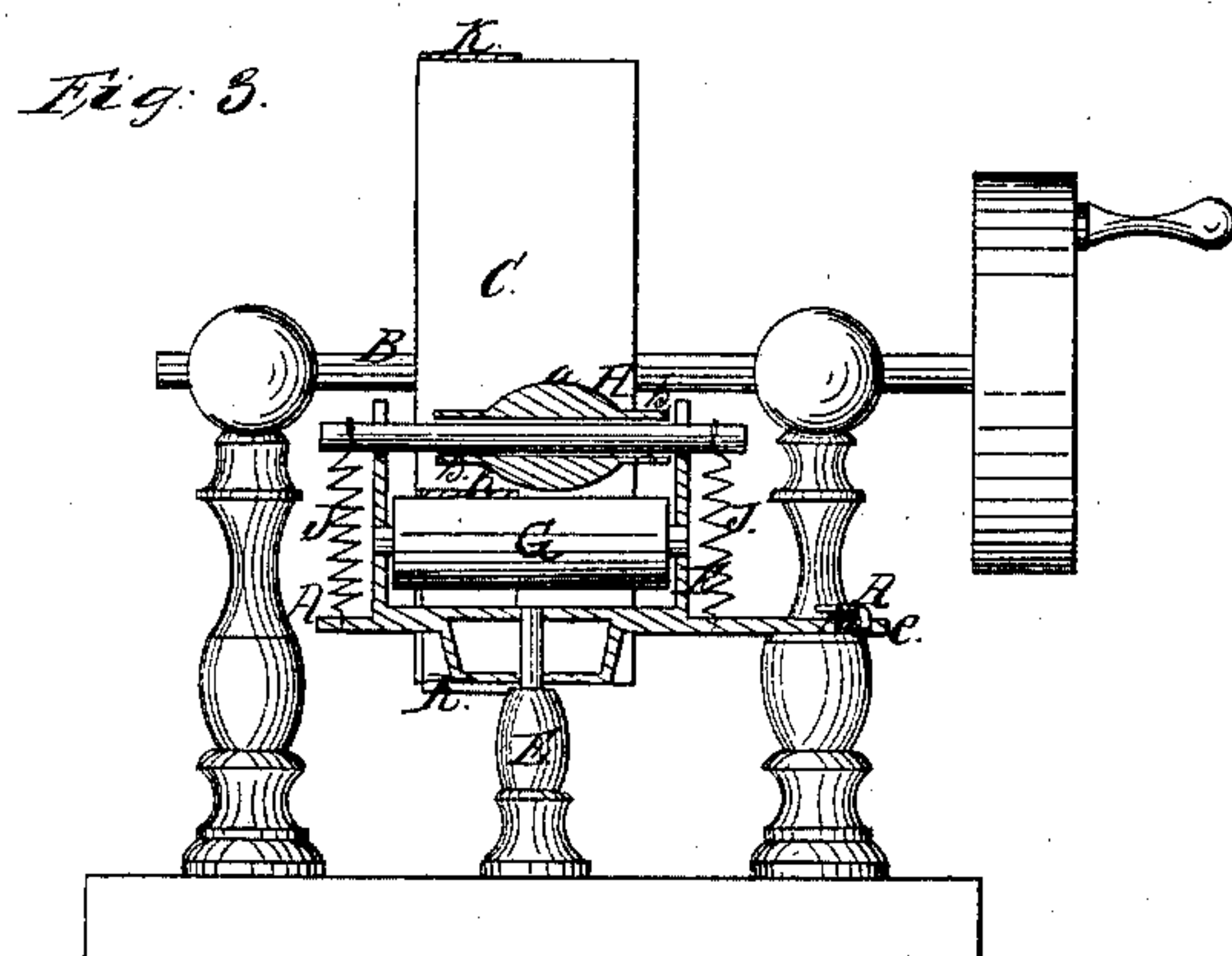
