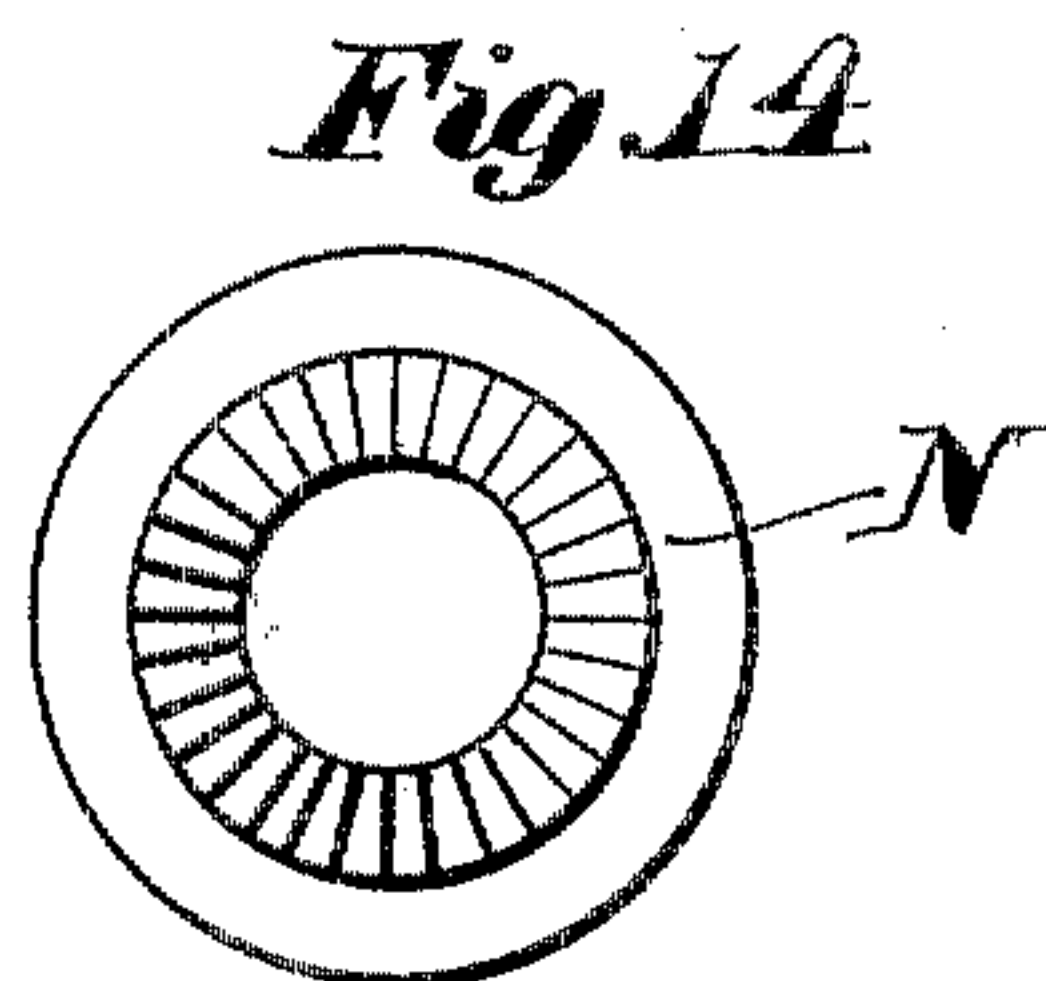
