

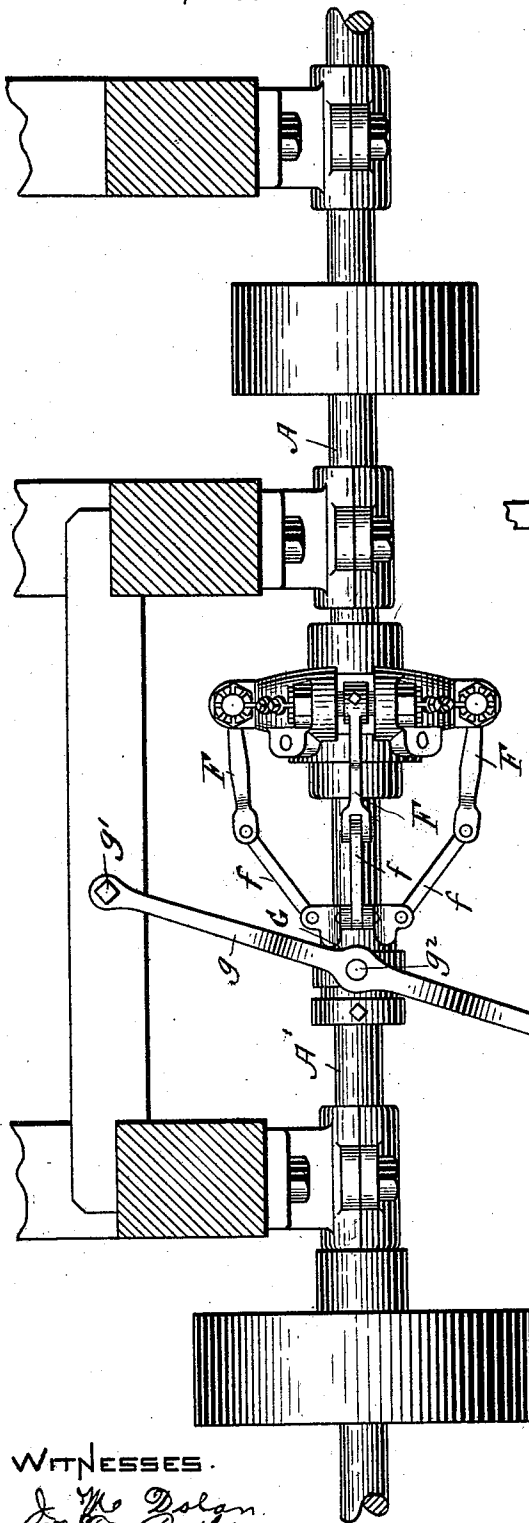
(No Model.)

D. G. LANGLANDS.  
CLUTCH.

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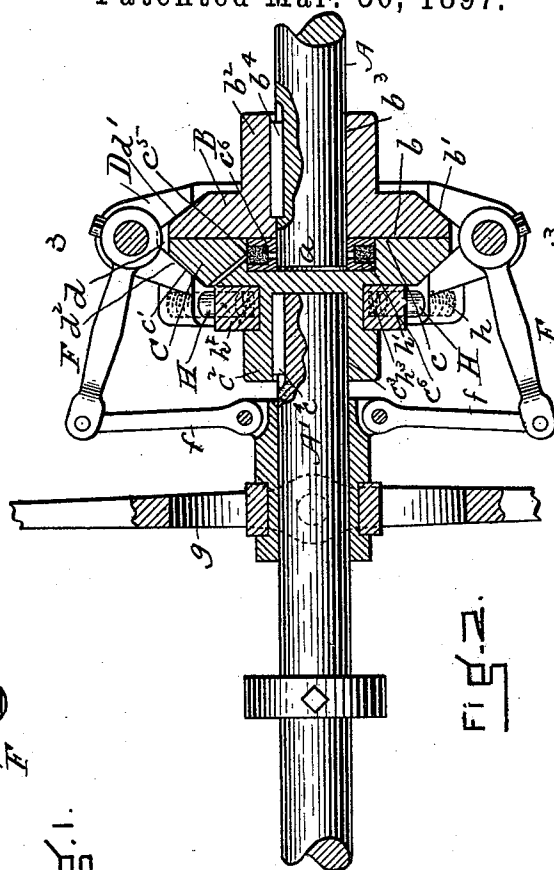
No. 579,713.

Patented Mar. 30, 1897.

