

(No Model.)

2 Sheets—Sheet 1.

J. F. McLAUGHLIN.
FRICTION CLUTCH.

No. 468,682.

Patented Feb. 9, 1892.

Fig. 1.

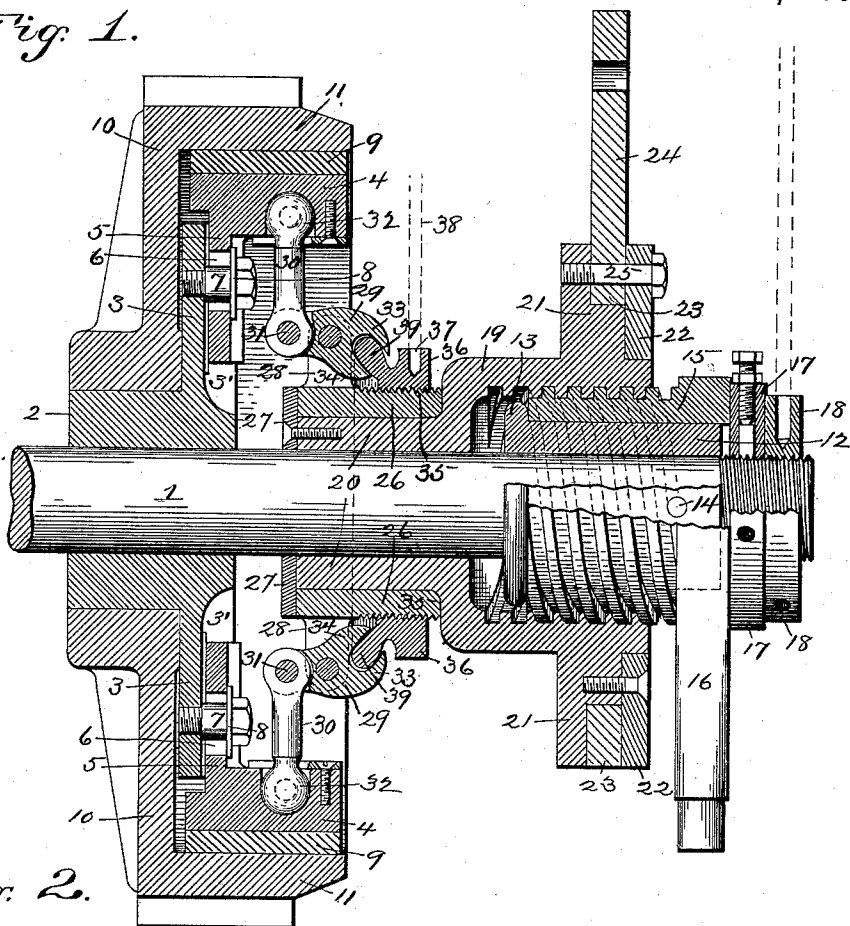
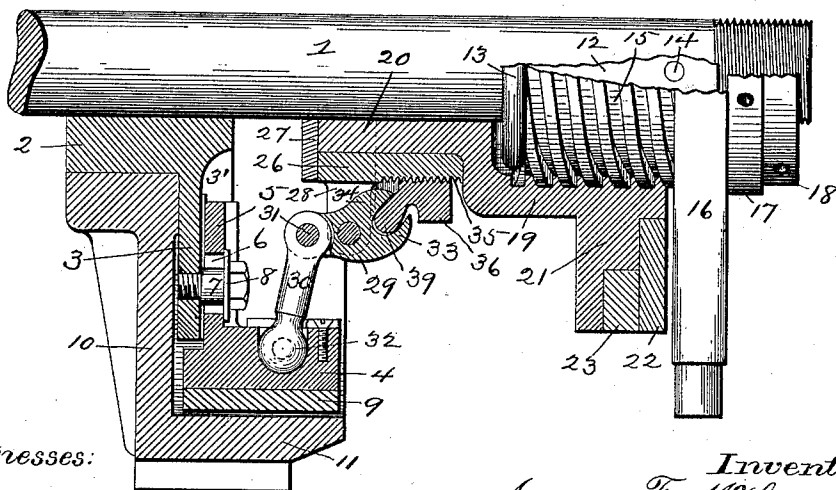


Fig. 2.