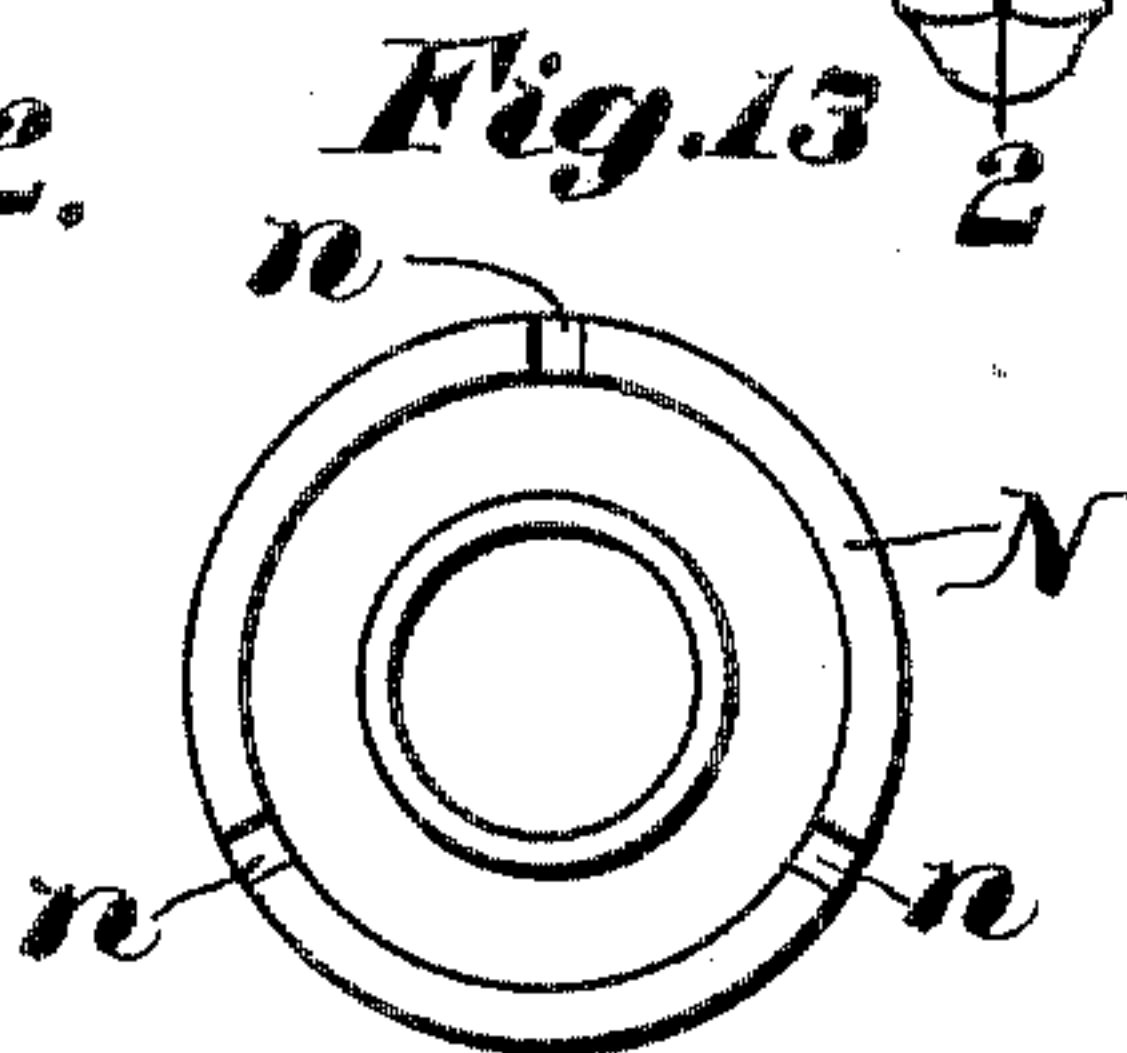
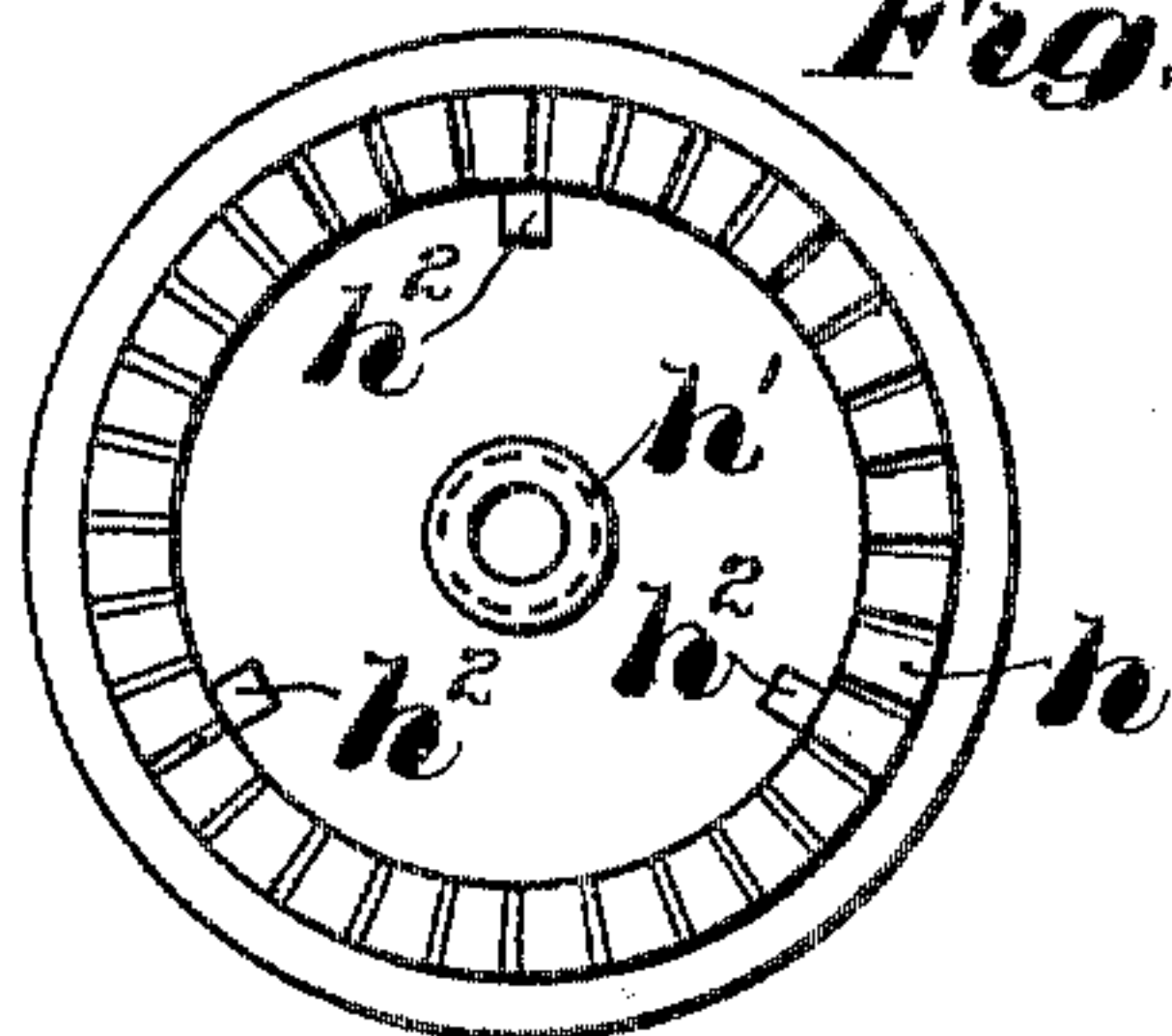
