Aug. 8, 1933. T. C. MLADINICH 1,921,994

FEED CLUTCH

Original Filed June 12, 1929 2 Sheets-Sheet 1

Fig. 1.

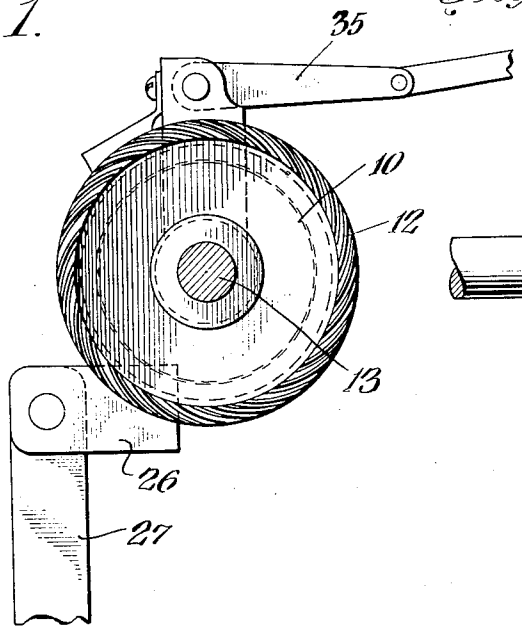


Fig. 2.

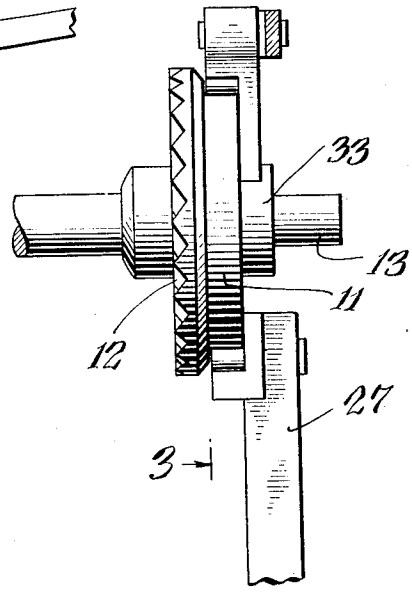


Fig. 3.

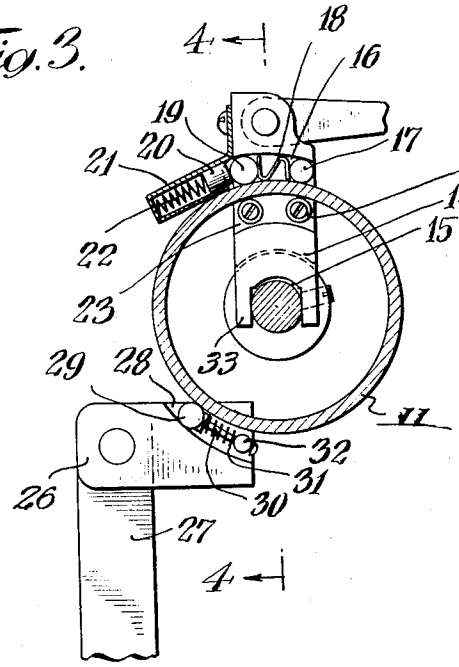
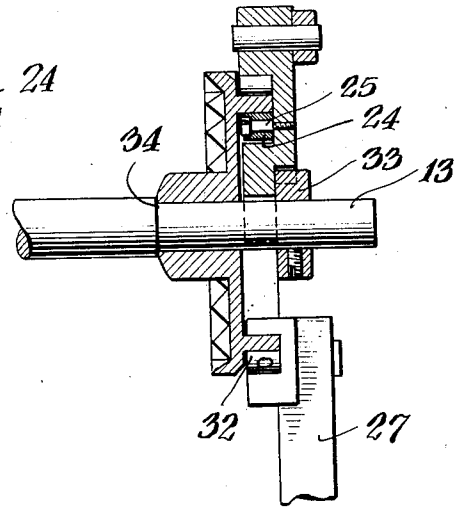


Fig. 4.