Witnesses:

Rich. C. Bowen
F. T. Chapman

Inventor:

James F. McLaughlin

By Joseph Lyons

Attorney.

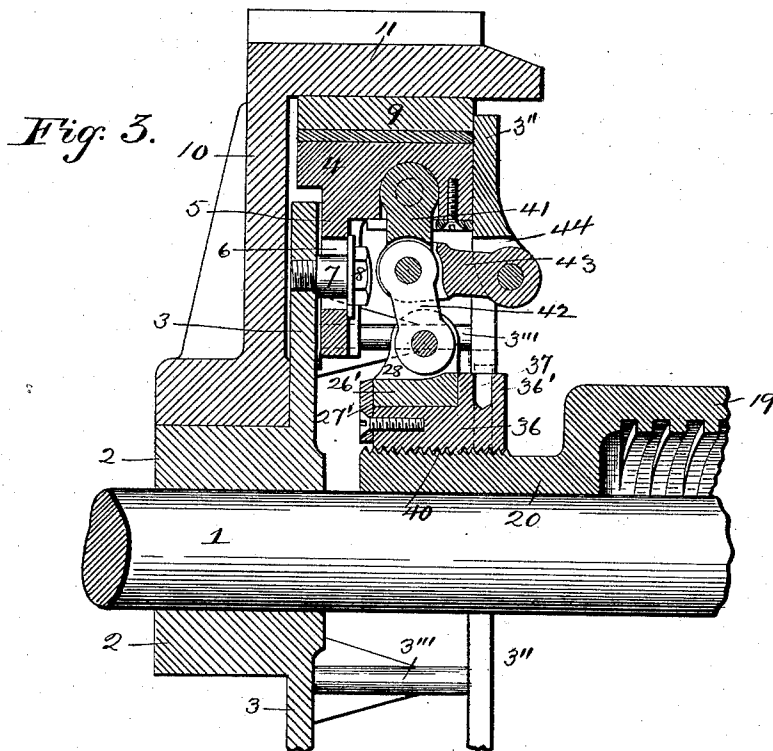
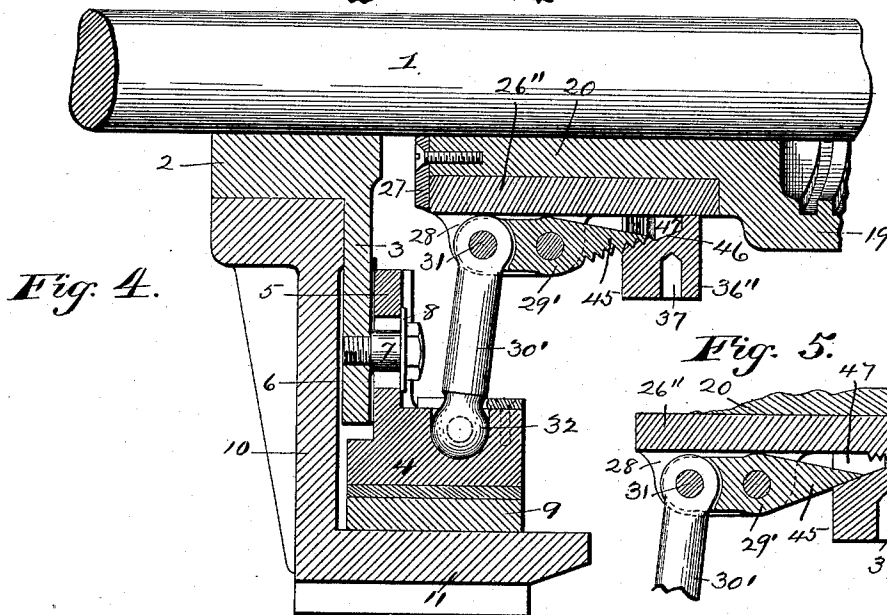
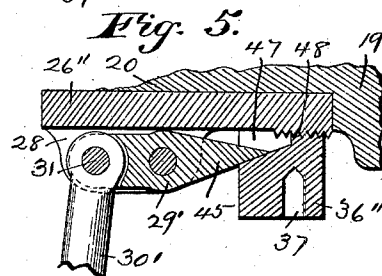
(No Model.)

