

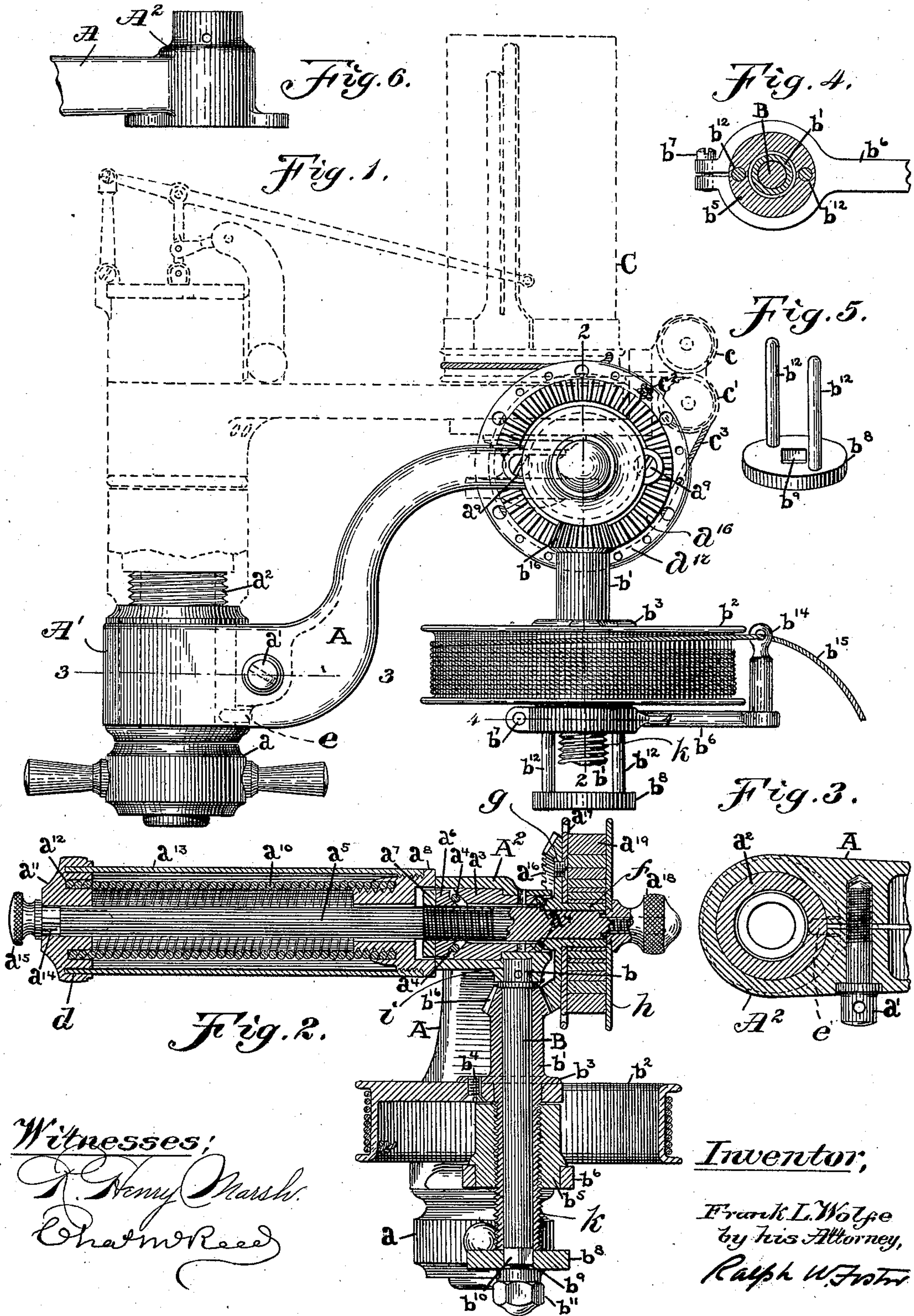
No. 689,528.

Patented Dec. 24, 1901.

F. L. WOLFE.  
SUPPORT FOR REDUCING WHEELS.

(Application filed Feb. 9, 1900.)