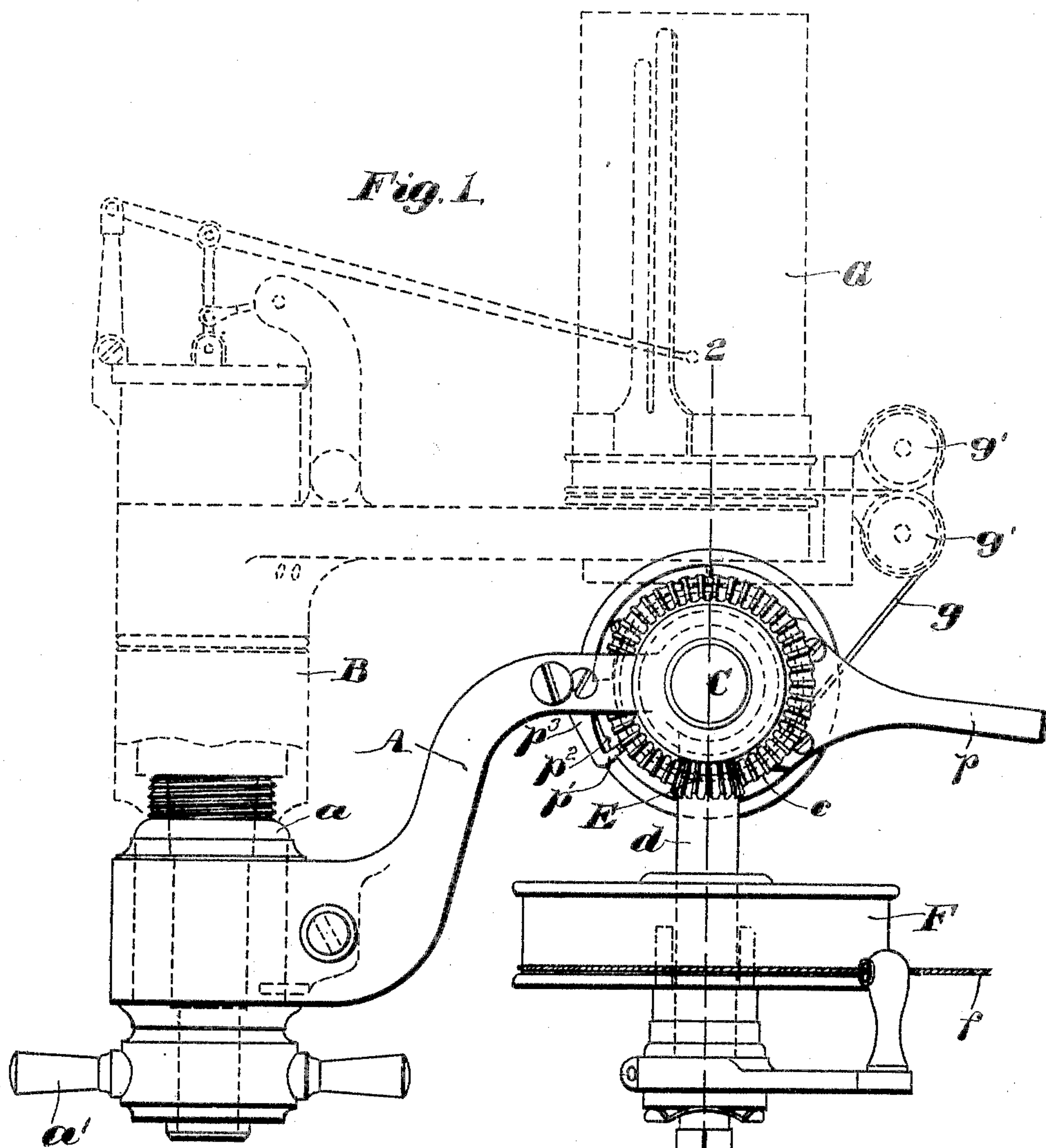


