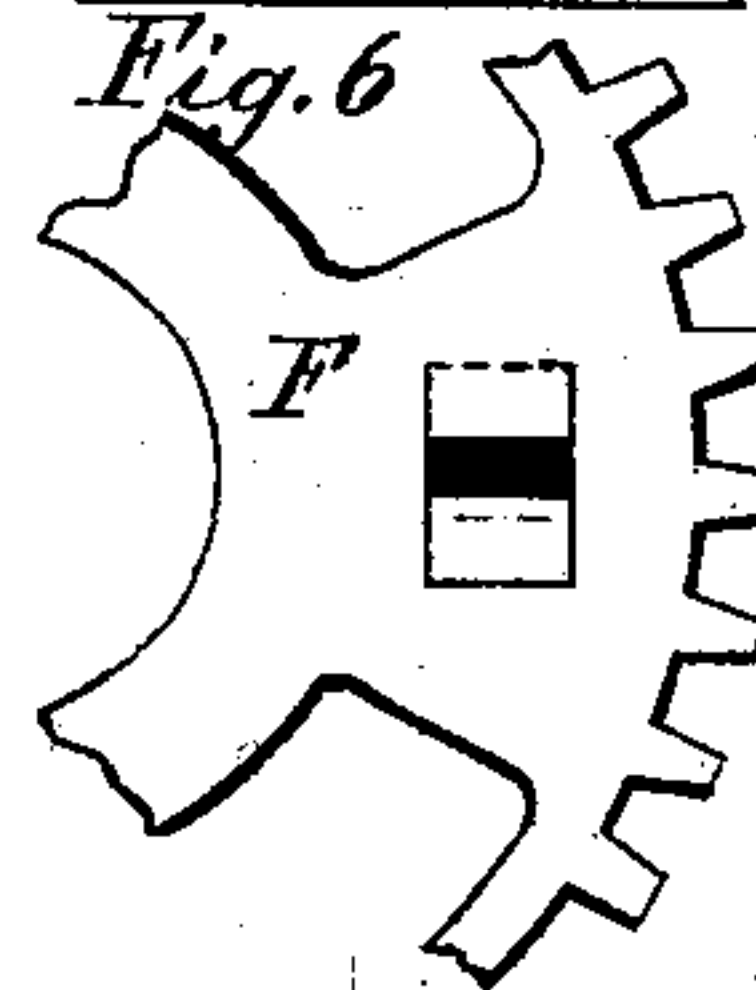