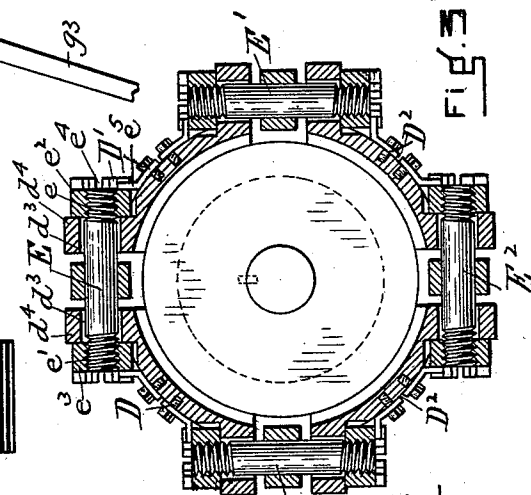


WITNESSES.

J. M. Dolan  
Butler.



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*INVENTOR*  
*Daniel B. Langhorne*  
*by his Attys Charles & Raymond*

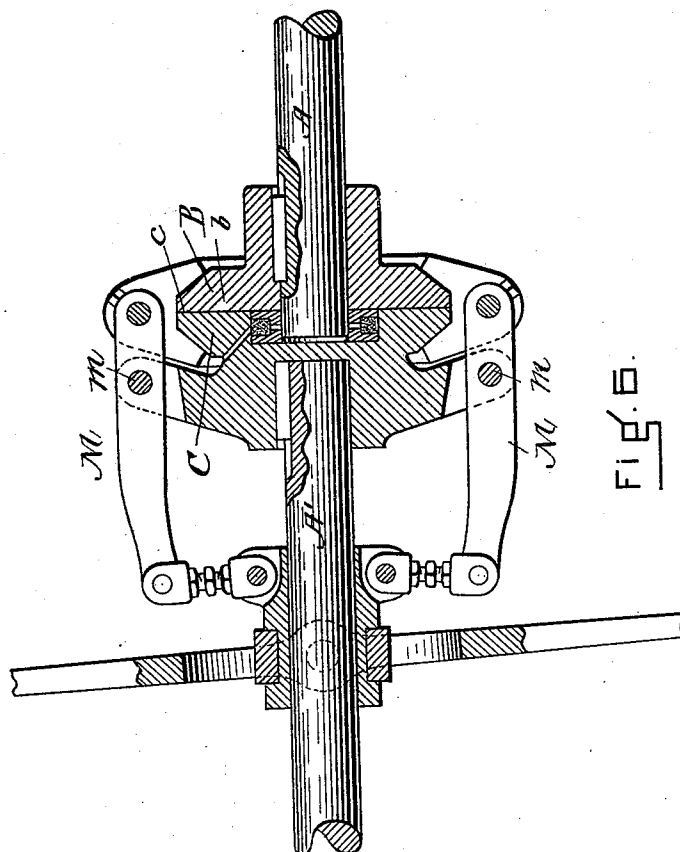
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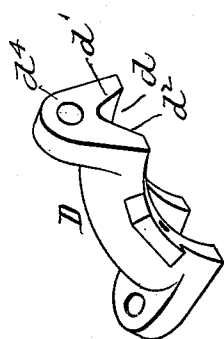
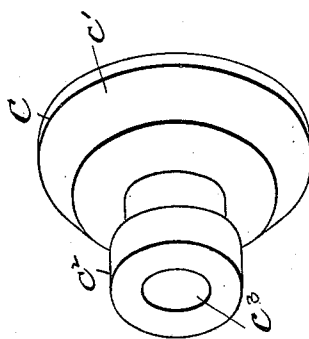


Fig. 4.



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WITNESSES.

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# UNITED STATES PATENT OFFICE.

DANIEL G. LANGLANDS, OF WINTHROP, MASSACHUSETTS.

## CLUTCH.

SPECIFICATION forming part of Letters Patent No. 579,713, dated March 30, 1897.

Application filed March 2, 1896. Serial No. 581,474. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL G. LANGLANDS, a citizen of the United States, residing at Winthrop, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Clutches, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to an improvement in clutches of the class known as "frictional" clutches; and it comprises a member or disk upon the driving shaft or pulley having a flat face and a tapering surface at or near its outer edge, and a second member or disk having a flat face and an inclined surface at or near its outer edge and attached to the driven shaft or pulley, the two members being arranged at the ends of their respective shafts to face each other and being combined with two or more shoes, each having in its inner face a curved tapering recess, the inclined sides of which are adapted to be brought into contact with the tapering surfaces of the disks by the closing of the shoes upon the same.

The invention further relates to means for attaching the shoes and for operating them, all of which will be hereinafter described.

