoted at a point intermediate to its ends to the abutting ends of said rods, reciprocating engines provided upon opposite sides of said rods and having their pistons pivotally connected with the ends respectively of said bar, sliding piston-valves for said engines having ports adapted to admit steam to one side of one piston and to the opposite side of the other, according to the direction said valves are moved, a rock-shaft having arms pivotally connected with the stems of said valves, a crank provided on said rock-shaft, a sawyer's lever, and suitable connections provided between said crank and said lever.

3. The combination, of the steam-feed or sawyer's valves and their connecting-rods, with a bar centrally pivoted to the adjacent ends of said rods, cylinders provided upon opposite sides of said rods, pistons 13 and 13' therein having their rods pivotally connected with the ends respectively of said bar, valve-casings provided on said cylinders having suitable steam inlet and exhaust openings, ports 19 and 19' and 20 and 20' leading from said valve-casings respectively to said cylinders near the ends thereof, sliding piston-valves 22 and 22' provided in said casings and adapted to admit steam simultaneously to both sides of either piston to balance the same in their cylinders or to admit steam to one side of one piston and to the opposite side of the other, a sawyer's lever, and suitable connections provided between said lever and said piston-valves.

4. The combination, of a steam-feed cylinder and its piston, with the cylinder feed-valves having connecting-rods 9 and 9', a bar 40 between the adjacent ends of said rods and pivotally connected therewith, engine-cylinders provided upon opposite sides of said connecting-rods, pistons therein having their rods pivotally connected respectively with the

ends of said bar, one piston being in one end of its engine-cylinder when the other piston is in the opposite end of the cylinder, sliding piston-valves provided on said engine-cylinders, having steam inlet and exhaust openings, suitable ports leading from the casings of said valves to the ends respectively of said engine-cylinders, said piston-valves being adapted to admit steam to one end of either engine-cylinder to move the piston therein and swing said bar and simultaneously to admit steam to the opposite end of the other cylinder and hold its piston stationary, a rock-shaft, arms provided thereon having pivotal connections with the stems of said piston-valves, a crank provided on said rock-shaft, a sawyer's lever and a rod pivotally connecting said crank with said lever.

5. The combination, with a steam-feed cylinder and its piston, of a cylinder feed-valve, a connecting-rod therefor, a bar pivoted at a point intermediate to its ends on said rod, reciprocating engines provided upon opposite sides of said rod and having their pistons pivotally connected with the ends respectively of said bar, sliding piston-valves for said engines and having ports adapted to admit steam to one side of one piston and to the opposite side of the other according to the direction in which said valves are moved, one piston and the adjacent end of said bar being held stationary by the pressure of the steam behind the piston while the other piston and the other end of said bar are moved to actuate said feed-valve, a sawyer's lever, and suitable operative connections provided between said lever and said piston-valves.

In witness whereof I have hereunto set my hand this 26th day of March, 1902,

WILLIAM B. BURROWS.

In presence of—

RICHARD PAUL,
M. C. NOONAN.