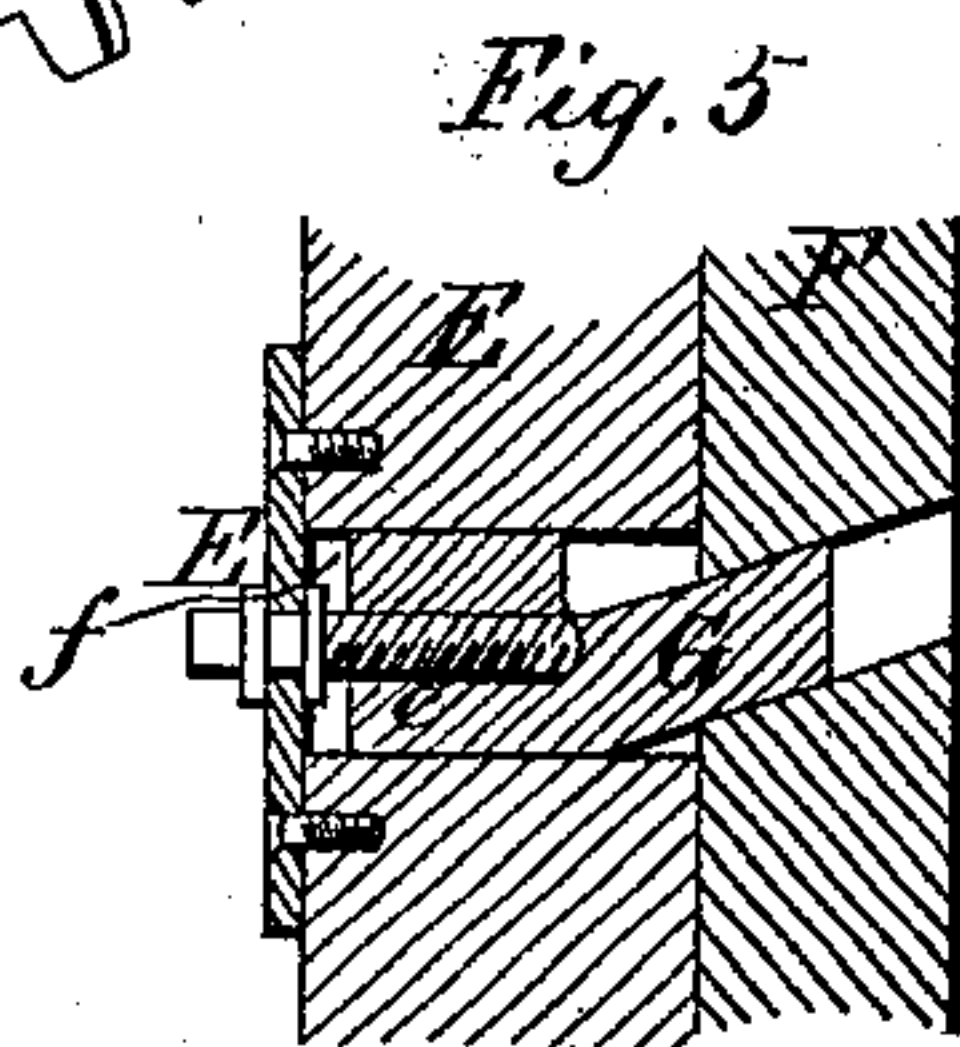