2 Sheets—Sheet 2.

J. F. McLAUGHLIN.
FRICTION CLUTCH.

No. 468,682.

Patented Feb. 9, 1892.



Witnesses;

Wm. C. Bowers.
H. T. Chapman

Inventor;

James F. McLaughlin.
By *Joseph Lyons.*
Attorney.

UNITED STATES PATENT OFFICE.

JAMES F. McLAUGHLIN, OF PHILADELPHIA, PENNSYLVANIA.

FRICITION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 468,682, dated February 9, 1892.

Application filed August 21, 1891. Serial No. 403,305. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. McLAUGHLIN, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Friction-Clutches, of which the following is a specification.

This invention has reference to improvements in friction-clutches, its object being to provide a means for quickly and conveniently adjusting the clutch-shoes to compensate for wear.

In Letters Patent No. 451,653, granted to me on May 5, 1891, I have shown a clutch consisting, essentially, of radial clutch-shoes interposed between the driving member and the part to be driven, toggles connected to the clutch-shoes, and a screw mechanism, which in the patent is termed a "screw-fed shifter," for operating the toggles and through them the clutch-shoes. In the construction shown in the said Letters Patent the toggles were each made in two parts united by a nut, so that each toggle could be lengthened, when necessary, to take up the wear of the clutch-shoes. This construction required the separate adjustment of each toggle, which operation I have found to be inconvenient and uncertain on account of the number of toggles to be separately adjusted and the likelihood of unequal adjustment and consequent unequal wear of the clutch-shoes. In addition thereto the separate adjustment of each toggle requires that a wrench or other specially-formed tool be applied to the toggle-arms in narrow places difficult of access and ordinarily hidden from inspection. The operator therefore is obliged to grope, as it were, in the dark and to be guided more by his sense of touch than by sight, and he must have thorough knowledge of the construction of the clutch mechanism in order to succeed at all in adjusting with any degree of accuracy and uniformity. These objections are entirely overcome by the present invention, according to which the several toggles, together with the clutch-shoes, are adjusted to take up wear simultaneously and equally and with the greatest ease and comfort.

The improved adjusting mechanism is fully

illustrated in the annexed drawings, forming part of this specification, in which—

Figure 1 is a longitudinal section, partly in elevation and partly broken away, of a clutch embodying the present invention, the clutch-shoes being shown in the expanded or "engaged" position. Fig. 2 is a similar section embracing only those parts shown in the lower half of Fig. 1, the clutch-shoes being shown in the retracted or disengaged position; and Figs. 3, 4, and 5 are sections of a portion of the clutch, showing modified forms of the invention.

The clutch illustrated in the drawings is, in the main, identical with that shown and described in the aforesaid Letters Patent. For this reason those portions of the clutch that are described in the said Letters Patent are not herein described in detail further than is necessary for a clear understanding of the relation of the wear-compensating mechanism thereto and of the operation of the clutch as a whole.

In the drawings there is shown a shaft 1, which may be either the drive or driven shaft. On this shaft is keyed or otherwise secured a hub 2, provided at one end with an annular flange 3, to which latter are secured a number of equidistant radial clutch-shoes 4, each formed with a shank 5. Passing through a slot 6 in the shank 5 of each clutch-shoe there is a bolt 7, screwed into the flange 3 and confining the shank 5 between the said flange and a washer 8, interposed between the said shank and the head of the bolt. The bolt thus holds the clutch-shoe to the flange 3, but permits it to move freely in a radial direction, suitable guides 3' being formed on the flange 3 to prevent lateral movement. Each clutch-shoe is provided with a wooden or other bearing-face 9, which may be replaced when worn out. Loosely mounted on the hub 2 there is a gear or pulley 10, having a peripheral annular flange 11 of sufficient width to inclose the clutch-shoes, so that when the latter are moved into contact with the inner face of said flange the shaft 1 and gear 10 are coupled together and one will drive the other. On the shaft 1, at a distance from the hub 2, there is a sleeve 12, provided at one end with an annular flange 13 and secured to the shaft