In the drawings, Figure 1 is a view in side elevation representing the application of my invention to a line of shafting. Fig. 2 is a view of the clutch enlarged, in vertical central section, also showing, principally in elevation, the ends of the shafts. Fig. 3 is a view in vertical section upon the dotted line 3 3 of Fig. 2. Fig. 4 is a view in perspective of a single shoe. Fig. 5 is a view in perspective of one of the sections or members of the clutch. Fig. 6 is a view in vertical section representing a slight modification in the means for actuating the shoes, to which reference will hereinafter be made.

In the drawings, A represents the driving-section of the shaft-line and A' the driven section thereof. At or near the end of the driving-section there is secured the disk or clutch member B. It has the flat face  $b$  and the inclined or tapering surface  $b'$  extending around its back near its outer edge. It also has a hub  $b^2$  and a hole  $b^3$ , which receives the end of the shaft. The hub is attached to the

shaft by a key  $b^4$ . To the end of the driven section A' of the shaft is secured the clutch member or disk C. This has the flat face  $c$ , the tapering or inclined outer surface  $c'$ , which extends continuously about it, and the hub  $c^2$ , in which there is a hole  $c^3$  for receiving the end of the shaft, to which it is attached by a key  $c^4$ . This clutch member or disk may also have extending from its face  $c$  an annular recess  $c^5$  for holding a ring, sleeve, or bushing  $c^6$ , adapted to receive and center the end  $a$  of the driving-shaft.

One or both members or disks have a slight endwise movement upon its or their shafts, in order that the two faces  $b$   $c$  may be brought into contact with each other. In the drawings D D' D<sup>2</sup> D<sup>3</sup> represent the clutch-shoes. They are alike in shape and construction and form an adjustable binding-ring which encircles the said clutch members or disks B C. Each one has the curved tapering or wedge-shaped recess  $d$ , the inclined surfaces  $d'$   $d^2$  of which are of the same angle as the inclined surfaces  $c'$   $b'$  of the clutch members or disks and are adapted, upon the reduction of the diameter of the outer ring, to be closed upon said surfaces and held closed upon them, thereby forcing the two members of the clutch together and also uniting them by means of the binding action of the inclined surfaces of each shoe upon the inclined or tapering surfaces of the clutch members. It is desirable that these shoes should be simultaneously moved inward to obtain clutching engagement and outward to release the clutch, and I have represented as one means of accomplishing this the employment of the screws E E' E<sup>2</sup> E<sup>3</sup>. Each of these screws has a right-handed thread  $e$  at one end and a left-handed thread  $e'$  at the other, and each passes through holes  $d^3$  in the ears  $d^4$  upon the shoes D, which are in line with each other, it being understood that each shoe is provided at its end with an ear of this character, so that when assembled the ear of one at each end will come opposite the corresponding ears of the next shoes in order, and upon the outer side of each of these ears there is a nut  $e^2$   $e^3$ , with which the right and left screw-thread of the screw engages and which are held from turning by any desired means.

In the drawings I have represented the nuts

as having notches  $e^4$  upon their outer edge, and each nut has entering one of these notches or recesses a locking-finger  $e^5$ , removably secured to the shoe. This construction not only provides means for locking the nuts, but also a way of adjusting them.

The ears  $d^4$   $d^4$  are separated from each other sufficiently to permit the attachment to each screw of a lever or arm F, which arms preferably extend laterally from the screws and the clutch, as represented in Fig. 1, and are connected at their outer ends with a sleeve G, mounted upon the driven shaft A', to be moved thereon by the links  $f$ . This sleeve is moved upon the shaft by means of the lever  $g$ , pivoted at  $g'$ , connected at  $g^2$  with the sleeve and having an extension  $g^3$ . The movement of the sleeve toward the clutch causes the arms or levers F to be moved from the position represented in Fig. 1 to that represented in Fig. 2 and causes the screws to be turned sufficiently to bring together upon the members CB of the clutch the shoes D D' D<sup>2</sup> D<sup>3</sup>, moving them inward simultaneously thereon and holding them in their closed position.

The links  $f$  may be made adjustable as to length, if desired. The shoes are also connected with the member C of the clutch by means of the pins H, each shoe having a laterally-extending ear  $h$ , from the inner surface of which extends inward the said pins, the pins entering the holes  $h'$  in a collar  $h^2$ , carried by the hub  $c^2$  and free to turn thereon. Compression-springs  $h^3$  in the holes  $h'$  bear against the inner ends of the pins and serve to press them outward. The object of this part of the clutch is to provide means for holding the shoes slightly removed from the clutch members or disks when the clutch is inoperative and also to permit the clutch to turn to any extent desired upon the driven shaft. In other words, it will be seen that the shoes are so attached to the driven shaft A' that they are entirely free to turn upon it, and this is very desirable, because it provides a more uniform wear of the bearing-surfaces of the shoes and clutch members than would otherwise be attained.