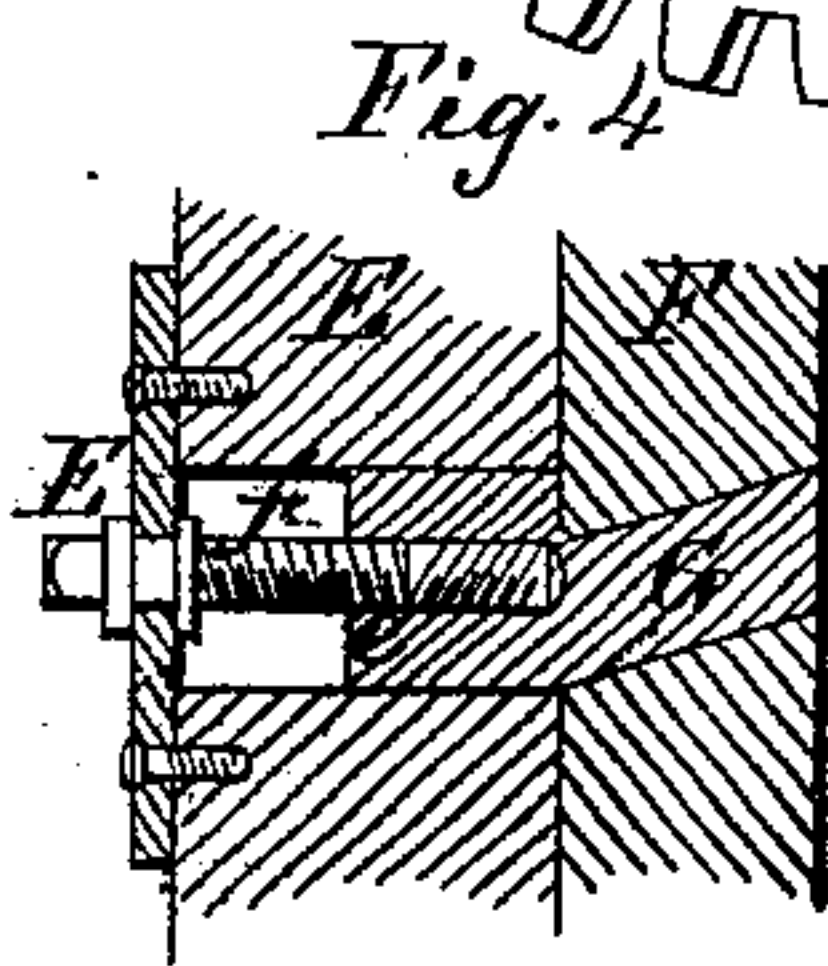
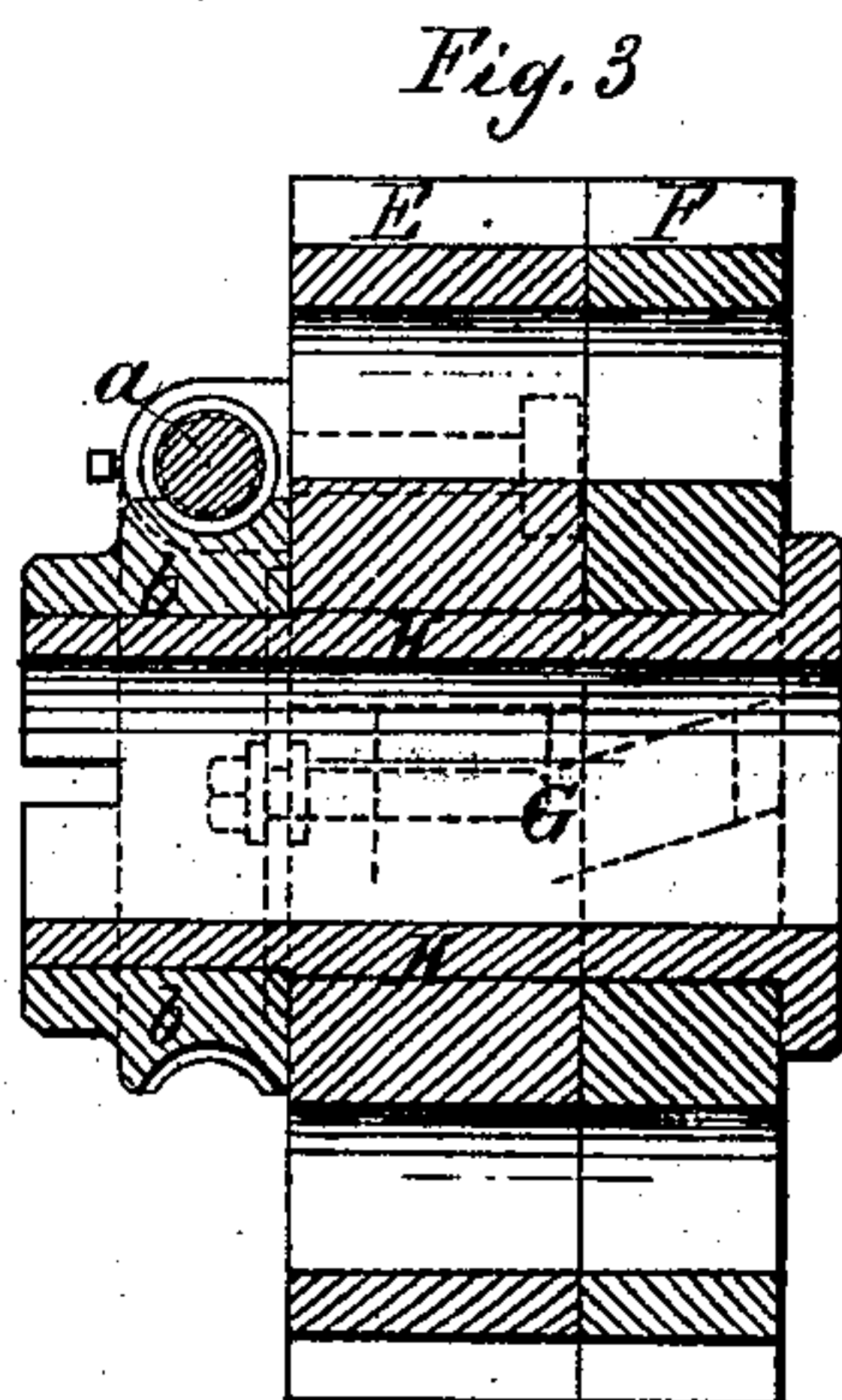