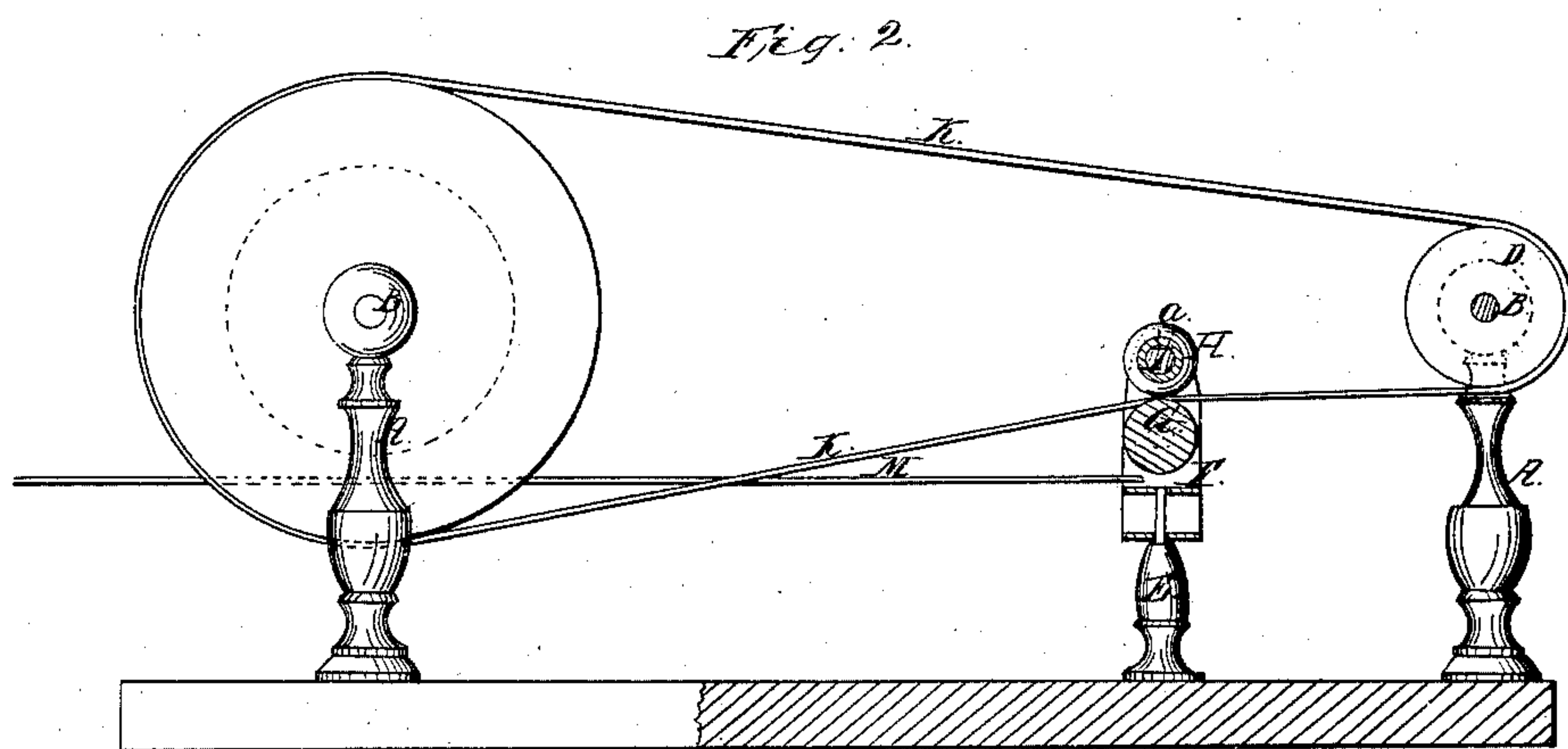