by a pin 14 or otherwise. On this sleeve there is another sleeve 15, having a greater portion of its outer surface screw-threaded, as shown, and near one end it is provided with an arm 16, projecting at right angles from it and designed to be engaged by some fixed structure to hold the sleeve 15 against rotation. One end of the sleeve 15 abuts against the flange 13 on the sleeve 12 and the other end abuts against a nut 17, which, together with a lock-nut 18, is screwed on one end of the shaft 1. Surrounding the screw-threaded part of the sleeve 15 there is an internally-threaded sleeve 19, provided with a reduced portion 20, forming a neck fitting the shaft 1 intermediate between the sleeve 12 and hub 2. The sleeve 19 is provided with a shouldered flange 21, to which is applied an annulus 22 in such manner as to confine a ring 23 against the flange 21. This ring 23 is extended into an arm 24 and is prevented from moving independent of the said flange 21 by a bolt 25, as shown in Fig. 1. It will be readily understood that when the lever 24 is moved in one direction it will unscrew the sleeve 19 from the sleeve 15, and thereby force the former toward the hub 2, and by means of suitable connections—such as toggle-levers between the said sleeve 19 and clutch-shoes 4—will force the latter into engagement with the flange 11 of the gear 10, and thereby clutch the same to the shaft, while a movement of the lever 24 in the opposite direction will retract the clutch-shoes, and thereby unclutch the gear and shaft.

The operation of clutching and unclutching the gear and shaft ultimately so wears away the bearing-faces of the clutch-shoes that the latter will not be brought into firm contact with the bearing-face of flange 11 of the gear 10 and the clutching action will therefore be uncertain.

In the construction shown and described in the aforesaid Letters Patent, when the clutch-shoes become worn, it is necessary to lengthen the toggles employed in such clutch to compensate for the wear of the shoes, and in order to do this each toggle is adjusted separately for this purpose.

It will be readily understood that in adjusting each toggle separately there is liability of adjusting them to different lengths, so that when expanded the clutch-shoes will not all engage the flange 11 of the gear 10 equally, and consequently they will wear unequally, thus impairing the utility of the clutch.

One form of the improved mechanism for taking up the wear of the clutch-shoes uniformly is shown in Figs. 1 and 2, to which reference is now made.

On the neck 20 of the sleeve 19 there is a collar 26, free to rotate but held against longitudinal movement by a washer or annulus 27, secured to the free end of the neck. This collar is provided with a number of pairs of ears 28, radiating from it, all similar to the construction shown in the aforesaid Letters

Patent. Pivoted between each pair of ears 28, about midway of its length, is a short rock-lever 29, one end of which is bifurcated to receive one end of a toggle 30, pivoted to said rock-lever by a pin 31. The other end of the toggle 30 has a ball-and-socket connection 32 with the corresponding clutch-shoe 4, like that shown in the aforesaid Letters Patent; or it may have a simple pivotal connection therewith, as indicated in dotted lines, in which latter instance it will be understood that the end of the toggle is suitably formed for this purpose. The rock-lever 29 has its other end formed into two fingers 33 34, for a purpose which will hereinafter appear. The collar 26 has a portion of its exterior surface screw-threaded, as shown at 35, to receive a nut 36, which latter is provided with a number of radial sockets 37 (one only being visible in the drawings) for the reception of a pin 38 (shown in dotted lines, Fig. 1) or other tool, by means of which the nut may be screwed along the collar 26, as desired.