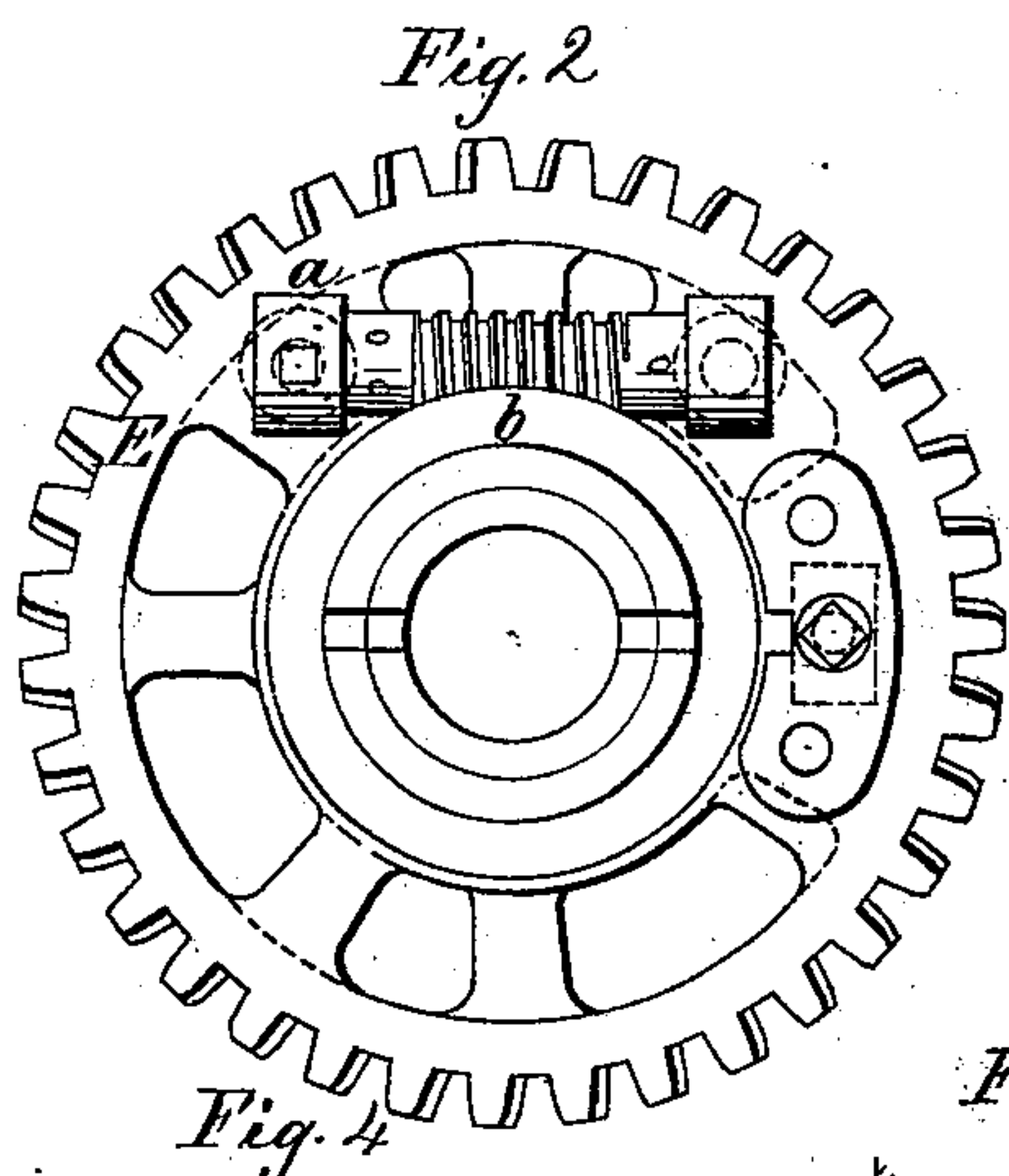
