No. 648,076. Patented Apr. 24, 1900.

E. LIKEN.

FRICTION CLUTCH.

(Application filed May 25, 1898.)

(No Model.) 3 Sheets—Sheet 1.

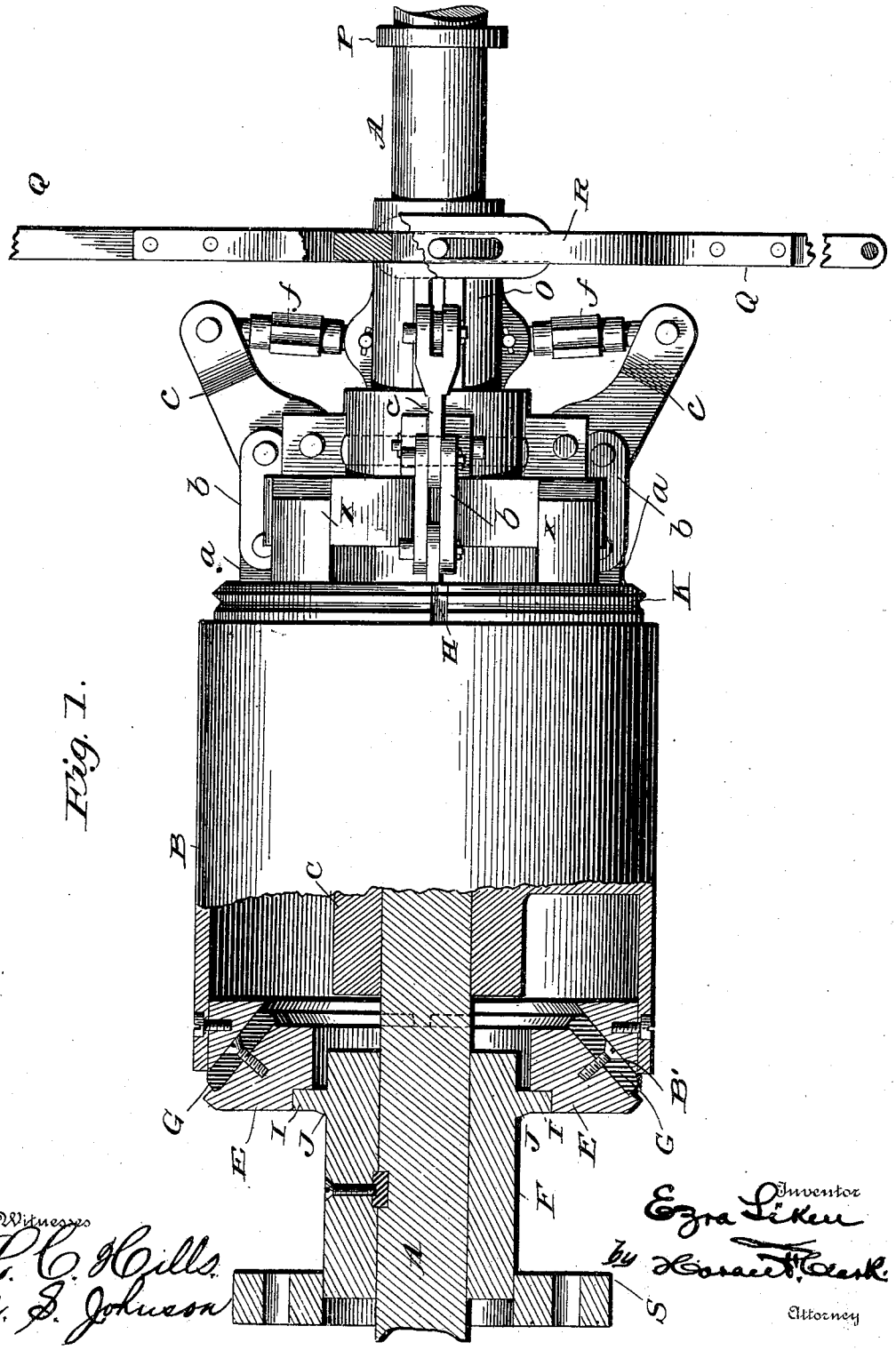

Fig. 1.