Projecting at an angle from one side of the nut 36 there is an annular rib 39, constructed to fit between the fingers 33 34 of the rock-lever 29. This annular rib 39 is rounded on both sides and at the edge, as shown, and the inner faces of the fingers 33 34 of each of the rock-levers 29 are shaped to conform approximately to the shape of the said rib. It will be observed that the fingers 33 34 project from the rock-levers 29 at an angle, so that the said levers are in effect bell-crank levers, and when the nut 36 is screwed on the sleeve 26 in a direction to cause the rib 39 to bear against the fingers 34 the rock-levers will be turned on their pivots and force the toggles 30 and clutch shoes 4 radially outward. Thus when the bearing-faces of the clutch-shoes have become so worn by friction with the flange 11 of the gear 10 that the clutching action is uncertain, it is only necessary, in order to take up the wear and restore the efficiency of the clutch, to insert the pin 38 in one of the sockets 37 in the nut 36, and by turning the latter adjust the clutch-shoes simultaneously and equally. This operation of adjusting the clutch-shoes for wear is performed with great ease and certainty and in a very few moments and without removing the clutch or any portion of the same. The adjustment may be repeated many times before the limit of travel of the nut 36 is reached, by which time the facings of the clutch-shoes are worn out and it becomes necessary to replace them by new ones.

From the foregoing description it will be understood that the mechanism for shifting the clutch-shoes consists of the lever 24, the screw-threaded sleeve 19, the loose sleeve 26, the nut 36, with its flange 39, the rock-levers 29, and the toggles 30, and that motion is transmitted from one to the other of these parts and finally to the clutch-shoes, both when the latter are applied and when they are withdrawn. The flanged nut 36 therefore

is a part of the shifting mechanism, and, as has been explained, it is at the same time a part of the wear-compensating mechanism, having a rectilinear reciprocating movement when operating as a part of the former and an independent screw movement when operating as a part of the latter.

Referring now to Fig. 3, there is shown a modified form of the toggle connections and wear-compensating mechanism. In this construction there is connected with the flange 3 an annulus 3'', parallel to the plane of the flange 3 and held in this position by rods or stays 3'''. The nut 36 is mounted directly on the neck 20, which is externally screw-threaded for this purpose, as shown at 40. A collar 26' is placed on the nut 36, so as to rotate freely thereon, but is held against longitudinal movement by an annular flange 36' at one end of the nut and by a washer or annulus 27' secured on the other end of the same. The collar 26' in the construction shown in Fig. 3 is shorter than the similar collar 26 (shown in Figs. 1 and 2) and the screw-threads are omitted. The toggle consists of two links 41 42, pivoted together at one end, the link 41 being pivoted at the other end to or connected by a ball-and-socket joint 32 with the clutch-shoe 4 and the link 42 being pivoted to the collar 26' between the ears 28 thereon. Pivotaly connected at one end to the toggle at the junction of the two links 41 42 is another link 43, pivoted at its other end to an arm 44, projecting from the annulus 3'', which, as has been described, is rigidly connected with the flange 3 by the rods 3'''. It will be readily understood that as the sleeve 19 is moved toward the hub 2 it tends to straighten all the toggles simultaneously, and thereby forces the clutch-shoes into engagement with the flange 11 on the gear 10, and a reverse movement of the sleeve 19 will retract the clutch-shoes by shortening the toggles. The adjustment for wear is effected by screwing the nut 36 toward the free end of the neck 20, thus tending to straighten all the toggles at once, so that the clutch-shoes are all brought simultaneously closer to the flange 11 of the gear 10.

Referring now to Fig. 4, there is shown still another form of wear-compensating mechanism embodying the invention. In this form the toggles 30' are similar to the toggles 30 shown in Figs. 1 and 2. There is also a loose collar 26'' on the neck 20 of the sleeve 19, the same being longer than the collar 26 before described and without screw-threads on its exterior. Rock-levers 29' are pivoted between ears 28 on the collar 26'' and are each connected at one end to one of the toggles 30', as shown. Each rock-lever has its other end 45 tapered as shown, and this tapered end engages the beveled face 46 of an annular recess 47, formed in one side of a nut 36'', fitted to rotate and slide freely on the collar 26''. The beveled face 46 of the nut 36'' is screw-threaded, as shown, and engages screw-threads

cut on the tapered end of the rock-levers. It will be readily understood that when the nut 36'' is rotated in the proper direction it will be screwed onto the tapered ends of all of the rock-levers at the same time and will force them inward toward the collar 26'', thus moving their other ends, together with the toggles and clutch-shoes, radially outward, the same as in the other forms of wear-compensating devices shown in Figs. 1 to 3.

