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PATENTED JUNE 4, 1907.

C. W. SPONSEL.

CLUTCH.

APPLICATION FILED SEPT. 8, 1904.

2 SHEETS—SHEET 1.

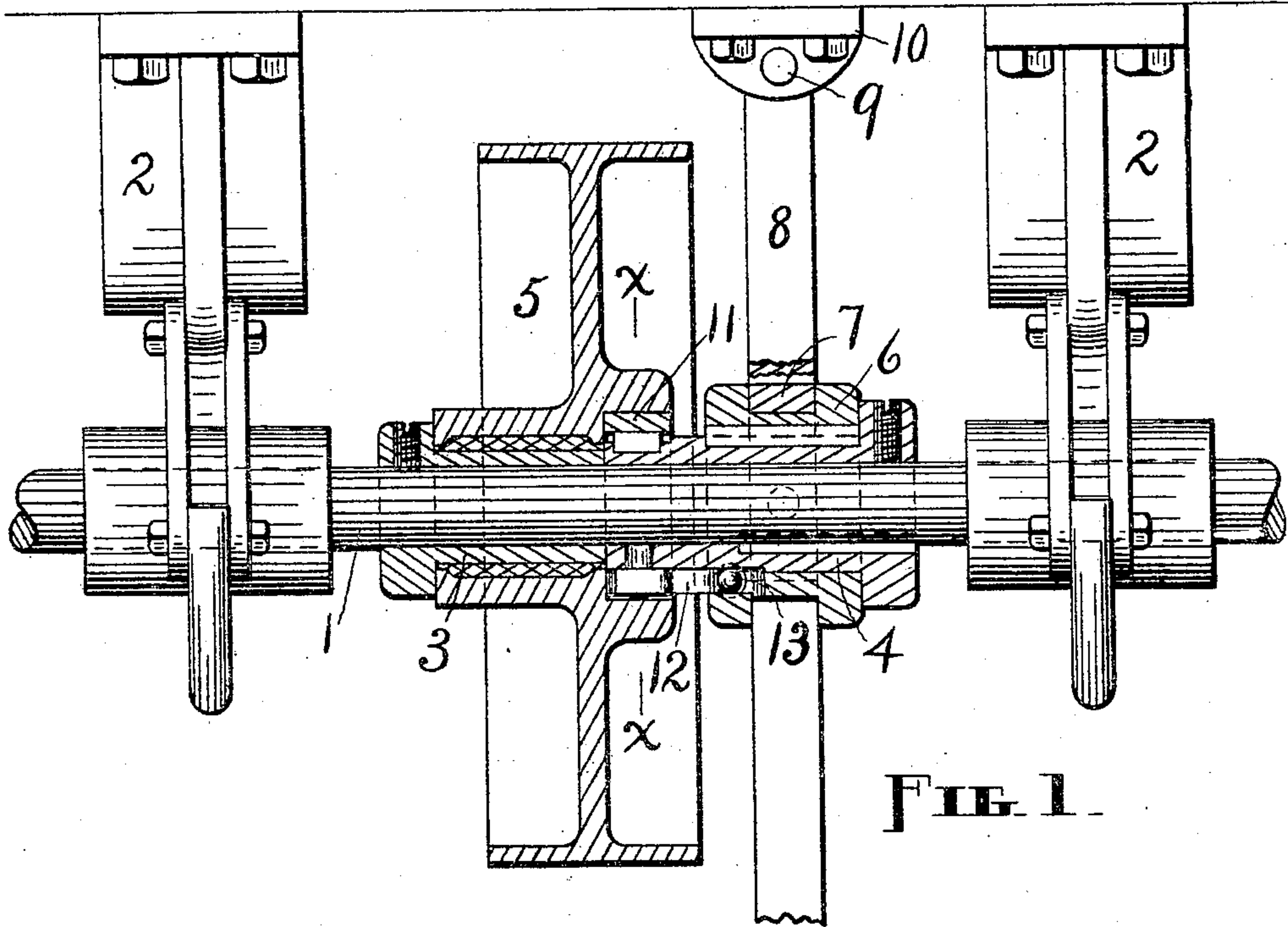


FIG. 1.