(No Model.)



Witnesses;

J. Henry Marsh.  
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# UNITED STATES PATENT OFFICE.

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## SUPPORT FOR REDUCING-WHEELS.

SPECIFICATION forming part of Letters Patent No. 689,528, dated December 24, 1901.

Application filed February 9, 1900. Serial No. 4,631. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK L. WOLFE, a citizen of the United States, and a resident of Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Supports for Reducing Mechanism, of which the following is a specification.

My invention relates to improvements in reducing-wheels or reducing mechanism for steam-engine indicators, and more particularly to the support for such reducing mechanism. Its object is to provide for attaching such support directly to the cylinder of the steam-engine or to an indicator-cock interposed between it and the cylinder, thereby relieving the steam-engine indicator from severe strains and avoiding consequent errors.

Reducing-motions similar in purpose are well known; but heretofore in all cases they have consisted of independent means erected between the cross-head of the steam-engine and the indicator attached to the cylinder thereof or they have been so designed as to be attached to the indicator itself below the drum thereof. In the first case it is inconvenient, cumbersome, and often inoperative or very difficult to operate. In the other case its attachment to the indicator tends to distort or injure the indicator by the strain which is thus brought upon it by the movement of the cross-head. It is to avoid both of these defects that this instrument is designed. Here all strains and distortions are confined to the reducing-wheel and are not transmitted to the indicator, as may be readily observed. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical elevation of the machine with the exception of a portion at the right lower part which is broken off, but seen in section in Fig. 2, showing the steam-engine indicator in dotted lines attached thereto. Fig. 2 is a sectional view on line 2 2, Fig. 1. Fig. 3 is a sectional view on the line 3 3, Fig. 1. Fig. 4 is a sectional view on the line 4 4, Fig. 1. Fig. 5 is a perspective view of the part  $b^8$ , Fig. 1. Fig. 6 is a plan

view showing the inner end  $A^2$  of the supporting-arm A.

Similar letters refer to similar parts throughout the several views.

The supporting-arm A has its outer end  $A'$  formed as a clamp and furnished with the binding-screw  $a'$ , employed to bind it to the bushing  $a^2$ , which is threaded at its upper end for attachment to the indicator (shown in dotted lines) and furnished at its lower end with the coupling  $a$  for attachment to the indicator-cock of the cylinder of the steam-engine. Through this bushing steam flows from the cylinder of the steam-engine into the indicator. The pin  $e$  serves to lock the clamp to the bushing. The inner end  $A^2$  of the supporting-arm is in the form of a hub. The bushing  $a^3$  fits tightly in this hub and is countersunk at either end to form bearings for the balls  $a^4$ . The shaft  $a^5$  has its outer end  $a^{14}$  squared, and to this squared end is fitted the removable cap  $a^{11}$ , made with the annular groove  $a^{12}$ , in which is fastened by solder or otherwise the outer end of the spiral spring  $a^{10}$ , and with the annular groove  $d$  to receive the outer end of the casing  $a^{13}$ . The cap  $a^{11}$  is held in place by the screw  $a^{15}$ . The casing  $a^{13}$  and the spring  $a^{10}$  at their inner ends engage the threaded portions of the sleeve  $a^8$ , which is fastened to the hub  $A^2$  by the screws  $a^9$ , which pass through corresponding lugs on the sleeve and the hub. The collar  $a^6$  engages the threaded portion of the shaft  $a^5$  and forms a bearing for the balls  $a^4$ , being held in place by the lock-nut  $a^7$ . The shaft  $a^5$  is made smaller near its inner end to receive the gear-hub  $f$ , formed to serve as a bearing for the balls  $a^4$ . Upon this hub  $f$  is fastened a disk  $a^{17}$ , which is perforated near its outer circumference by the screws  $g$ . The shaft  $a^5$  is made still smaller at its inner end and threaded to receive the knurled nut  $a^{18}$ , to which is fixed the disk  $h$ . Upon the shaft  $a^5$  between the disks  $a^{17}$  and  $h$  are carried the nest of pulleys  $a^{19}$ , composed of several rings fitting one over the other, the innermost fitting over the hub  $f$ . The hub  $A^2$  is made with the socket  $i$ , and into this socket is tightly fitted the shaft B, upon