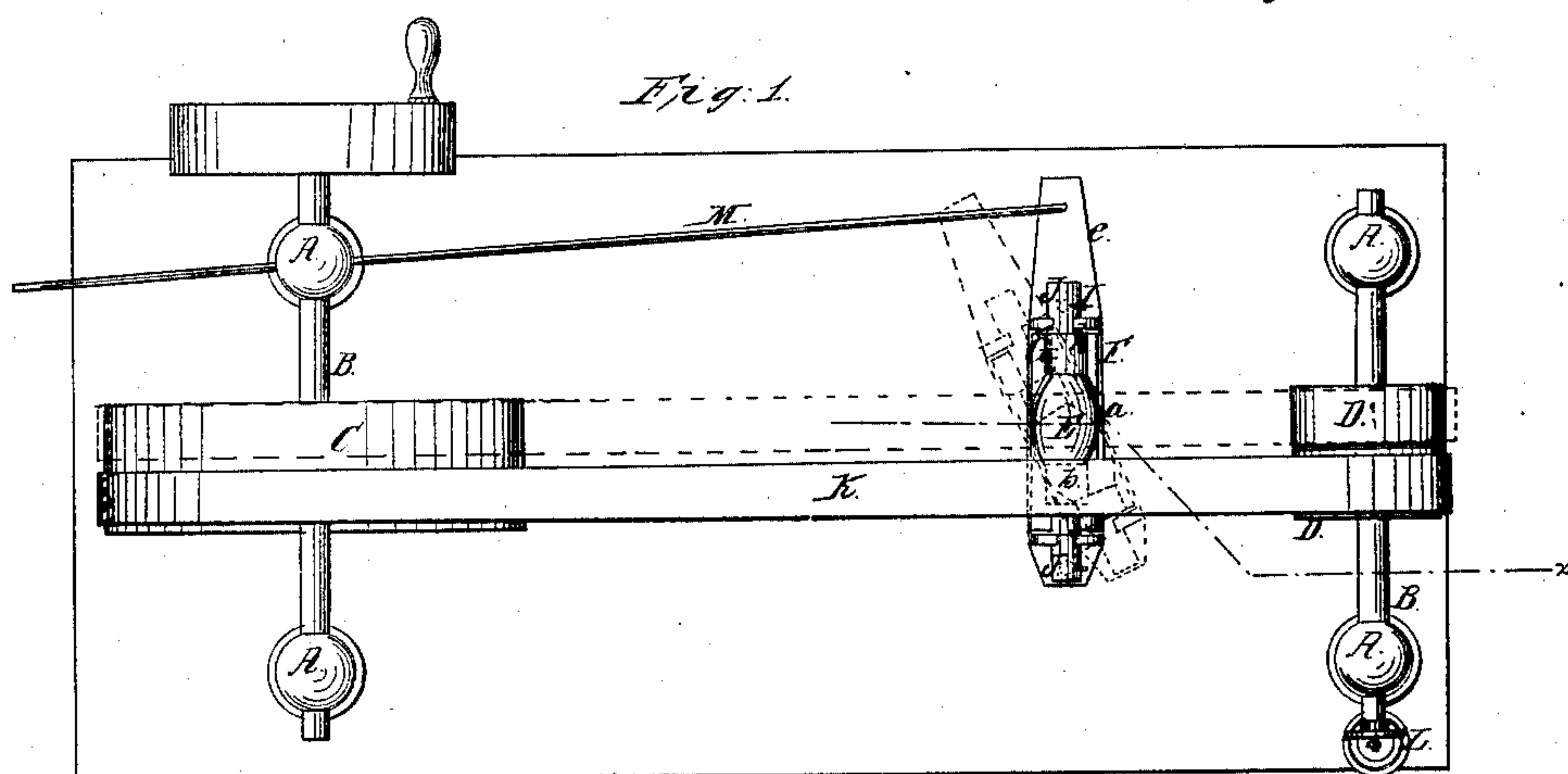