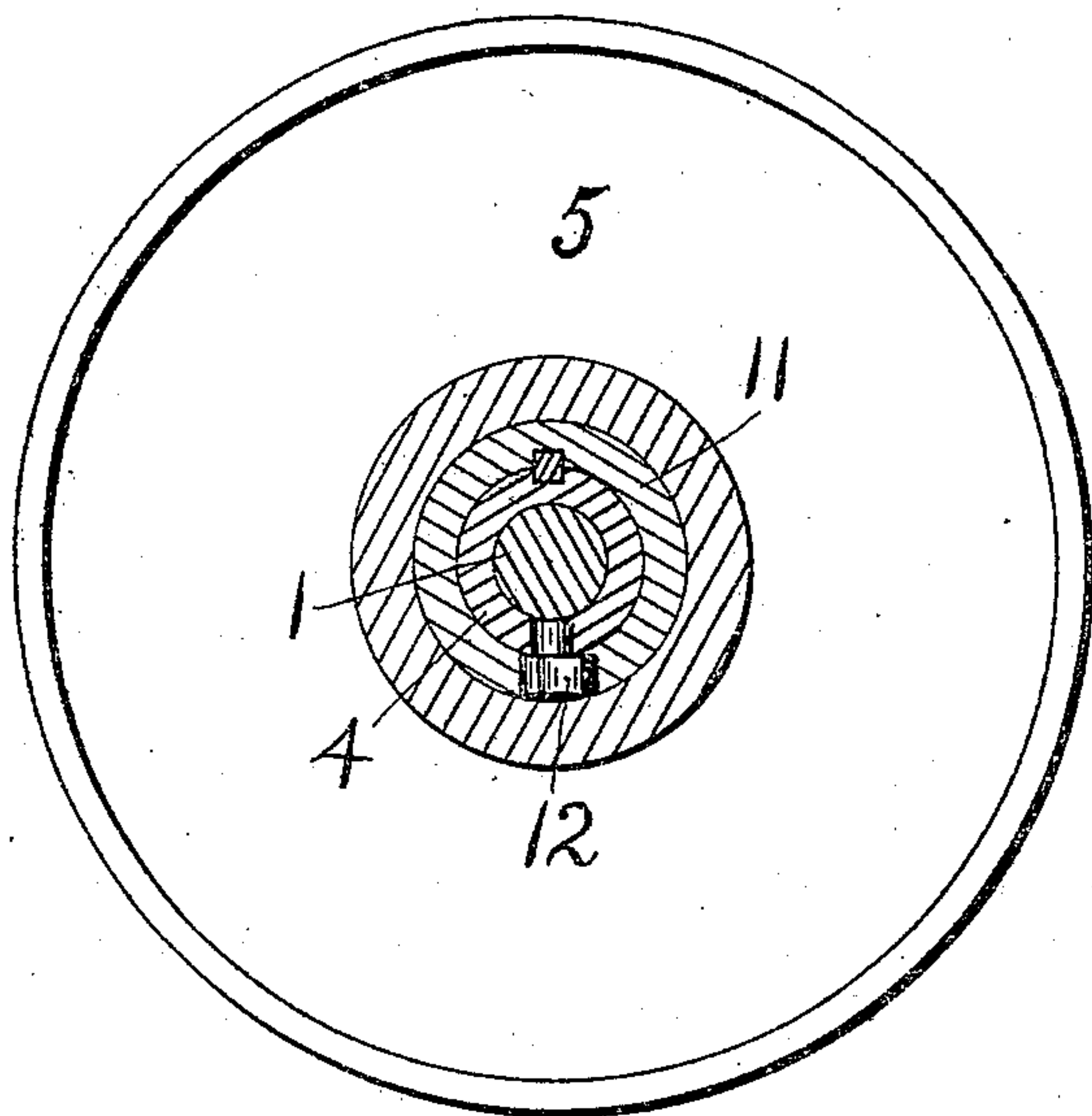


FIG. 2.