F. L. WOLFE.
REDUCING WHEEL.
APPLICATION FILED FEB. 15, 1904.

2 SHEETS—SHEET 1.



Witnesses:
Edwin Luce
H. L. Williams

Inventor:
Frank L. Wolfe
by his attorney
Ralph Adams

UNITED STATES PATENT OFFICE.

FRANK L. WOLFE, OF MEDFORD, MASSACHUSETTS, ASSIGNOR TO CROSBY STEAM GAGE AND VALVE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

REDUCING-WHEEL.

SPECIFICATION forming part of Letters Patent No. 793,974, dated July 4, 1905.

Application filed February 15, 1904. Serial No. 193,759.

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 Reducing-Wheels, of which the following is a specification.

My invention relates to improvements in reducing-wheels for steam-engine indicators; and its object is to provide for stopping the motion of the indicator-drum without interrupting that of the cord-pulley which carries the cord attached to the cross-head of the steam-engine.

It is illustrated by the accompanying drawings, in which—

Figure 1 is an end view of a reducing-wheel and its supporting-arm, showing the indicator and indicator-drum and guide-pulleys in dotted lines. Fig. 2 is a central vertical section through line 2 2, Fig. 1, without the dotted portion and looking from the right. Figs. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 are detailed views of the several parts of the mechanism.

Similar letters refer to similar parts throughout the several drawings.

A is a supporting-arm furnished with the bushing *a*, to which is attached the indicator B and the coupling *a'*, by which it is attached to the cylinder of a steam-engine. Extending through the outer end of the supporting-arm A is the shaft C, having mounted on its inner end the bevel-gear *c*. This shaft C is mounted in a cylindrical case *c'*, which is fixed to the supporting-arm A. Within this case *c'* is a spring *c''*, one end of which is fixed to said case and the other end of which is fixed to said shaft C. Fixed to the outer end of said supporting-arm A is a second shaft D, over which fits the sleeve *d*, carrying at its inner end the pinion E and having mounted upon it the cord-pulley F, to which is attached the cord *f*. These parts are fully described in the patent issued to me for a support for reducing-wheels, December 24, 1901, No. 689,528.

The action of the reducing motion is as follows: The outer end of the cord *f* is fastened to the cross-head of a steam-engine. As the cord is drawn by the movement of the cross-head from the cord-pulley F this pulley rotates and with it rotates the pinion E and the bevel-gear *c* against the action of the spring *c''*. Upon the return motion of the cross-head the spring *c''* recoils, thus keeping the cord *f* always taut. G is the indicator-drum, which is rotated against spring action by means of the cord *g*, fastened thereto, passing over the guide-pulleys *g'* *g'* and being attached to the stroke-pulley H. Heretofore this stroke-pulley H has been fixed to the bevel-gear *c*, so that it moved when and as said bevel-gear moved, imparting its movement to the indicator-drum G. To prevent this transmission of the motion of the cord-pulley F to the stroke-pulley H and thence to the indicator-drum G, I interpose between the bevel-gear *c* and the stroke-pulley H a clutch, which constitutes my invention.