While I have described the use of four shoes, I would not be understood as so limiting the invention, as there may be used a less or a greater number. Neither would I be limited to specific means for opening and closing the shoes, as there are other devices which can be employed therefor, and one of them I have represented in Fig. 6, where the shoes are represented as carried at the ends of levers M, pivoted at  $m$  to brackets or supports extending from the hub of the clutch member C, the said levers being operated by a sliding collar and connecting-links and the levers making engagement with the shoes by means of ears and a cross-pin. Slight play may be provided in the pin-holes of the lever, either at the fulcrum or where it engages the shoe, for the purpose of permitting the con-

tacting surfaces of the shoe to center themselves upon the tapering surfaces of the clutch members.

The opposing faces  $b$   $c$  of the clutch members may be of any desired extent and are not necessarily flat, although better so. The clutch may be used for making any of the usual connections for which clutches are generally employed, and one member may be formed upon or attached to a driving or driven wheel or pulley.

The advantages of the invention arise from the simplicity of the construction, from the superior binding effect produced by the shaping of the clutch members and shoes as specified, from its uniform wearing properties, and also from its flexibility and freedom from wearing points and breaking strains.

In operation the closing of the shoes causes the faces of the clutch members to be forced into contact with each other, while at the same time the inclined surfaces of the shoes act upon the inclined surfaces of the clutch members and are so held to continue the engagement of the two members. Upon their outward movement the two members are released and the shoes held from dragging upon the clutch members by means of their supporting-springs.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination in a clutch for connecting and disconnecting power-shafts of a driving member B attached to the end of one shaft and having a flat face  $b$  and an inclined surface  $b'$  at its outer edge, a driven member C fast to the end of another shaft in line with the first-named shaft and having the flat face  $c$  and the inclined surface  $c'$  at its outer edge, clutch-engaging shoes upon the exterior of said members B, C, having the inclined inner surfaces  $d'$ ,  $d^2$ , means for moving said shoes slightly from the inclined surfaces of the clutch members and for holding them so removed carried by one of the shafts, and devices for closing said shoes against the clutch members and for holding them closed and for opening said shoes also carried by one of the shafts and means for operating said opening and closing devices from a stationary point while one or both shafts are revolving, as and for the purposes set forth.

2. The combination of the clutch members B, C, having the inclined surfaces as specified, the shoes having the inclines  $d'$ ,  $d^2$  and the collar  $h^2$  to which the shoes are yieldingly secured, as and for the purposes described.

3. The combination of the clutch members B, C, having the inclined surfaces  $b'$ ,  $c'$ , the shoes having the inclined surfaces  $d'$ ,  $d^2$  and the ears  $h$  extending laterally from the sides of the shoes, the pins H carried by the said ears and extending inwardly into the holes  $h'$  in the collar, and a spring in each of said holes to act against said pins.

4. The combination of the clutch members B, C, having the inclined or tapering surfaces, the shoes having inclined or tapering surfaces to close upon the inclined or tapering surfaces of the clutch members, the collar  $h^2$  which is free to turn upon its support, and yielding connections between it and the shoes, substantially as and for the purposes described.

5. The combination in a clutch of the members B, C, having the inclined surfaces  $b'$ ,  $c'$ , shoes surrounding said clutch members, having the inclined surfaces  $d'$ ,  $d^2$ , means for sustaining the shoes in their open position free to turn with the shoes, upon its support, and shoe-actuating devices also free to turn upon their support, as and for the purposes described.

6. The combination of the clutch members B, C, having inclined surfaces, the shoes arranged to surround the clutch member, and having the inclined surfaces  $d'$ ,  $d^2$ , to engage the inclined surfaces of the clutch members, the shoe operating right and left screws connected with the shoes as specified, their turning arms F, the links  $f$ , the sliding sleeve G, and a device not turning with the shaft for

moving said sleeve, as and for the purposes described.

7. In combination with the clutch members shaped as specified, the surrounding shoes, each of which has ears  $d^4$  provided with holes  $d^3$  and adjustable nuts  $e^2$  stationarily held, the screws connecting the shoes as specified, with means for turning the screws, substantially as and for the purposes set forth.

8. The combination of the clutch member C, fixed to the shaft A', carrying a collar  $h^2$  free to turn thereon, said collar, and a number of shoes yieldingly supported thereby, a bearing in the face of said clutch member for the shaft A, the said shaft and the clutch member thereon, the clutch members engaging each other and having inclined surfaces as specified, and the shoes having inclined surfaces to engage the inclined surfaces of the clutch members, all as and for the purposes set forth.

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Witnesses:

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