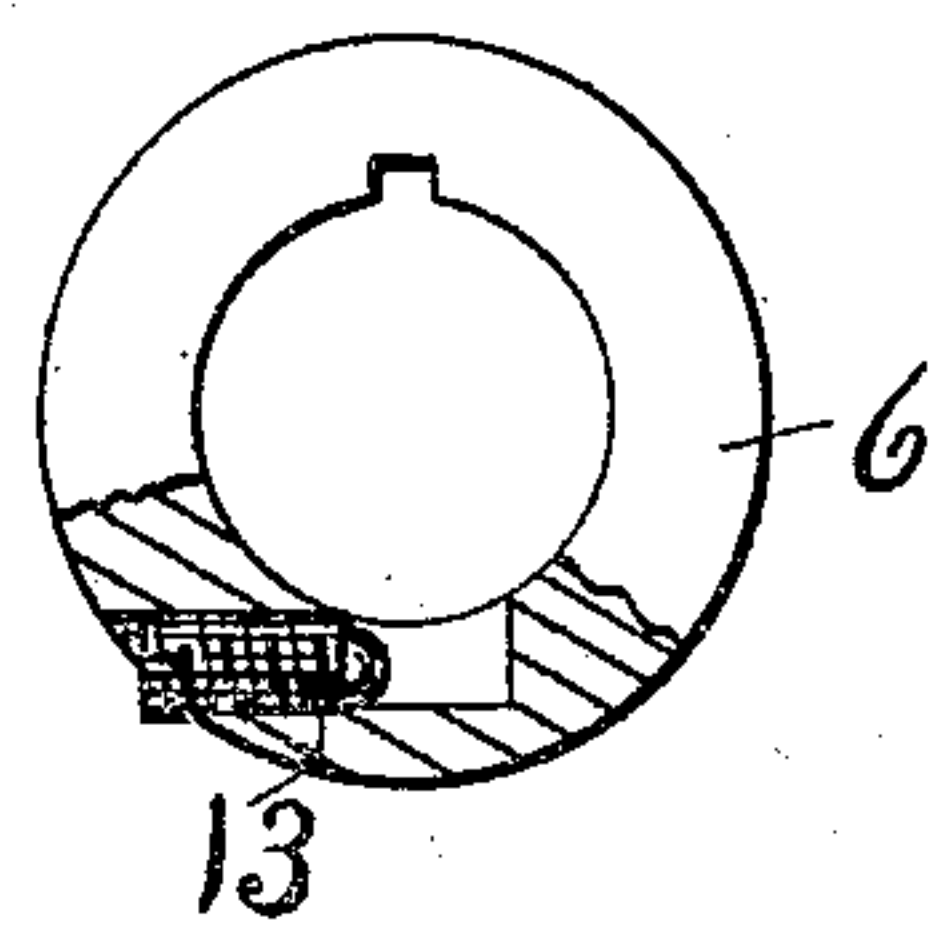


FIG. 3.

