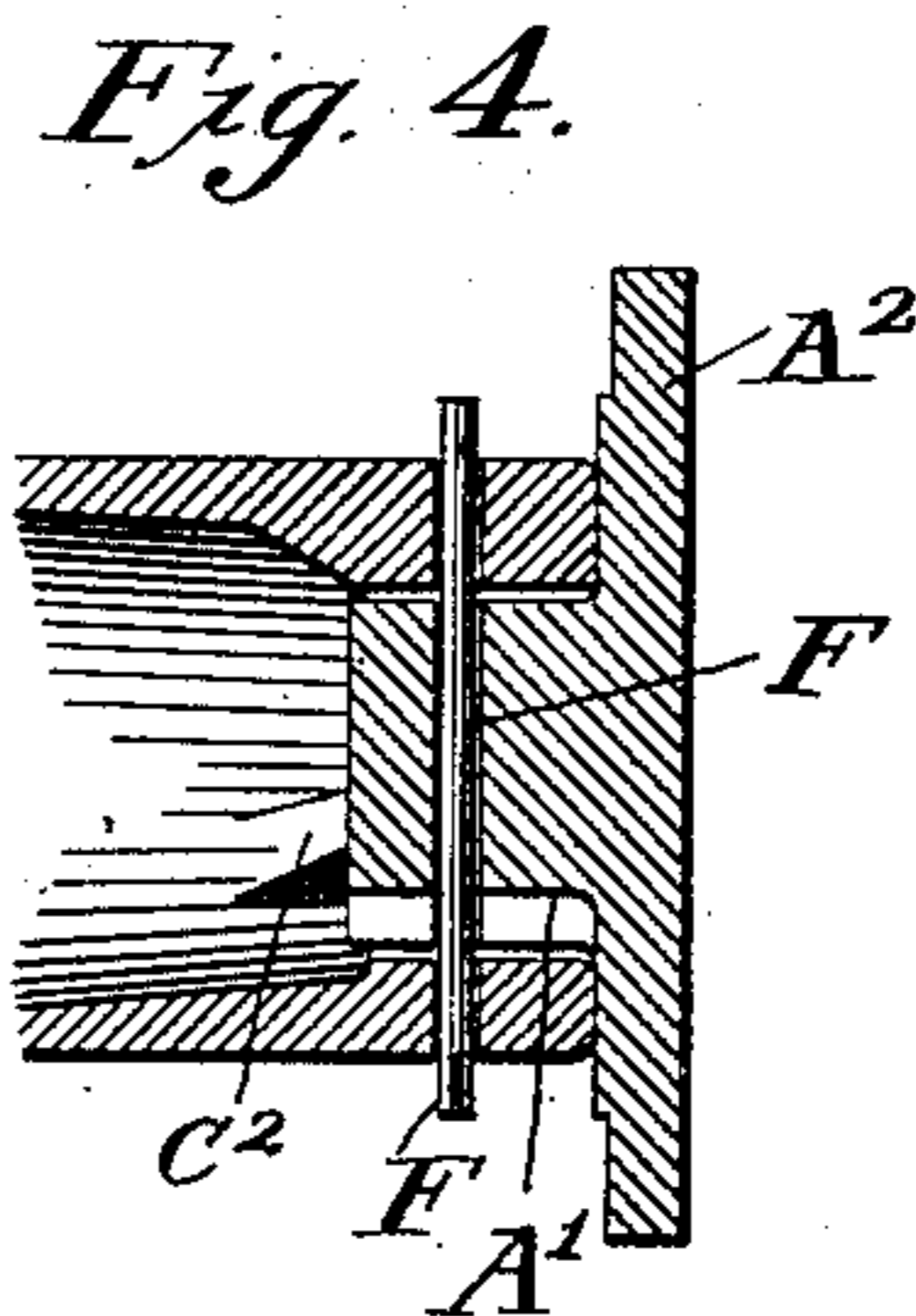