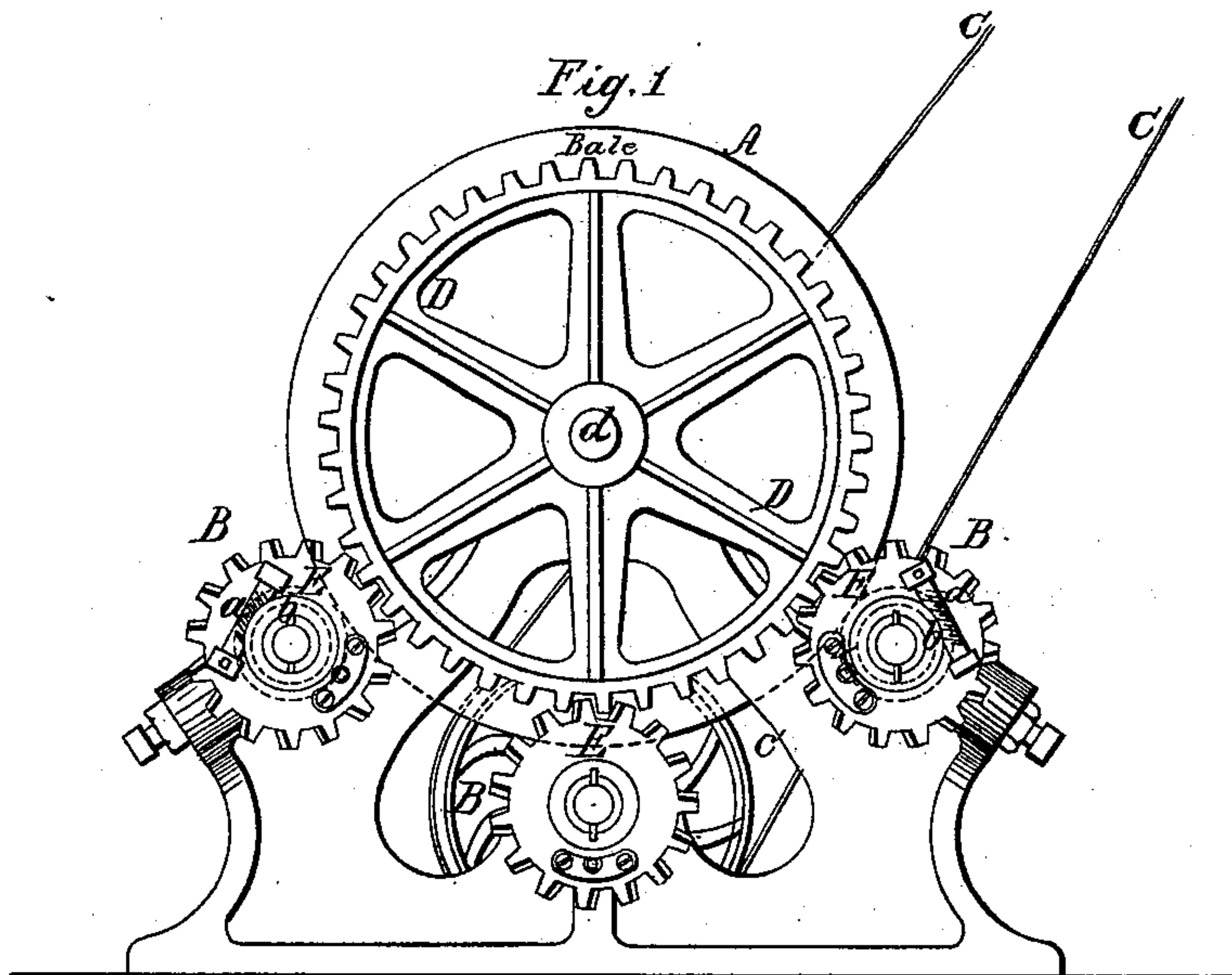