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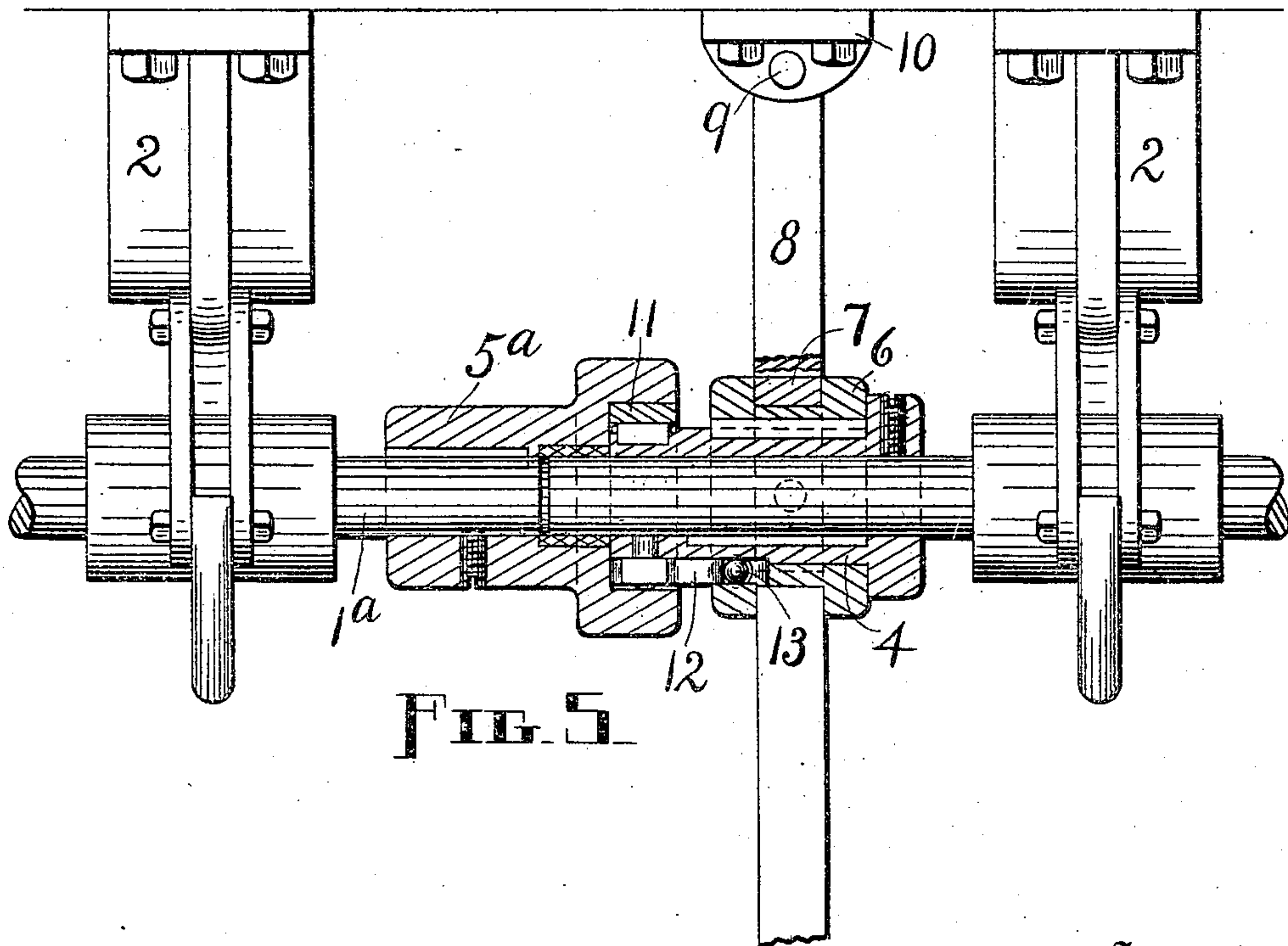
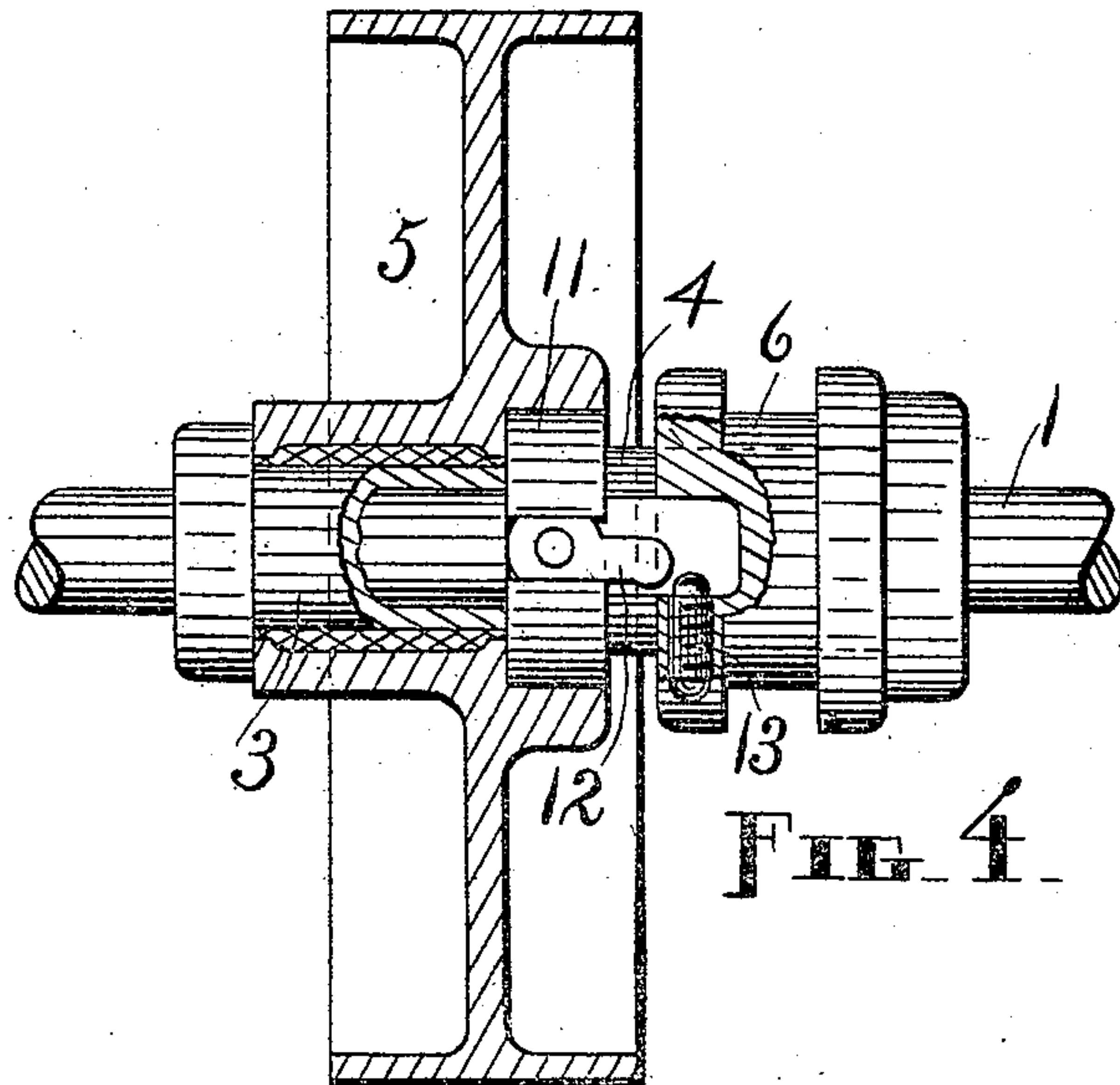
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2 SHEETS—SHEET 2.