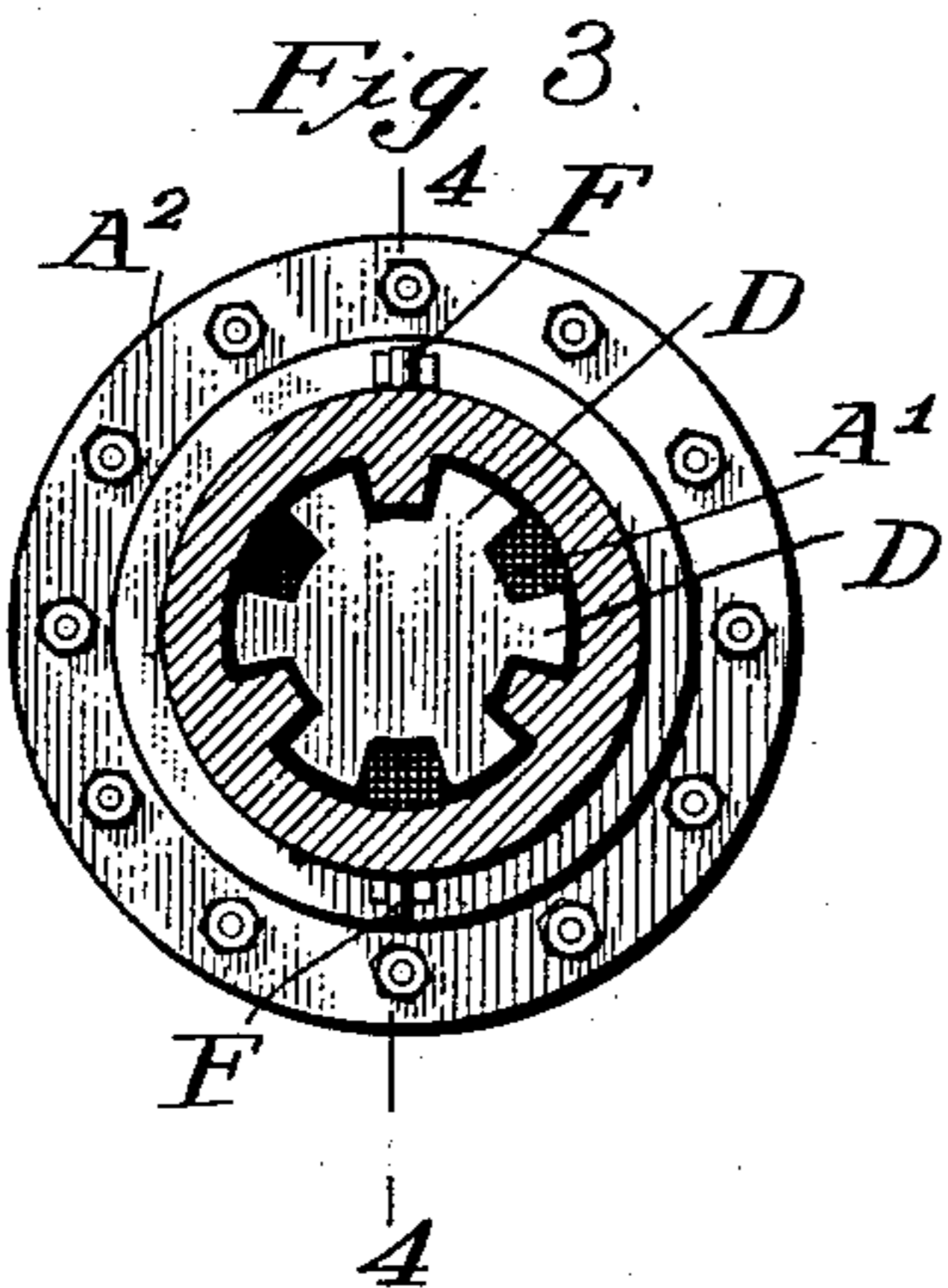
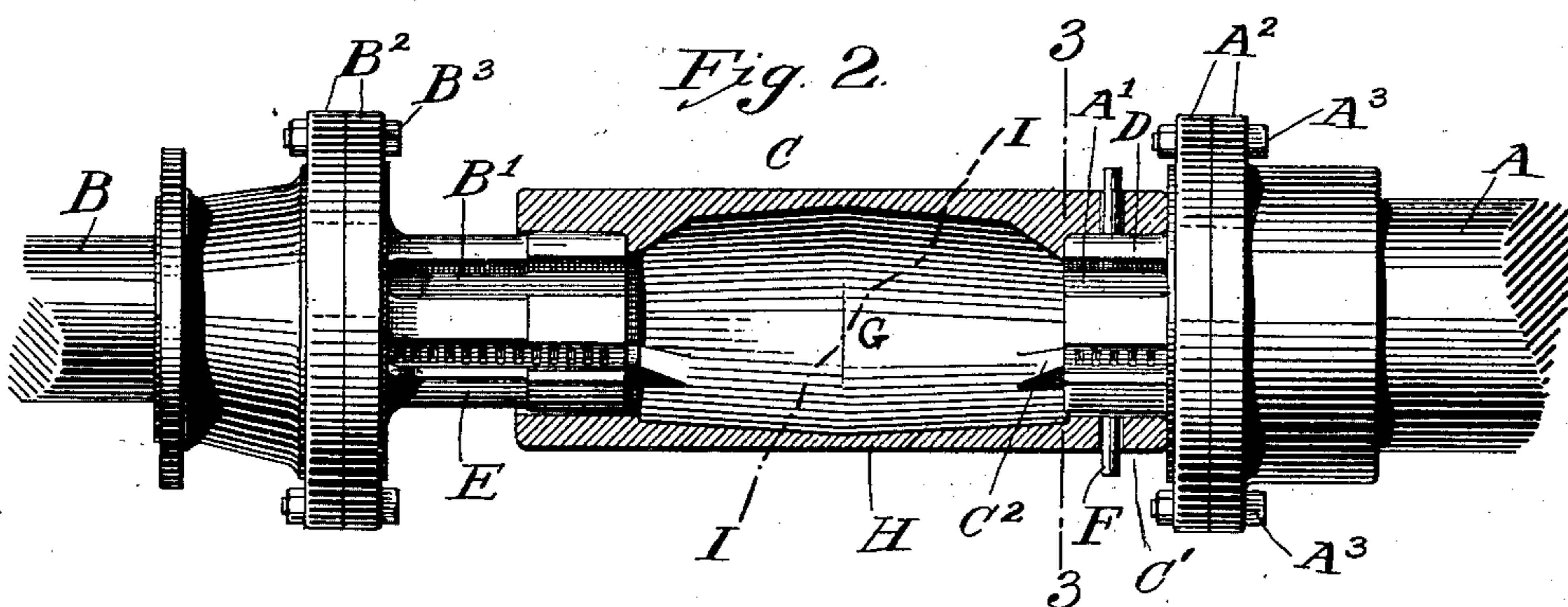