Babcock, Manton & Boyd.

Preventing Backlash in Gearing.

N^o 95,757.

Patented Oct. 12, 1869.



Witnesses
J. R. Hopkins
Frank A. Jackson

Inventors
George H. Babcock
Jos. P. Manton
J. Boyd
By their Attorneys
Wm. F. Chas. & Co.
New York

United States Patent Office.

GEORGE H. BABCOCK, JOSEPH P. MANTON, AND JONATHAN BOYD, OF
PROVIDENCE, RHODE ISLAND.

Letters Patent No. 95,757, dated October 12, 1869; patented in England, May 8, 1868.

MEANS FOR PREVENTING BACKLASH IN MACHINES DRIVEN BY GEARING.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, GEORGE H. BABCOCK, JOSEPH P. MANTON, and JONATHAN BOYD, all of the city and county of Providence, in the State of Rhode Island, have invented a new and useful Means for Preventing Backlash, particularly applicable and desirable in cylinder-machines used for printing colors upon textile fabrics, wall-papers, &c.; and we do hereby declare that the following specification, taken in connection with the drawings as a part of the same, is a full, clear, and exact description thereof.

Figure 1 represents a side view of a cylinder printing-machine, exhibiting our invention attached thereto.

Figure 2 is a view upon a larger scale, exhibiting, in detail, the features and application of our invention.

Figure 3 is a sectional view through the diameter of fig. 2.

Figures 4 and 5 are views, in section, of the two gears shown in fig. 3, with the device by which they are connected.

Figure 6 is a face view of that portion of gear-wheel F, figs. 4 and 5, which is furnished with the oblique mortise of the key G.

Inasmuch as our invention is especially applicable to machines for printing textile fabrics or wall-papers, it will be described with particular reference to such machines.

A calico-printing machine may be understood to consist of a series of metallic rollers, whose surfaces are engraved with such portion of the pattern as it is intended that they shall print, respectively arranged partially around the surface of a large drum, called the bole or impression-cylinder, so that cloth or other material to be printed, in passing along the surface of such impression-cylinder, which is made elastic by a jacket of lapping, and is also covered by a printers' blanket, receives an impression from each of the engraved cylinders in succession, it being understood that each of the printing-rollers is provided with a box containing color, and that the aggregate of the imprints made by the several rollers makes up the prescribed figure composing the printed pattern.

Thus, in the accompanying drawing—

A is the bole or impression-cylinder, and

B B B indicate the positions of three of the many printing-rollers which may be employed.

Motion is given to any one of the rollers, as by the belt C passing around a pulley, C', keyed to the mandrel on which such roller is placed. A toothed gear upon the other end of the mandrel engages with the teeth of the intermediate gear D, whose axle is the stud *d*, projecting from the side of the frame, and gives movement to such gear, which, in turn, communicates motion to all the other printing-rollers of the

series, as is well understood. The piece of cloth to be printed is fed in from the back side, and passes between the surface of the impression-cylinder and the surfaces of the rollers, resting upon and carried along by an endless blanket, (not shown,) which passes around such impression-cylinder and a roller overhead, motion being given to such blanket and to the bole A by the friction of the surfaces of the revolving printing-rollers.

The several engraved printing-rollers must be adjusted, with respect to each other, with great nicety, in order to make them print, respectively, at the exact points required to form a perfect figure. The slightest want of harmony in their operation will cause the different colors to be misplaced, and the pattern distorted.

In practice, a machine printing a complicated pattern of many colors does not maintain itself in adjustment for any considerable length of time. Slight disturbances, sufficient to throw out of proper relation to the others one or more of the rollers, will ensue from simply starting or stopping the machine, for the reason that there is always more or less backlash in a printing-machine of the usual size and weight of parts, especially as the rollers are required to be driven by toothed gears.

To maintain the proper adjustment between the rollers, constant attention on the part of the operator is required to be given to the machine. He must watch the cloth as it passes over the bole A, and, as soon as a defect in the manner in which any part of the figure is printed indicates that the particular roller which prints that part is "out of fit," he must commence to move the roller forward or backward, as the case requires, by means of the worm-gear *a b*, figs. 2 and 3, connecting such roller with its mandrel, as is familiar to all calico-printers.