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CLUTCH.

No. 855,867.

Specification of Letters Patent.

Patented June 4, 1907.

Original application filed May 25, 1903, Serial No. 158,592. Divided and this application filed September 8, 1904. Serial No. 223,735.

To all whom it may concern:

Be it known that I, CHARLES WILLIAM SPONSEL, a citizen of the United States of America, residing at Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Clutch, (the same being a divisional part of an application for United States Letters Patent filed by me May 25, 1903, and numbered Serial No. 158,592,) of which the following is a specification.

My invention relates to improvements in mechanism for locking a driving part to a driven part, and consists of the construction hereinafter set forth; and the object of my invention is to produce a simple and powerful clutch mechanism. I attain this object by the means illustrated in the accompanying drawings, in which—

Figure 1 is a central longitudinal section of the clutch on a shaft supported by hangers; Fig. 2, a cross-section on lines $x-x$, Fig. 1, looking toward the left, an end elevation of the member employed to expand the split ring being shown; Fig. 3, a face view of the collar, the same being partially broken away; Fig. 4, a bottom view of the collar, as it stands in Fig. 1, with associated members, the split or expansible ring being arranged in the recess in the pulley, said pulley being in section and portions of the sleeve and collar being broken away; Fig. 5, a central longitudinal section of the clutch as applied to a coupling, the whole being on two shafts supported by bearings.

Similar figures refer to similar parts throughout the several views.

The illustrations show an embodiment of my invention as employed with a pulley, and also as employed with a coupling, and comprises the preferred form of construction.