The clutch device is described as follows: To the back of the bevel-gear *c* is fastened the collar K by the screws *k* *k*, holding in place the hub L, which is furnished with the flange *l* for that purpose and which is interiorly threaded for engagement with the threaded axis *h'* of the hub *h* of the stroke-pulley H. Fixed to the collar K, or integral with it, is the ratchet-wheel M, normally in engagement with the corresponding ratchet-wheel N and transmitting thereto the motion of the bevel-gear *c*. Encircling the ratchet-wheel M and resting against the collar K is the cam-wheel O, slotted at *o* to receive the stud *o'*, fixed to the post T and adapted to prevent its rotation. The corresponding cam-wheel P is mounted upon the ratchet-wheel M, has a lever-arm *p* by which to partially rotate it, and slots *p'* *p''* to receive the pawl *p'''*, mounted on the post T and held in said slots by the spring *p''''*. The hub *h* of the stroke-pulley H is partially bored and furnished with the threaded axis *h'*, the lugs *h''* *h'''*, and threaded end *h''''*. Within the bored portion of the hub *h* fits the ratchet-wheel N in sliding contact therewith,

having the slots $n\ n$ to engage the lugs $h^2\ h^2$, and thus prevent its rotation within said hub. The spring R is adapted to be placed in hub h and against it rests the ratchet-wheel N.

5 The stroke-pulley H consists of a series of concentric rings $h^4\ h^4$, which fit over the axis h' . The disks S and S' hold the cord g on the cord-pulley H, the disk S being affixed to the hub h by screws s , and the disk S' being furnished with the screw s' , by which it is screwed to the end h^3 , and with the lugs $s^2\ s^2$, to which is attached the cord g . The hub h has its surface adjoining the cam-wheel P in the form of a ratchet-wheel for engagement with the

10 spring-pawl p^3 , fixed to the cam-wheel P to enable the operator to take up any slack in the cord leading from the indicator-drum to the stroke-pulley and to hold the stroke-pulley in place. Mounted on the supporting-arm

20 A is the post T, to which is fastened the stud o' by the screw o^2 and which is threaded at its upper end to receive the screw-bolt U, on which is mounted the pawl p^3 and the spring p^4 , actuating said pawl.

25 When the machine is in operation, the two ratchet-wheels M and N are in close engagement and rotate together and the cam-wheels O and P are also in close engagement, but held from rotating by the stud o' . The pawl p^3 rests in the slot p^2 . When the lever-arm p is pressed downward, the cam-wheel P moves upward, forcing the ratchet-wheel N out of engagement with the ratchet-wheel M and into the hub h , thereby compressing the

35 spring R. The stroke-pulley H stops. The cam-wheel P is held open by the spring-actuated pawl p^3 entering the slot p' in said cam-wheel. The parts are so proportioned that the upward travel of the cam-wheel P is limited and the two cam-wheels O and P are never

40 entirely out of engagement. Normally the two ratchet-wheels and the two cam-wheels are held together by the spring R, assisted to some extent by the pawl p^3 .

45 The parts are assembled as follows: To the back of the bevel-gear c is fastened the collar K by the screws $k\ k$, holding in place the hub L and carrying the ratchet-wheel M. Then

the cam-wheel O is put into place, encircling the ratchet-wheel M and resting against the collar K. Then the stud o' is placed in the slot o and secured by the screw o^2 . Then the cam-wheel P is placed on the cam-wheel O in close engagement therewith and encircling the ratchet-wheel M, so that the pawl p^3 drops into the slot p^2 . We now take the hub h and place within it the spring R and the ratchet-wheel N, compressing the spring as described. The axis h' of the hub h is now screwed into the hub L, care being taken to keep the ratchet-wheel N tight against the compressed spring R, so as to enable us to screw the parts together. It is necessary to prevent the hub L from rotating during this process, and this is accomplished by turning the hub L until the small hole l' therein registers with the corresponding hole in the plate carrying the bevel-gear c and locking these two parts together temporarily by a pin, which is withdrawn when the hubs have been screwed together. The disk S is screwed to the hub h . The pulleys or rings $h^4\ h^4$ are now mounted on the axis h' and the screw s' with the disk S' screwed into the end h^3 .

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a reducing-wheel as described, a clutch composed of two cam-wheels arranged on the stroke-pulley shaft, one cam-wheel being rotatable upon the other, said cam-wheels being normally held together by a spring and said clutch being operated by rotating one cam-wheel upon the other against such spring thereby compressing it, together with such spring and with means for rotating such cam-wheel; substantially as described.

2. In a reducing-wheel as described a cam-wheel furnished with a spring-pawl; substantially as and for the purposes set forth.

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

FRANK L. WOLFE.

Witnesses:

W. L. WILLIAMS,

ADOLPH L. AZATHMARY.