which is loosely fitted the sleeve  $b'$ , terminating at its inner end in the bevel-gear  $b^{16}$ . This sleeve  $b'$  has a threaded portion  $k$  and a flange  $b^3$  and has its outer end  $b^{10}$  squared to receive the cap  $b^8$  and threaded to receive the nut  $b^{11}$ . To the flange  $b^3$  is fastened the pulley  $b^2$  by the screws  $b^4$ . To the movable cap  $b^8$  are fixed the posts  $b^{12}$ , employed as guides for the threaded hub  $b^5$ , which engages the threaded portion of the sleeve  $b'$ . To the hub  $b^5$  is clamped the arm  $b^6$ , with the binding-screw  $b^7$ , and to this arm is fixed the post  $b^{14}$ , through the eye of which travels the cord  $b^{15}$ .

The operation of the machine is as follows:

15 The outer end of the cord  $b^{15}$  is attached to the cross-head of the steam-engine in the usual way, and as the cross-head moves the cord unwinds and rotates the pulley  $b^2$  and rotates through the coacting gears  $b^{16}$  and  $a^{16}$  20 the shaft  $a^5$  and increases the tension of the spring  $a^{10}$ , and rotates also the pulley  $a^{19}$ , thereby winding thereon the cord  $c^3$ , operating the indicator-drum C. Upon reversing the motion of the cross-head the action of the 25 machine is reversed by the recoil of the spring, and thus the cord is kept taut in both its forward and return movements. The hub  $b^5$  is prevented from rotary motion by the guide-posts  $b^{12}$ , but has a vertical motion due to its 30 engagement with the threaded portion of the sleeve  $b'$  whenever the sleeve is rotated, and so carries up or down the arm  $b^6$ , thus preventing the overlapping on itself of the cord  $b^{15}$ . The disks  $h$  and  $a^{17}$  form flanges and 35 serve to hold in place the cord  $c^3$ , which is fastened to one of the perforations  $c^2$  in the disk  $a^{17}$  and which leads therefrom over pulleys  $c' c$  to the indicator-drum, as shown in dotted lines. The spring  $a^{10}$  is given the 40 proper tension by means of the movable cap  $a^{11}$ , which may be removed from the shaft  $a^5$  and turned as far as desired and then locked in place by the screw  $a^{15}$ , as explained. From the nest of pulleys  $a^{19}$  is selected such a one 45 as shall give to the drum C the desired rotation. The ball-bearings are placed where they can best perform their function. The

adjustable arm  $b^6$  gives any desired direction to the cord  $b^{15}$ .

Having described my invention, what I 50 claim, and desire to secure by Letters Patent, is—

1. In a reducing-wheel the combination, with a supporting-arm having one end adapted to be attached to the cylinder of a steam-engine and to receive a steam-engine indicator, of a reducing mechanism; substantially as described. 55

2. In a reducing-wheel a supporting-arm having one end furnished with a bushing, the 60 lower part of which is adapted to be attached to the cylinder of a steam-engine, and the upper part of which is adapted to receive a steam-engine indicator, such bushing constituting a duct, or passage, through which the 65 steam will flow directly from the cylinder of the steam-engine into the steam-engine indicator; the other end of such supporting-arm being adapted to support a reducing mechanism; substantially as described. 70

3. In a reducing-wheel a supporting-arm having one end adapted to be attached to the cylinder of a steam-engine, to receive a steam-engine indicator, and to constitute a duct, or 75 passage, for the flow of steam from the cylinder into the indicator; the other end of said supporting-arm being adapted to support a reducing mechanism; substantially as described.

4. In a reducing-wheel the combination of 80 the supporting-arm A with its end A' and bushing  $a^2$  adapted to receive a steam-engine indicator, to be attached to the cylinder of a steam-engine, and to permit the flow through it of steam from said cylinder to said indi- 85 cator, and a reducing mechanism; substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

FRANK L. WOLFE.

Witnesses:

CHAS. M. REED,  
RALPH W. FOSTER.