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FEED CLUTCH

Original Filed June 12, 1929 2 Sheets-Sheet 2

Fig. 5.

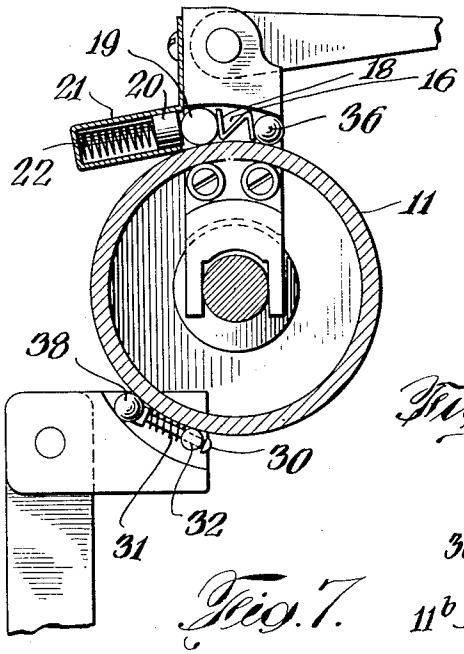


Fig. 6.

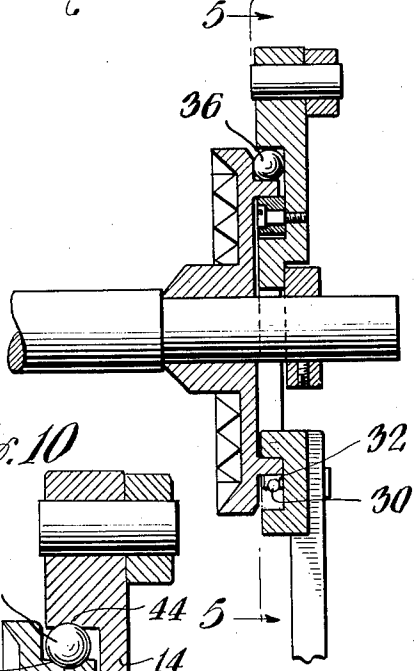


Fig. 10

Fig. 7.

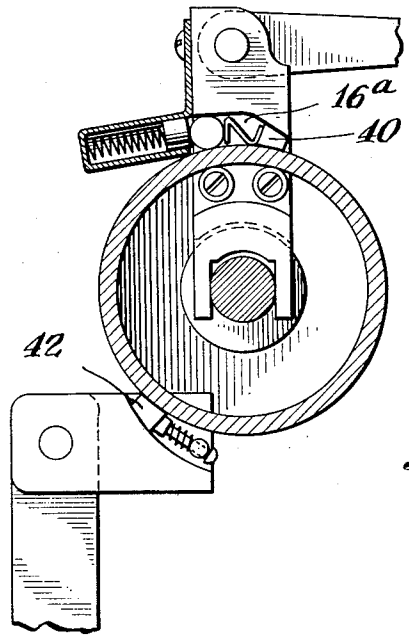


Fig. 8.

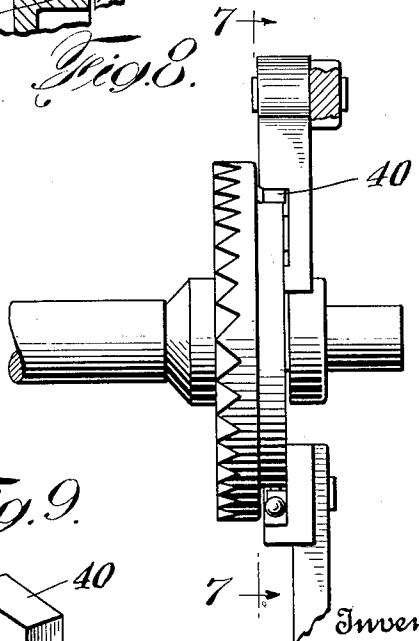
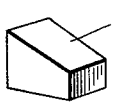


Fig. 9.