*L. J. Knowles,  
Belt Shifter,*

*No 17,743,*

*Patented July 7, 1857.*





# UNITED STATES PATENT OFFICE.

LUCIUS J. KNOWLES, OF WARREN, MASSACHUSETTS.

## BELT-SHIFTER FOR MACHINERY.

Specification of Letters Patent No. 17,743, dated July 7, 1857.

*To all whom it may concern:*

Be it known that I, L. J. KNOWLES, of Warren, in the county of Worcester and State of Massachusetts, have invented a new and useful Contrivance for Shifting Belt or Band Gearing; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a plan or top view showing one method of applying my invention. Fig. 2, is a vertical longitudinal section in the line  $x, x$ , of Fig. 1 of the same. Fig. 3, is a vertical transverse section of ditto.

This invention provides a simple means whereby belts of all sizes may be shifted automatically from one pulley to another in a very quick time.

The nature of the invention consists in having the belt or band pass between two rollers which are arranged in a frame which is capable of being turned in the path of a horizontal circle, and by being turned, so as to stand slightly oblique, in either a right or left direction, to a line at right angles to the edge of the belt, its rollers will shift the belt instantly from a fast to a loose pulley or vice versa, accordingly as the frame may have been adjusted.

The nature of the invention also consists in making the upper one of the rollers somewhat shorter in length than the lower one; and of longer diameter at the center of its length than near its ends, and having it arranged to move laterally over a horizontal shaft; whereby when the belt is fully shifted from the loose to the tight pulley, or vice versa, it will be perfectly free from contact with the upper roller and thus the tendency of the roller to still continue the lateral movement of the belt overcome.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

In the accompanying drawing the belt shifter is represented as applied for automatically shifting the belt of a steam boiler pump or feeder, from a fast to a loose pulley, and vice-versa.

A, A, A, A, represent standards for supporting shafting B B, which carry pulleys C, D, D'.

E, is a vertical standard arranged between the pulleys C, and D. F is a frame pivoted to the upper end of this standard so as to be

capable of turning horizontally either to the right or left.

G, is a roller arranged in the lower part of the frame so as to revolve but not have vertical movement. H, is another roller arranged just above and in line with the roller G, in said frame; this roller is somewhat shorter than the width of the frame and is arranged to slide or vibrate loosely over a shaft I, which is arranged to yield vertically by springs J, J, but not revolve. It is also made of greater diameter at its center  $a$ , where it is spherical, than near its ends  $b, b$ , where it is cylindrical.

K, is a belt which is passed between the two rollers H, I, and then around the pulley C, and either the pulley D, or D', as shown.

L, is an engine pump or "doctor" its piston rod is connected with the shaft of the pulley by a crank or eccentric.

M, is a lever or rod pivoted to an extension  $e$ , of the frame F, and connected with an expansion tube float or other regulator of a boiler.

The lower roller G, might be constructed and arranged to operate precisely similar to the upper one, if found desirable.

Operation if used in connection with a pump or doctor of a steam boiler: We will suppose the parts to be made in a position reverse of that shown in red in Fig. 1 and that the pump or doctor has just completed its duty of replenishing the boiler. At this moment the expansion tube of the boiler contracts and causes the lever or rod to draw the frame to an oblique position as shown in red. By thus shifting the frame the rollers H, I, are caused to be out of a line at right angles to the edge of the belt; when the rollers are in this position the belt instantly shifts from the fast to the loose pulley and thus stops the supply of water. The reason of the belt thus shifting so suddenly when the rollers are oblique is owing to the tendency of the rollers to move the belt in a line at right angles to the axes on which they turn and to the rollers revolving in opposite directions to one another, and both thereby acting at the same time to effect the movement of the belt laterally either to the right or left, accordingly as the axes of the rollers may stand relatively to the edge of the belt.

The lateral movement of the belt is controlled by the roller H, moving laterally as it shifts the belt, and thus coming in



contact with the side of the belt and bringing the shortest diameter of the roller directly over the belt in a manner to free the longest diameter thereof from the belt.

5 In shifting large belts the operation of the upper roller is to move laterally and bear against the frame and then shift the belt very easily, by reason of its spherical part bearing upon the central portion, 10 instead of the edge of the belt, and the end of its cylindrical part bearing against the frame.

I am aware that a device employing a single roller and arranged to be capable of 15 being canted has been used in combination with guard arms on a belt for the purpose of preventing the belt changing its position laterally upon the pulley or for causing the belt to traverse directly over the turning 20 point of the roller frame and for righting the belt in case it should deviate from the center to either one side or the other of the

pulley. Therefore I do not claim such an arrangement, as the same was patented by Samuel Sawyer in 1833.

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

1. Shifting a belt or band from one pulley to another by means of two rollers capable of vibration, so as to be set slightly 30 oblique, either to the right or left, to a line at right angles with the edge of the belt or band; substantially as set forth.

2. The peculiar construction of the upper roller G, substantially as and for the purpose 35 set forth.

3. Having the roller H, capable of sliding on its axle, as it shifts the belt substantially as and for the purpose set forth.

LUCIUS J. KNOWLES.

Witnesses:

ROBT. FENWICK,  
G. Y. AT LEE.