Referring first to the application of the clutch to a pulley, as illustrated in Figs. 1, 2 and 4, it will be seen that a driving shaft 1 is supported by hangers 2 2, of any suitable design or construction, and sleeves 3 and 4 are mounted on this shaft and held tight thereon by means of screws and a key in the present instance. The outer ends of the sleeves 3 and 4 are enlarged and the inner ends of said sleeves abut. The hub of a pulley 5 is loosely mounted on the sleeve 3 and said pulley is held against endwise movement, directly by means of the enlarged end of said sleeve and indirectly by means of the sleeve 4,

as will be clearly seen upon referring to the drawings. Adjacent the enlarged end of the sleeve 4 is a sliding collar 6 on said sleeve, keyed or otherwise secured against independent rotation thereon. The collar 6 is provided with an annular channel to receive a yoke 7, the latter being connected with an operating lever 8 pivoted at 9 to a bracket 10. A split ring 11 is, as before stated, located within a recess in the face of the pulley hub, and a lever or cam-like member 12 is arranged between the end portions of said ring so that when said member is moved to the right or left from its normal position it causes such end portions to separate, thus expanding the ring and forcing its periphery against the wall of the recess in said hub and locking the hub and ring together. The split ring 11 is preferably keyed to the end of the sleeve 4 which projects into the recess in the hub of the pulley 5. To move the member 12 from its normal position, or in other words the position occupied by it while the split ring is not opened or expanded, I provide an abutment or part on or in the collar 6, and to make this adjustable I prefer to employ a screw 13, the inner end portion of which is adapted to engage and move the member 12. The collar 6 is preferably recessed, as shown, and the screw and member 12 arranged to enter said recess. I prefer that the member 12 be pivotally mounted and that the pivot of such member be located midway in the opening between the ends of the expansible ring, and the portion of said member that is engaged by the ends of the ring be flattened so that, when the member 12 is moved, one corner portion of the flat portion will force one end of the ring in one direction and the diagonally opposite corner portion of the flat portion will force the other end of the ring in the opposite direction. When the collar 6 is at one end of its travel, as illustrated in the drawings, the rotation of the driving shaft simply causes a rotation of the sleeve 4 and said collar without causing the rotation of the pulley. If the collar 6 be moved along the sleeve 4 toward the pulley 5, the member 13 will be brought onto the crown of a cam face formed by the rounded outwardly projecting end of the expanding member 12, thus causing the expansion of the ring 11 against the walls of the recess in the pulley hub, so that said hub

will be frictionally locked to the split ring and, as the latter is restrained from rotation on said hub, the hub will be locked to the sleeve. With the parts in these positions the
 5 pulley will, by means of the sleeve 4 and the ring 11, be driven in the same direction as the driving shaft. If now the collar 6 be moved away from the pulley, the point of the screw 13 will release the expanding mem-
 10 ber 12, thus relieving the ring 11, permitting it to contract, and releasing the hub of the pulley, which pulley will no longer revolve with the shaft 1. The location of the adjusting screw 13 in the collar brings it into
 15 an accessible position, and as the screw may conveniently be of harder material than the collar, the wear is less than it would be if the collar made direct contact with the clutch applying member.

20 In Fig. 5 I illustrate a method of applying this clutch to a cut-off coupling used with a line shaft made in two sections, so that one of such sections can be permitted to remain idle while the other is running. In this case
 25 the clutch members are applied to a section 1 or the driving shaft in precisely the same manner as has already been described, but in place of a pulley a coupling 5^a is secured to a section 1^a or the driven shaft by means
 30 of a key and a screw or otherwise. The ends of the shaft sections 1 and 1^a come close together within the coupling 5^a and a recess is formed in one face of said coupling to receive the split ring 11. By moving the collar
 35 6 toward the coupling 5^a, said coupling becomes locked to the shaft section 1 through the medium of the intervening members, as hereinbefore described and explained, and the shaft section 1^a is driven with the
 40 shaft section 1. By withdrawing the screw 13 from engagement with the member 12, the coupling and driven shaft section are disengaged and remain idle while the driving shaft section revolves.

45 It will be seen that all of the parts of this mechanism, in either application of the same, are simple to construct and easy to assemble. The screw 13 may be quickly adjusted so as to obtain the exact necessary movement of
 50 the expanding member 12 borne by the sleeve 4, and this member is so located and shaped that the ring will be expanded powerfully in both directions against the walls of the recess in which it is located. The member
 55 13 can be easily adjusted without taking the mechanism apart. The expanding member 12 is preferably carried by the sleeve and so shaped that it will exert an equal force upon the opposite ends of the ring and expand it
 60 equally in opposite directions and obtain a uniform pressure against the interior walls of the recess in which the same is located.

