(No Model.) 2 Sheets—Sheet 1.

L. J. HIRT.

FRICTION CLUTCH.

No. 458,578. Patented Sept. 1, 1891.

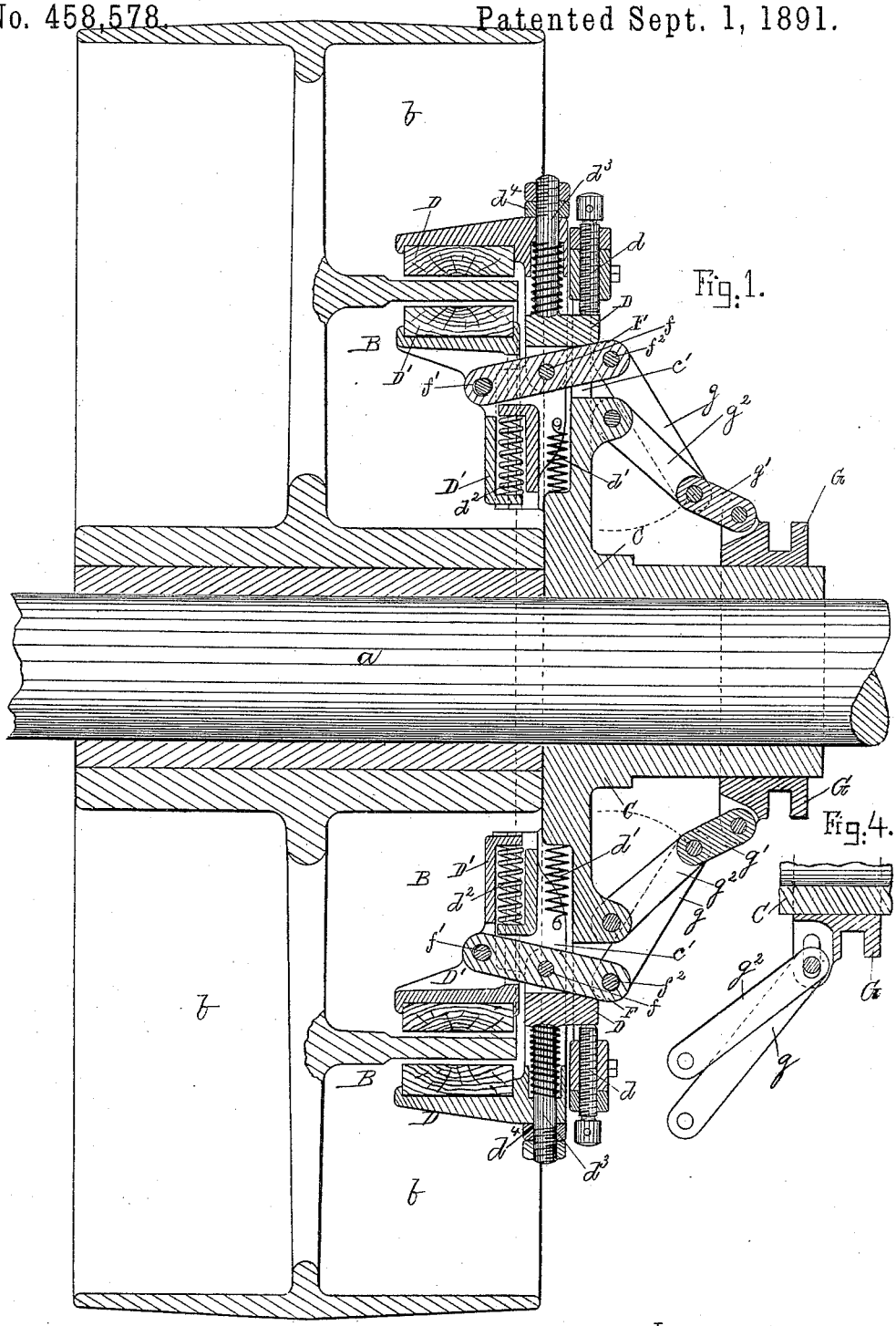

Fig. 1.