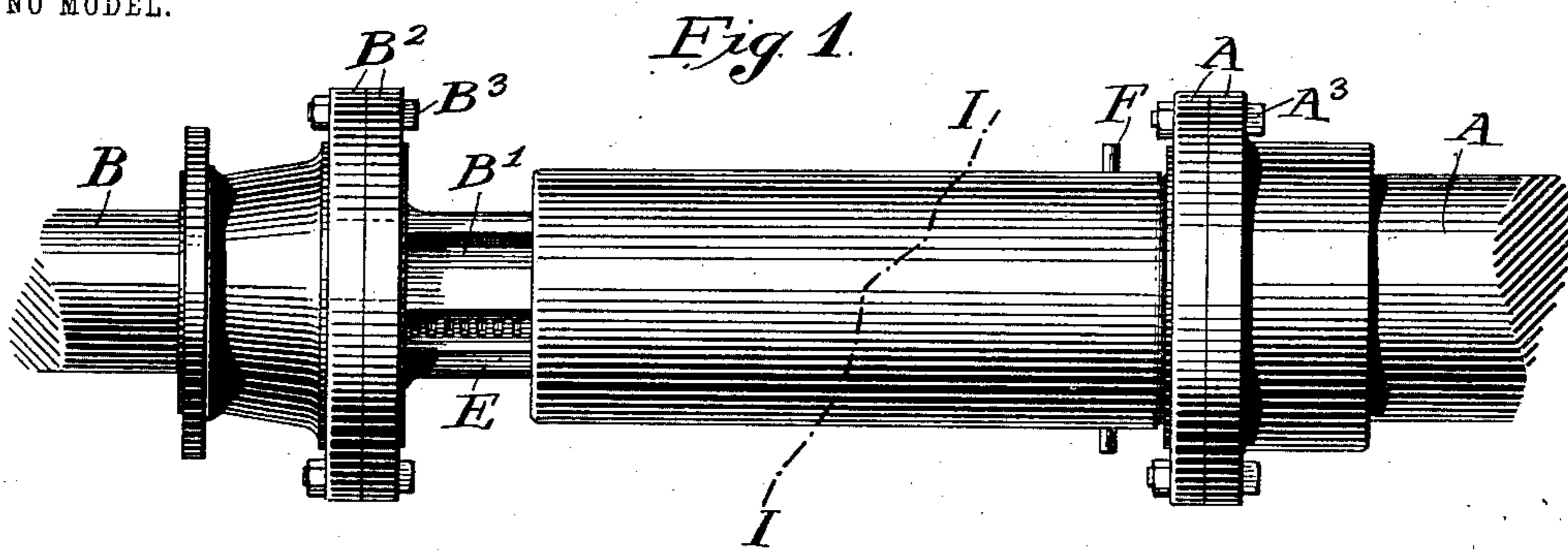