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3 Sheets—Sheet 2.

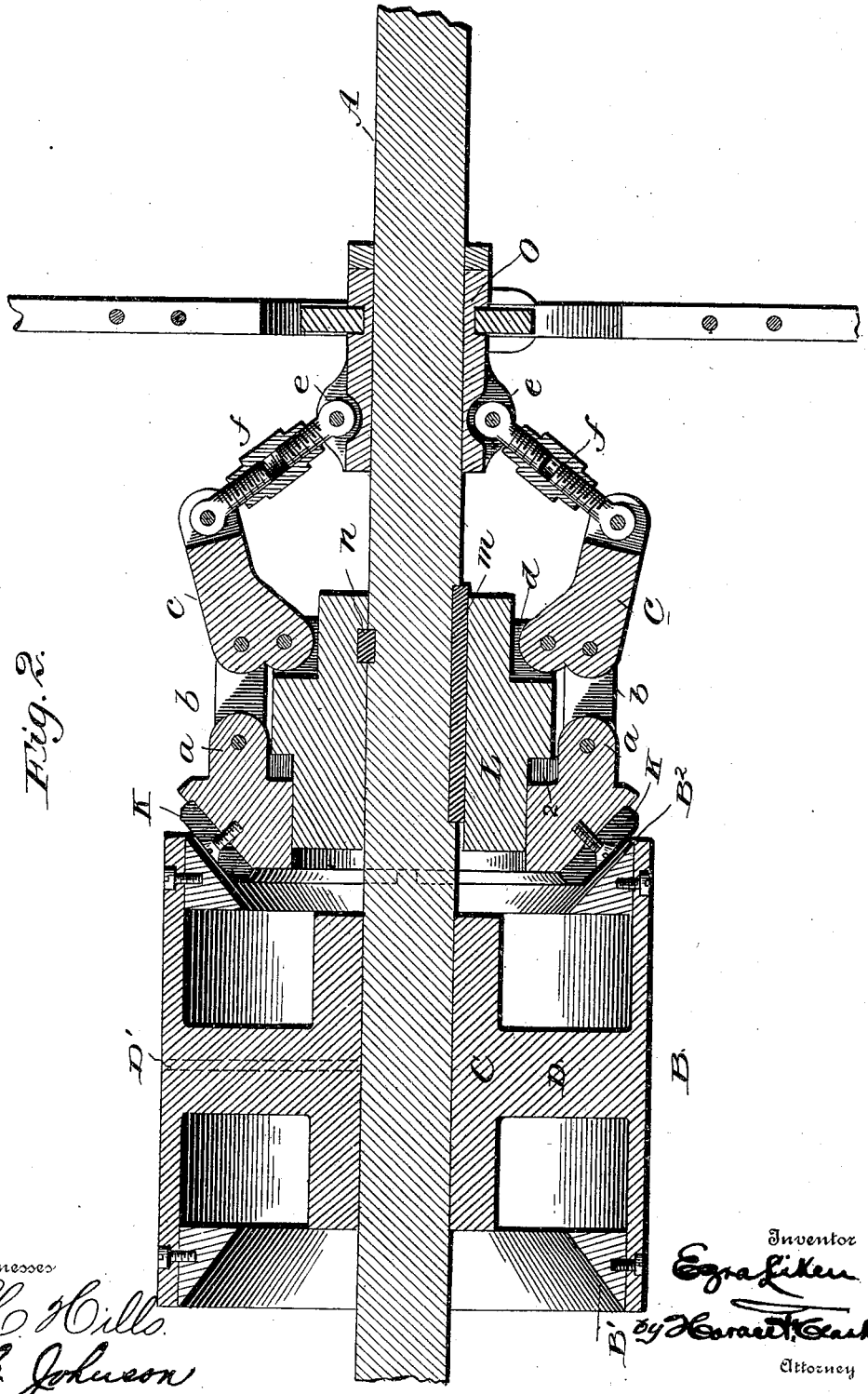

Fig. 2.