The present invention proposes to provide a means for preserving a fixed relation between the several printing-rollers after they have once been properly adjusted to print the pattern correctly, so that all shall move in unison, and without any backlash between the gears from which the rotation of the printing-rollers is derived. To accomplish this, we employ upon each roller, in addition to a single toothed wheel, E, with its worm-gear attachment *a b*, as heretofore, a second toothed gear, F, placed, side by side with the first, upon the hollow sleeve which is keyed to the mandrel. The second gear is connected with the outer one, E, by the bent key G, and is capable of being adjusted upon the mandrel, with reference to its fellow, so as to throw its teeth out of coincidence with the teeth of the gear E, as shown in dotted line in fig. 2.

In the drawing, it will be seen, figs. 4 and 5, that

the two gear-wheels E and F, attached to the mandrel of each roller, (both of which, it will be understood, engage with the teeth of the intermediate gear D,) are connected by means of the key G, a portion of which is bent at an angle with the residue, which is straight. In that portion which is straight is a hole, tapped with a thread, into which is fitted a screw-plug, c. The head of this plug is squared, and projects outside of a face-plate upon the side of the gear E, which face-plate fills the space between two collars, e and f, upon the plug.

The position of the key G, which is bent, fitting into an oblique hole or mortise, of corresponding shape, in the side of the gear F, renders it evident, that when the screw-plug c is turned, it will, according to the direction in which it is turned, thrust forward or draw backward the key G, and that in so doing, its effect will be, as it is located on one side of the common centre of the gears E and F, to cause the gear F to be turned slightly on its axis, and thus change the relation of the teeth of the two gears to each other. Instead of the particular device shown, a cylindrical plug, with a feather wound spirally about it, would answer the desired purpose, and be an obvious modification in structure of our own invention.

It is essential that the driving-gears may be readily removed from and attached to the mandrels of the printing-rolls, for convenience in cleaning, and for changing patterns. For this purpose, we mount both gears, E and F, upon the hollow sleeve H, which sleeve carries the worm-gear b, into which the worm a, attached to the gear E, meshes.

The gear F, being connected to the gear E by means of the plug G, as above described, is adjustable relatively thereto, for the purpose of preventing backlash, as set forth, while both gears E and F are under the control of the worm a b, for the purpose of adjusting them upon the mandrel, in the usual manner, in getting the pattern in fit; and the several parts are so combined that they form, as it were, one piece, for placing upon or removing from the mandrel of the printing-rollers.

Let it be supposed, now, that the machine is to be made ready to print a piece of cloth. It will be understood that the teeth of gears E and F are in coincidence, and that both are in engagement with their driver. The operator will first proceed to adjust the

printing-rollers so that each will perform its proper duty, and all combine to print the figure perfectly, in the manner that has heretofore been customary. This having been done, he should next apply a turn-key to the square of the screw-plug c, and throw the teeth of each gear appertaining to the several printing-rollers, in succession, out of coincidence with the teeth of its fellow gear E, and so far that the under sides of the teeth of such gears will bear hard against the upper sides of the teeth of their driving-gears. The effect of this will obviously be the same as if the teeth of the driven wheel were severally thickened just enough to fill snugly the space between the teeth of the driver, and will prevent all play between the teeth of the driving-wheel and driven wheel, respectively. After all the rollers have been once correctly adjusted, they will, by being thus held, preserve the same relation with each other, and work in perfect unison, without the necessity of being, from time to time, readjusted, as is now required.

Having thus described our invention, we do not mean to be understood as claiming, broadly, the prevention of backlash in a machine driven by gearing by the employment of double sets of driving or driven gears, whose teeth may be thrown out of coincidence, to fill the spaces between the teeth of the gears with which they engage. Neither do we claim placing the driving-gear itself upon a hollow sleeve carrying the worm-gears; but

What we do claim, is—

1. The double gears E and F, in combination with the wedge-acting key G, substantially as described, for the purposes specified.

2. The double gears E and F, mounted upon the hollow sleeve, in combination with the wedge-acting key G, arranged in such a manner that the gear F may be partially rotated upon the sleeve by means of the worm a b, the several parts forming one complete adjustable gear, which may be attached to and removed from the mandrel of the roller as one piece, substantially as herein shown.

GEO. H. BABCOCK.
JOS. P. MANTON.
JONATHAN BOYD.

Witnesses:

JOHN D. THURSTON,
JAMES M. COSGROVE.