V. E. EDWARDS.
COUPLING FOR ROLLING MILLS.

APPLICATION FILED MAY 12, 1902.

NO MODEL.



Witnesses
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COUPLING FOR ROLLING-MILLS.

SPECIFICATION forming part of Letters Patent No. 724,684, dated April 7, 1903.

Application filed May 12, 1902. Serial No. 107,000½. (No model.)

To all whom it may concern:

Be it known that I, VICTOR E. EDWARDS, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Couplings for Rolling-Mills, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 represents in front elevation the opposing ends of two rolling-mill shafts united by a coupling embodying my invention. Fig. 2 represents the same view as shown in Fig. 1, but with the coupling-sleeve shown in central sectional view. Fig. 3 is a sectional view on line 3 3, Figs. 1 and 2; and Fig. 4 is a central view of a portion of the coupling-sleeve and showing the method of holding the same from longitudinal movement.

Similar reference letters refer to similar parts in the different views.

My invention relates to a coupling device for uniting the fluted ends of rolling-mill shafts, whereby the rotary motion of one shaft is imparted to another shaft in alignment therewith; and it consists in the construction and arrangement of parts, as hereinafter described, and pointed out in the annexed claims.

Referring to the drawings, A denotes a driving-shaft, and B a driven shaft, of a rolling-mill provided with fluted ends A' and B', which are preferably united thereto by means of flanges A² and B² and bolts A³ and B³. The fluted end B' is nearly twice the length of the fluted end A', and the two shafts A and B are journaled with their axes in alignment and are connected by means of my improved coupling, which consists of a cylindrical sleeve C, with its ends inclosing the fluted ends A' and B' of the shafts. The end C' of the sleeve C which incloses the fluted shaft end A' is provided with short interior longitudinal ribs C², which enter into the spaces between the ribs D. The opposite end of the sleeve C is provided with similar ribs, which enter into the spaces between the ribs E on the fluted shaft end B'. Each of the fluted ends A' and B' is preferably provided with six ribs, and each end of the sleeve C is preferably pro-

vided with three interior ribs, as shown in Fig. 3 of the drawings, thereby allowing the interior ribs of the sleeve to be shifted in different spaces whenever the ribs on the fluted shaft ends become worn. The sleeve C is shorter than the intervening space between the flanges A² B² and is held from longitudinal movement by means of a pin F, which passes diametrically through the sleeve and also through a hole in the shorter fluted end A'. Sufficient space is left between the flanges B² and the opposing end of the sleeve C to allow the sleeve to be moved longitudinally by the removal of the pin F far enough to clear the fluted end A', and thereby disconnect the two shafts A and B, when by removing the bolts B³ the fluted end B' and the coupling-sleeve C can be removed. The sleeve C is hollow throughout its entire length, and the central section of the sleeve between its fluted ends incloses a chamber G, which gradually increases in diameter from each of the fluted ends to the center of the sleeve, thereby making the metal of the sleeve the thinnest at the point H in the center of the sleeve, so that the center of the sleeve will become its weakest section, causing the sleeve to break through the center whenever the torsional strain applied to the sleeve exceeds its strength. It has been found in practice that a fracture of the coupling-sleeve, due to excessive torsional strain, usually occurs upon a diagonal line, corresponding, for example, to the broken line I I, Figs. 1 and 2, and when such a fracture occurs that portion of the sleeve inclosing the fluted end B' is free to be moved longitudinally, and thereby prevent injury to the mill, and as the coupling-sleeve C is placed outside the fluted ends A' B' whenever a breakage in the coupling-sleeve occurs it is free to clear itself from the fluted ends of the shafts. By placing the coupling-sleeve outside the fluted ends and reducing the thickness of the metal at its central section I secure the maximum torsional strength with a minimum thickness of metal, so that the coupling-sleeve, which is usually made of cast-iron, is able to resist the high torsional strain incident to the transmission of power from one shaft to the other and at the

same time capable of being readily crumbled whenever a fracture occurs, and thereby avoid injury to the rolling-mill.