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Fig. 5.

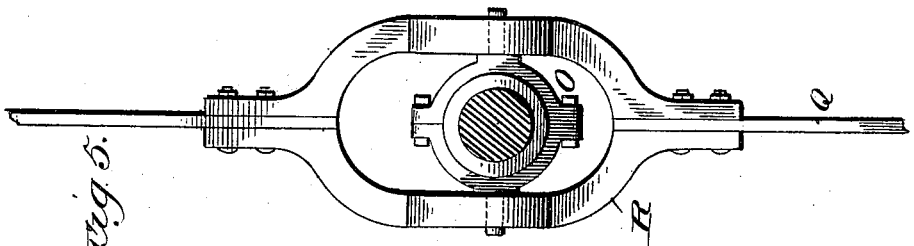


Fig. 4.

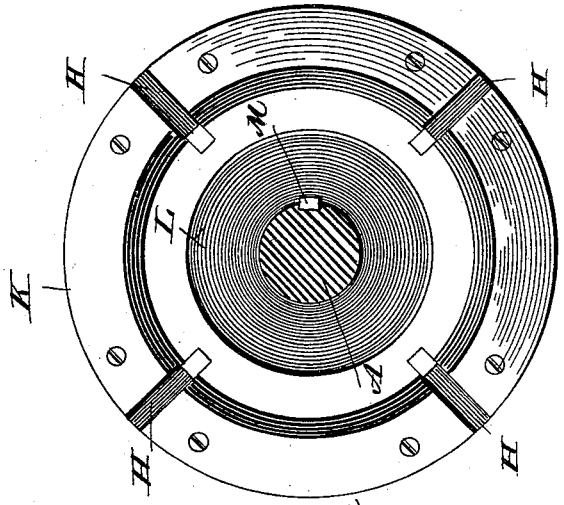
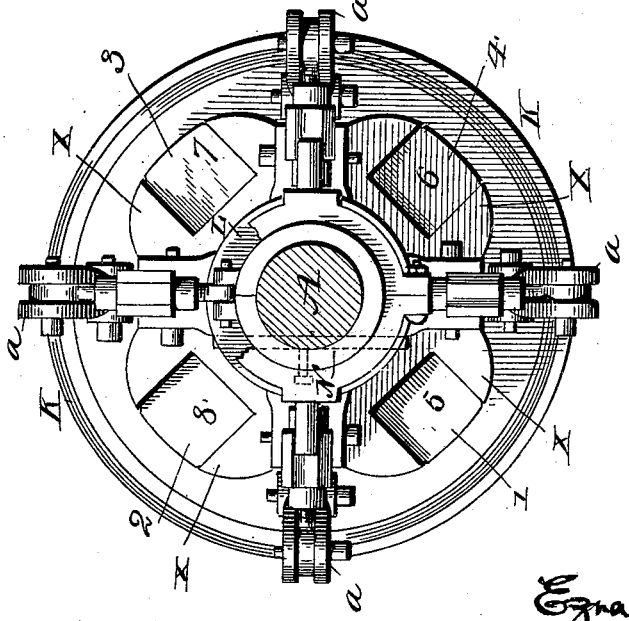


Fig. 3.



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UNITED STATES PATENT OFFICE.

EZRA LIKEN, OF BARKEYVILLE, PENNSYLVANIA.

FRICTION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 648,076, dated April 24, 1900.

Application filed May 25, 1898. Serial No. 681,685. (No model.)

To all whom it may concern:

Be it known that I, EZRA LIKEN, of the city of Barkeyville, in the county of Venango and State of Pennsylvania, have invented certain new and useful Improvements in Friction-Clutches, of which the following is a specification.