It is obvious that a pulley having a recessed hub mounted to rotate loosely on a
 65 shaft may be locked to the shaft so that the

pulley may drive the shaft when locked thereto and run loosely thereon when not locked, or the shaft may run loosely in the pulley as hereinbefore explained, and, furthermore, the shaft section 1^a may be em-
 70 ployed to drive the shaft section 1 instead of being driven by said shaft section 1.

One of the objections heretofore obtaining in the construction of clutch mechanisms has been that a considerable movement of
 75 the operating parts has been required in order to bring the locking members into the necessary positions to lock the surfaces together. I avoid this by the construction set out herein, wherein the expanding lever
 80 12 bears when operating against the end of the split ring adjacent to one edge thereof on one side and adjacent the opposite edge of the ring on the other side so that a trifling movement of the expanding lever turning as
 85 on a pivot between the ends of the split ring separates the ends of the ring to a very much greater extent than would result if the expanding member was elliptical or cam-shaped, and thus a very short projecting
 90 arm on the expanding lever is required, and very slight movement of the collar toward and from the free end of the expanding lever is required to turn this lever sufficiently to expand the ring to the desired extent. This,
 95 it will be observed, does away with the long sweep of the lever which operates the collar which would otherwise be required.

The construction is very much simplified and the number of parts lessened, and the
 100 construction cheapened by forming the sleeve without recesses or projections and making the expanding lever of substantially the same thickness as the split ring and making the operative end portion of the expand-
 105 ing lever of a size to substantially fill the open space between the ends of the split ring when the same is in its collapsed or normal position.

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

1. The combination, in a clutch, with a shaft, a sleeve tight on such shaft, a collar mounted on such sleeve and rotatably held thereto but permitted to reciprocate there-
 115 on, such collar being provided with an interior abutment, a split-ring also mounted on said shaft and rotatably held thereto, and an expanding member for such split-ring pivotally mounted between the ends of the lat-
 120 ter on the sleeve and extending parallel with said shaft into the path of said abutment, of a rotary member loosely mounted on the shaft and having an internal friction face for engagement by said split-ring, sub-
 125 stantially as shown.

2. The combination, in a clutch, with a shaft, a sleeve tight on such shaft, a collar mounted on such sleeve and rotatably held thereto but permitted to reciprocate thereon,
 130

such collar having a recess therein between its periphery and the bore for the sleeve and being provided with an abutment projecting into such recess, a split-ring also mounted on
5 said sleeve and rotatably held thereto, and an expanding member for such split-ring pivotally mounted between the ends of the latter on the sleeve and extending into the path of said abutment, of a rotary member
10 loosely mounted on the shaft and having an internal friction face for engagement by said split-ring, substantially as shown.

3. The combination, in a clutch, with a shaft, a sleeve tight on such shaft, a collar
15 mounted on such sleeve and rotatably held thereto but permitted to reciprocate thereon, such collar being provided with an adjustable abutment screw, a split-ring also mounted on said sleeve and rotatably held thereto,
20 and an expanding member for such split-ring pivotally mounted between the ends of the latter on the sleeve and extending parallel with said sleeve into the path of said screw, of a rotary member loosely mounted

on the shaft and having an internal friction 25 face for engagement by said split-ring, substantially as shown.

4. The combination, in a clutch, with a shaft, a sleeve tight on such shaft, a collar mounted on such sleeve and rotatably held 30 thereto but permitted to reciprocate thereon, such collar being provided with an interior abutment, a split-ring also mounted on said sleeve and rotatably held thereto, and an expanding member for such split-ring pivot- 35 ally mounted between the ends of the latter on the sleeve and extending parallel with said shaft into the path of said abutment, of a second shaft, and a rotary member connecting both shafts but being tight on said sec- 40 ond shaft, said rotary member having an internal friction face for engagement by said split-ring, substantially as shown.

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Witnesses:

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