Fig. 4.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

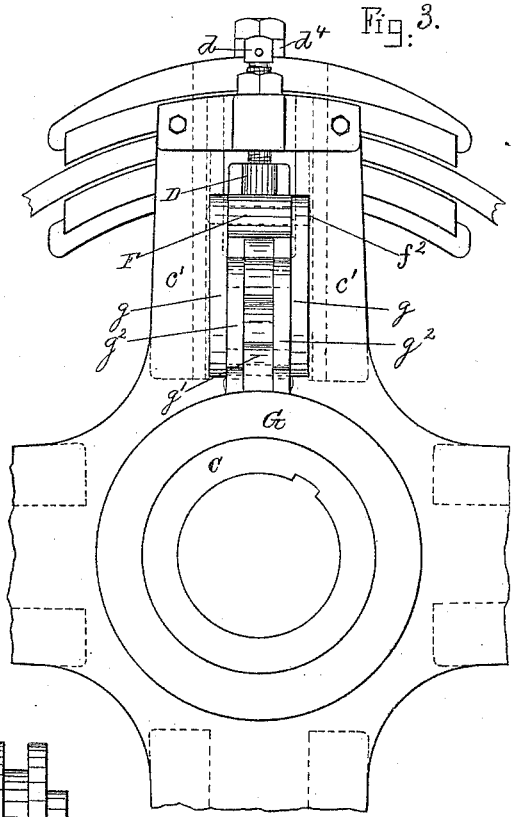
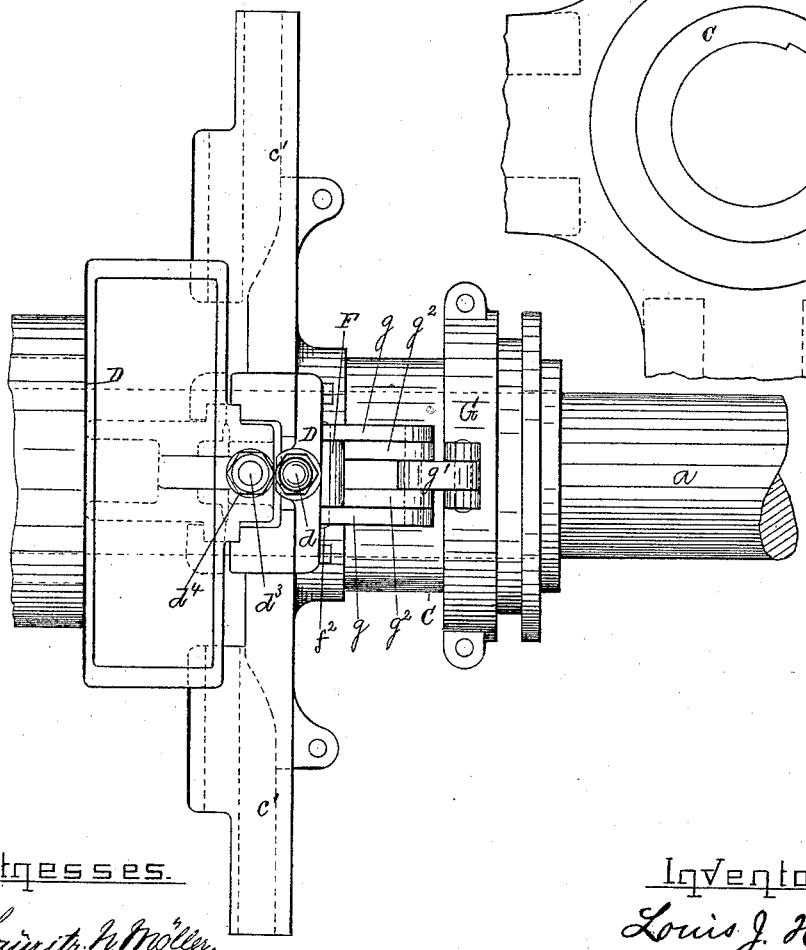


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

LOUIS J. HIRT, OF BOSTON, MASSACHUSETTS.

FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 458,578, dated September 1, 1891.

Application filed January 12, 1891. Serial No. 377,454. (No model.)

To all whom it may concern:

Be it known that I, LOUIS JOSEPH HIRT, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Friction-Clutch, of which the following is a specification, reference being had to the accompanying drawings, making a part hereof, in which—

Figure 1 is a sectional elevation, Fig. 2 a plan, and Fig. 3 an elevation, illustrating my invention in its preferred form. Fig. 4 is a modification of connection between the sliding sleeve and the floating lever.

My invention relates to that class of friction-clutches in which one or more pairs of jaws clamp between a flange; and it consists, mainly, in the combination of the clutch-jaws with a lever which is pinned directly to both jaws and not connected to either by a link, as heretofore, and which has no pin between the two pieces which connect it with the jaws, but is provided with three pins only, the outermost one connecting the lever with its actuating mechanism, the middle pin connecting the lever with one of the jaws and the innermost pin connecting the lever with the other jaw, this combination making an improved clutch which has many advantages in practice over any other known to me.

In the drawings, a is a shaft; b, a pulley loose on the shaft; B, a flange fast to pulley b, and C a frame fast to shaft a. This frame C carries on its arms c' two jaws D D′, so mounted that they can move toward and from one another but otherwise rigid in the arm c'. The jaw D is on one side and the jaw D′ on the other side of flange B, and as the jaws are mounted in ways on arm c', and arm c' is fast through frame C to shaft a it will be clear that when jaws D D′ are moved toward one another and clamp flange B the pulley b, to which flange B is fast will also be connected to shaft a.

The clutch, as hereinbefore described, is not new with me; but, so far as I have any reason to believe, I am the first to actuate the jaws of such a clutch by a lever F, pinned at f to jaw D and at f' to jaw D′, and without a pin or any equivalent for a pin between the pins f and f', the jaws forming two fulcra for the lever F, for when the upper jaw D is in contact with flange B jaw D, through pin f, becomes the fulcrum of lever F, and that lever, acting through pin f', forces jaw D′ into contact with flange B. On the other hand, should jaw D′ come first into contact with flange B, then it becomes, through pin f', the fulcrum of lever F, which, acting then through pin f, forces jaw D into contact with flange B. The main difficulty (heretofore explained) with this kind of clutch has been to adjust the jaws to the flange and preserve them in proper adjustment, so that the work done is thrown equally upon both jaws, and the main advantage of my contrivance is that I am enabled to do this not only more perfectly than heretofore, but in a much more simple manner. Jaw D is held against its stop d not only by spring d', which acts directly upon jaw D, but also by spring d^2, which acts directly upon both jaws D D′, forcing them apart and aiding spring d' to force jaw D against its stop d. Centrifugal force also tends to hold jaw D against its stop d when the clutch is not in use. When shaft a revolves, the spring d' is under compression, and its inner abutment is a shoulder on frame C and its outer abutment a pin fast to the shank of the jaw D, and its function is to force jaw D toward the adjustable stop d, so that as sleeve G is moved back jaw D is forced by spring d' against stop d, and when the motion of jaw D is thus arrested the farther movement of sleeve G (aided by the distending spring d^2, if one be used) will pull jaw D′ away from flange B; but as the outer pin f^2, through which power is applied to lever F, is held in a fixed position by its connections when the jaws are opened, jaw D′ cannot move pin f in the same direction, but pin f, being fast to jaw D, cannot so move, as jaw D is prevented from moving by stop d. On the other hand, jaw D′ cannot move toward flange B, when pin f^2 is held stationary, for in that case pin f', fast to jaw D′, cannot move toward flange B without carrying with it pin f fast to jaw D, and the stop d, which prevents the outward movement of jaw D, also prevents the movement of pin f toward flange B. When the clutch is not revolving, that jaw D which is uppermost cannot fall toward flange B because of the thrust-spring d', which in that case holds jaw D up against

stop d, and the force of these springs d' d^2 is sufficient to prevent any motion of the pin f away from or jaw D toward flange B while pin f^2 is fixed.