The object of the present invention is to provide a new and improved clutch mechanism, which while possessing all the characteristics of clutches now in use, is simple and durable in construction and very effective in operation.

With this object in view the invention consists of certain parts and details and combinations of the same, as will be hereinafter more fully described, and then pointed out in the claims.

The nature of the invention and the manner in which the same is or may be carried into effect can best be explained and understood by reference to the accompanying drawings, in which—

Figure 1 is a side elevation, partly in section, of a clutch mechanism embodying my invention. Fig. 2 is a central longitudinal section of the same. Fig. 3 is a view looking at the outer end of the movable or sliding clutch member with the shaft in section and showing the construction and arrangement of certain parts more clearly. Fig. 4 is an inner end view of the sliding clutch member with the shaft also in section and showing the connection between said member and its supporting-sleeve and also the construction of the frictional surface of said member, which engages a corresponding surface formed in the adjacent end of the loose pulley. Fig. 5 is an end view of the shifting-lever secured in place to its supporting movable sleeve.

Referring to the accompanying drawings, A is the shaft, on which is loosely mounted the pulley B by means of a hub C and intervening radiating spokes D, preferably located at about the center of the hub and pulley, respectively, with a view to better overcoming any danger of the pulley becoming loose upon the hub. The pulley is normally free to revolve on the shaft and to slide upon the same to some extent, and its two opposite ends B' and B^2 are made conical or tapering inwardly in shape. At a suitable point in the pulley is placed a tube D', which enters the hub also, for lubricating the shaft A.

E represents a fixed cone-faced clutch member, preferably secured to a sleeve F, keyed to the shaft A in close proximity to the end B' of the pulley B. This clutch member is fixed to the shaft A, so as to revolve therewith. Its inner end or face is made conical or tapering and has secured thereto a plurality of friction sections or segments G, (preferably four in number, as represented in Fig. 4,) which sections are secured to the face of the clutch member by screws, and these sections are separated by means of radially-inserted blocks or pieces H, which are set into the conical face of the clutch member a suitable distance, and against these pieces the ends of the sections G abut, so that the pieces H serve to brace and to prevent the said sections G from becoming loose about the screws which secure them in place. These radial pieces H, when set into the conical face of the clutch member and between the sections G, are so disposed that they do not form ribs, but rather are flush with the wearing-surfaces of the said sections G. It will also be understood that in case any one of the sections should become damaged or loosened upon the screws another section can be substituted for it in a very short time and at slight expense without removing or in any way affecting the remaining sections or dismembering the apparatus, which would be necessary were the conical surface of the clutch member made in a solid ring. In order to provide against any accidental longitudinal movement or sliding of the clutch member E upon the sleeve F, I have interposed between the sleeve F and said member E a series of braces or supports I, (of any suitable construction,) so as to withstand the strain occasioned by the pressure of the pulley against the clutch when the machine is in operation. Upon the opposite end of the pulley B and in close proximity to its conical end B^2 is mounted the sliding clutch member K, the adjacent end of which is also conical and made in all respects similar to that of the companion or oppositely-arranged clutch member E, and hence needs no further description. The sliding clutch member K is mounted on a sleeve L, which is fixed upon

shaft A by means of a longitudinal key M, set in the shaft A, and cross-pin N, passing through said sleeve and into a cross-groove in the shaft A, as seen in Figs. 2, 3, and 4. In this manner the sleeve is prevented from revolving on the shaft or from sliding thereon. Secured to or formed integral with the sleeve L are four radial projections X, equidistant apart and having guideways 1 2 3 4 formed therein. The radial projections X extend outwardly from the fixed sleeve L and are adjacent to the rear face of the sliding clutch member K. The ring-like or sliding annular clutch member K is provided on its rear face with rearward-extending guide-pieces 5, 6, 7, and 8, preferably square in cross-section, and arranged to fit in the guideways or recesses 1 2 3 4 in the said adjacent projections X, in which guideways they are free to slide longitudinally. The projections X strengthen and reinforce the sleeve L against rupture, and the means for connecting this sleeve with the sliding clutch member K are particularly advantageous in that the power from the shaft A to rotate the clutch member is applied well toward the periphery of the clutch and is applied through means not liable to break or get out of order.