In rolling-mill practice one of the most frequent and serious accidents liable to occur is caused by the heretofore unavoidable end thrust of a broken coupling-spindle of the type now in common use, owing to the fact that the fracture of the coupling-spindle usually occurs on a diagonal plane, so that the continued rotation of one end acts as a cam to crowd the opposite end and move either the mill or the engine endwise. By the use of my improved coupling-sleeve there are two provisions for avoiding the injurious end thrust referred to. First, the unattached end of the coupling-sleeve is free to slide on its fluted shaft end without crowding the mill-housing, and, second, in case it fails to slide endwise it will readily be crumbled, owing to the thinness of the metal at its central section.

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

1. In a shaft-coupling, the combination with two opposing fluted shaft ends, one of said shaft ends having flutes longer than the other shaft end, of a coupling consisting of a sleeve provided at its ends with internal ribs engaging said fluted shaft ends and having its central section reduced in thickness to reduce its resistance to a breaking strain, and means for connecting one end of said coupling to the shaft end having the shorter flutes, said coupling having an end clearance at its opposite end sufficient to allow it to be withdrawn from the other shaft end, substantially as described.

2. In a shaft-coupling, the combination with the opposing fluted ends of two shafts, of a coupling-sleeve having internal projections at its ends adapted to engage the fluted shaft ends, said sleeve being reduced in thickness at its central section to reduce its resistance to a breaking strain, and being capable of sufficient longitudinal movement on one of said shaft ends to entirely clear it from engagement with the other of said shaft ends, substantially as described.

3. In a shaft-coupling, the combination with the opposing fluted ends of two shafts, of a coupling-sleeve having internal ribs or projections at each of its ends to engage said fluted shaft ends, said sleeve being capable of longitudinal movement, and having end

clearance at one end whereby it may be withdrawn from engagement with one of said shafts, means for holding said sleeve from longitudinal movement, said sleeve being reduced in thickness at its central section, substantially as described.

4. The combination with two shafts placed in alinement and provided with fluted shaft ends to receive an internally-fluted coupling-sleeve, one of said fluted shaft ends being longer than the other, and removably attached to its shaft, of an internally-fluted coupling-sleeve inclosing and adapted to engage said fluted shaft ends, substantially as described.

5. The combination with two shafts placed in alinement and provided with fluted shaft ends to receive an internally-fluted coupling-sleeve, one of said fluted shaft ends being longer than the other and removably attached to its shaft, of an internally-fluted coupling-sleeve operatively connecting said shaft ends and capable of sliding longitudinally thereon, and means for holding said sleeve from longitudinal movement, substantially as described.

6. The combination with two shafts placed in alinement and provided with fluted shaft ends to receive an internally-fluted coupling-sleeve, of an internally-fluted coupling-sleeve operatively connecting said shaft ends and capable of sliding longitudinally thereon to disconnect the shafts and means for holding said sleeve from longitudinal movement, one of said fluted shaft ends being removably attached to its shaft to allow the coupling-sleeve to be removed from the shafts, substantially as described.

7. The combination with two shafts provided with fluted shaft ends to receive an internally-fluted coupling-sleeve, of an internally-fluted coupling-sleeve operatively connecting said fluted shaft ends and capable of sliding longitudinally thereon to disconnect the fluted shaft ends, one of said fluted shaft ends being removably attached to its shaft to allow the coupling-sleeve to be removed, means for holding said sleeve from longitudinal movement, said sleeve having its central portion reduced in thickness to form a breaking section, substantially as described.

Dated this 10th day of May, 1902.

VICTOR E. EDWARDS.

Witnesses:

RUFUS B. FOWLER,
M. M. SCHUERMANN.