It will be plain that a variety of contrivances can be used to actuate the floating lever F, so as to open and close jaws D D'; but of the many I have contemplated I prefer the link g, connected to sliding sleeve G, which is connected by a third link g^2 to frame C; so that when sleeve G slides on frame C, link g^2 will compel link g to move in the arc dotted in Fig. 1, and this motion of link g will actuate lever F. This combination of lever F with sliding sleeve D by means of the links g g^2 is also one feature of my invention. In lieu of link g' to connect sleeve G with link g^2, a slot in sleeve G will answer, as shown in Fig. 4. To obtain the necessary adjustment and in order to compensate for wear, jaw D is made in two parts connected by stud d^3 and nut d^4. When the shoe of jaw D wears, nut d^4 can be screwed farther down on stud d^3, and thus bring the face of the shoe in proper relation with flange B. The spiral spring on stud d^3 aids in the adjustment, as will be clear without description.

In this class of clutch—that is, in which the jaws are operated by a floating lever—the upper pair of jaws shown in Fig. 1 would not be properly supported to keep the shoe of jaw D away from flange B when the shaft a was not revolving were it not for spring d', which tends to force jaw D against stop d. Although this is not the only practical way of sustaining the jaws when operated by a floating lever, I yet regard it as a feature of my invention of considerable importance, as this combination of two jaws with a stop to regulate the outward movement and a supporting-spring to preserve contact with the stop when the jaws are separated is a simple and effective contrivance for doing this work. Although the supporting-spring d' is of little or no use when the clutch is revolving, yet it is of great use during the adjustment of the clutch as well as when the force of gravity tends to move the jaws toward the shaft.

The operation is as follows: When sliding sleeve G is moved to clutch, link g^2 is forced to move in the arc of a circle by link g', and link g thereby forced to actuate floating lever F, so that jaw D' will be moved until it brings up against the inner surface of flange B and jaw D until it brings up against the outer surface of flange B, thus clamping flange B between the jaws D D'. When sleeve G is moved to unclutch, the springs d' d^2 assist lever F in separating the jaws and forcing jaw D against its stop d. The spring d^2 serves mainly to prevent rattle, and, while desirable, is manifestly like the spring between the two parts of jaw D—a matter of convenience merely.

What I claim as my invention is—

1. In a friction-clutch, the combination of a cylindrical flange, radial jaws, one opposite the inner and the other opposite the outer surface of the flange, and a lever pinned at three points only, the innermost pin connecting the lever to the inner jaw, the middle pin to the outer jaw, and the outermost pin to the actuating mechanism, all substantially as described.

2. In a friction-clutch, the combination of a cylindrical flange, radial jaws, one opposite the inner and the other opposite the outer surface of the flange, a sliding sleeve, two links of different lengths, the shorter link connected to the frame at one end and the longer link at the other end, and a lever pinned at three points only, the outermost pin connecting the lever with the longer link, the middle pin connecting the lever with the outer jaw, and the innermost pin connecting the lever with the inner jaw, all substantially as described.

3. In a friction-clutch, the combination of a cylindrical flange, radial jaws, one opposite the inner and the other opposite the outer surface of the flange, a stop to limit the outward movement of the outer jaw, and a thrust-spring tending to force the outer jaw against its stop, all substantially as described.

4. In a friction-clutch, jaw D, made in two parts, in combination with the adjusting-stud d^3 and means to hold the outer part of the jaw on the stud after the proper adjustment.

LOUIS J. HIRT.

Witnesses:
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JOHN R. SNOW.