To the outer end of the clutch member K is fixed at equal distances apart four pairs of lugs or bearings *a*, with which are connected links *b*, which connect with inverted-L-shaped levers *c*, which latter also connect with lugs *d*, fixed on the sleeve L. The outer and upwardly-projecting ends of the said inverted-L-shaped levers are connected with lugs or ears *e* on the inner end of sleeve O by means of movable adjusting devices *f* for regulating the degree of friction between the clutch members and the loose pulley. Said devices consist of right and left hand screws and an adjusting-sleeve having a right and left hand screw-threaded bore or opening, in which the ends of the screws are received.

A collar or follower P is placed upon the shaft A and adapted to slide thereon to gage and prevent the movable sleeve O from being drawn out too far.

Q is a shifting-lever secured to the shaft A at a suitable point by means of a yoke R and is adapted when properly pivoted to a suitable bearing to cause the sleeve O to slide backward and forward upon the shaft A for throwing into or out of operative connection the several parts of the clutch mechanism.

S is a fixed disk upon the end of the shaft A and adapted to be secured to a gas-engine or other motive power.

The pulley as herein constructed by me can be connected directly to the hub of a gas-engine or used on an extension-shaft for running any kind of machinery.

It will be observed that in Fig. 1 the clutch members are shown in contact with the pulley, which brings the sleeve O well down on the shaft A and extends the inverted-L-shaped links, while in Fig. 2 the clutch members are out of contact, which requires the exact opposite movement of the sleeve O and the connecting-links hereinbefore referred to.

The operation of this class of friction-clutches is so well known to those skilled in the art that no further description of the *modus operandi* of the clutch forming the subject-matter of the foregoing specification is deemed necessary.

Having now described my invention and the best way known to me for carrying the same into effect, what I claim, and desire to secure by Letters Patent, is—

1. The combination with a shaft and a loose pulley thereon provided with a friction-face, of a sliding annular clutch member having a friction-face adapted to engage with the friction-face of the pulley, and provided upon its rear face with rearward-extending guide-pieces, a sleeve fixed to the shaft and provided with projections, extending outward from the said sleeve and adjacent to the rear face of the sliding clutch member, in which are formed guideways for the rearward-extending guide-pieces of the sliding clutch member, and means for sliding the clutch member, substantially as set forth.

2. The combination, with a shaft and loose pulley thereon provided with a friction-face, of a sliding annular clutch member K having a friction-face adapted to engage with the friction-face of the pulley, and provided with guide-pieces 5, 6, 7, and 8, extending rearward from the rear face of the said clutch member, near the periphery thereof, and provided also with lugs, a sleeve L secured to the shaft and provided with outward-extending projection X adjacent to the rear face of the sliding clutch member, in which projection are formed guideways fitted to receive the said guide-pieces of the clutch member, and means for sliding the clutch member substantially set forth.

3. The combination, in a clutch of the character described, of a loose pulley mounted upon a shaft having a clutch-face, a clutch member adapted to engage therewith and having a conical or tapering face, friction segments or sections G detachably secured to such conical face of the clutch member, radially-disposed blocks or pieces H inserted into the clutch-face between the ends of the segments G, with which ends they abut to prevent the segments moving or becoming loose upon the screws, the said pieces H being flush with the segments G to form a continuous friction wearing-face, and means for sliding the clutch member, substantially as set forth.

In testimony whereof I have hereunto set my hand this 19th day of May, 1898.

EZRA LIKEN.

Witnesses:
FRANK KOHLER,
WALTER L. GRAHAM.