In the construction shown in Fig. 5 each rock-lever has its tapered end formed smooth without screw-threads, and the beveled face of the recess 47 in the nut 36'' is also smooth and impinges on the face of the tapered end of the rock-lever. The said nut is provided on its inner surface with threads which engage screw-threads on one end of the collar 26'', as shown at 48. The operation of adjusting for wear in this latter construction is the same as that of the form shown in Fig. 4.

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

1. In a friction-clutch, the combination, with a driving and a driven member, of clutch-shoes on one member and in operative relation to the other member, actuating mechanism for the clutch-shoes, and a wear-compensator common to all the clutch-shoes, moving with and constituting a part of the shifting mechanism and constructed to adjust the said clutch-shoes simultaneously, substantially as described.

2. In a friction-clutch, the combination, with a driving and a driven member, of clutch-shoes on one member and in operative relation to the other member, actuating mechanism for the clutch-shoes, toggles connected to the clutch-shoes, and a wear-compensator moving with and constituting a part of the shifting mechanism and connected to all the toggles to adjust the latter simultaneously, substantially as described.

3. In a friction-clutch, the combination, with a driving and a driven member, of clutch-shoes on one member and in operative relation to the other member, and actuating mechanism for the clutch-shoes, comprising a nut constructed to react upon all of the clutch-shoes simultaneously to adjust the same for wear, substantially as described.

4. In a friction-clutch, the combination, with a driving and a driven member, of clutch-shoes for connecting and disconnecting the same, actuating mechanism comprising a toggle for each clutch-shoe, a rock-lever for each toggle, and a nut common to all the rock-levers constructed to act on the same both for shifting and for compensating for wear, substantially as described.

5. In a friction-clutch, the combination, with a driving and a driven member, of clutch-shoes for connecting and disconnecting the same, and a wear-compensator for the clutch-shoes comprising two-armed rock-levers, one for each clutch-shoe and connected to the

same at one end, and a nut provided with an annular rib engaging the other end of each rock-lever for moving all the rock-levers simultaneously to adjust the clutch-shoes for wear, substantially as described.

5 6. In a friction-clutch, the combination, with a driving and a driven member, of clutch-shoes for connecting and disconnecting the same, toggles, one for each clutch-shoe, rock-
10 levers, one for each toggle, pivoted to the latter at one end and at the other formed into two fingers, and a nut provided with a rib entering between the said fingers on all the rock-levers and constructed to move all the said
15 levers at the same time and thereby adjust the clutch-shoes for wear simultaneously, substantially as described.

7. In a friction-clutch, the combination, with a driving and a driven member, of clutch-
20 shoes for connecting and disconnecting the same, toggles, one for each clutch-shoe, actuating mechanism for the toggles, rock-levers forming part of the actuating mechanism and connected to the toggles, a rotatable collar
25 carrying all the rock-levers and moving with the actuating mechanism, and a nut on the collar engaging all the rock-levers and moving the same simultaneously to adjust the clutch-
shoes for wear, substantially as described.

30 8. In a friction-clutch, the combination, with

a driving and a driven member, of clutch-shoes for connecting and disconnecting the same, and a combined actuating and wear-compensating mechanism for the clutch-shoes, comprising toggles, one for each clutch-shoe, 35
rock-levers, one for each toggle, a rotatable collar carrying the rock-levers and provided with exterior screw-threads, and a nut on the screw-threaded portion of the collar engaging
40 all the levers and constructed to move the same for adjusting the clutch-shoes simultaneously, substantially as described.

9. In a friction-clutch, the combination, with a driving and a driven member, of clutch-
45 shoes for connecting and disconnecting the same, and a wear-compensator for the clutch-shoes, comprising a rock-lever, one for each clutch-shoe and connected to the same at one
end, and a nut engaging the other end of each rock-lever for moving all the rock-levers 50
simultaneously to adjust the clutch-shoes for wear, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES F. McLAUGHLIN.

Witnesses:

W.C. McCURDY,
EDWARD ELDRED.