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Patented Aug. 8, 1933

1,921,994

UNITED STATES PATENT OFFICE

1,921,994

FEED CLUTCH

Thomas C. Mladinich, Garden City, N. Y.

Application June 12, 1929. Serial No. 370,432
Renewed June 21, 1932

3 Claims. (Cl. 74—53)

This invention relates to improvements in clutches, and more particularly in feed clutches for imparting rotation to a driven member from a driving member. This application is a continuation in part of my prior application, Serial No. 317,153, filed Nov. 5, 1928.

The invention may find application to a wide variety of machines and to numerous purposes, but is designed especially for application in the feeding of fur in fur stitching machines. In these machines, the fur is held stationary while the needle engages the material and is moved forward during the periods when the needle is out of engagement with the material. Of course, this intermittent feeding of the material is characteristic of all sewing machines, for feeding of the material must occur during the periods when the needle is out of the material. Hitherto, in fur stitching machines, the intermittent feeding of the fur has been obtained from a driving mechanism through a friction clutch operating by friction and functioning to feed the material during the periods when the needle is out of engagement with the material, and not to feed the material during engagement of the needle therewith. The friction clutch has proved most unsatisfactory. It wears easily, requires constant renewal of the friction surface, must have just the correct amount of lubrication for successful operation and is a constant source of trouble and attention. To provide a more reliable and satisfactory clutch is the salient object of this invention.

By my invention, I produce a positive clutch as distinguished from a friction clutch so that the feeding of the material is positive during the periods when the needle does not engage the material and no slipping in the clutch occurs. I further provide means for positively preventing the feeding of the material during those periods when the needle is in the material. In the preferred form of the invention, the means include a disc which is adapted to be intermittently rotated positively and to be held positively against rotation during the periods when the needle engages the material or fur. The intermittent rotations of the disc are communicated through suitable mechanism to the feeding wheels of the machine and impart a corresponding intermittent feeding movement to the material or fur.

The means for imparting the intermittent rotation to the disc preferably comprise a lever which is oscillated in synchronism with the stitching operation and which is preferably provided with a cam groove in which a loose member such as a roller is positioned. When the lever is oscillated in one direction, the roller is urged by friction to the narrow portion of the groove so that it firmly engages the disc in wedging fashion and communicates the movement of the lever thereto. When the lever is oscillated in the other direction, the roller is moved by friction to the larger portion of the groove and does not communicate any rotation to the disc. The oscillations of the lever occur in time to the stitching in such a way that oscillations in one direction causing movement of the disc takes place when the needle is out of the material while oscillations in the other direction, not causing movement, occur when the needle is in engagement with the fur.

The means for preventing movement of the disc during the inactive periods of the lever may also take the form of a stationary element having a cam groove in which a loose member such as a roller is disposed to act to prevent reverse rotation of the disc during the nonfeeding movements of the lever, while permitting rotation of the disc during the feeding movements.

Reference is to be had to the accompanying drawings, forming a part of this invention and showing the preferred embodiment and in which:

Fig. 1 is a side elevational view of a mechanism constructed in accordance with the present invention;

Fig. 2 is a front elevational view of the mechanism;

Fig. 3 is a sectional elevational view, taken as on the line 3—3 of Fig. 2;

Fig. 4 is a transverse sectional elevational view, taken as on the line 4—4 of Fig. 3;

Fig. 5 is a lateral sectional view of a modification taken on line 5—5 of Fig. 6;

Fig. 6 is a transverse sectional view of the modification shown in Fig. 5;

Fig. 7 is a lateral sectional view of a second modification, taken on line 7—7 of Fig. 8;

Fig. 8 is an end view of the modified form shown in Fig. 7;

Fig. 9 is a perspective view of the wedge used in the modification shown in Figs. 7 and 8; and,

Fig. 10 is an enlarged detail showing a further slight modification of the form shown in Fig. 6.

In detail, the invention is embodied in a mechanism which comprises a clutch disc 10 carrying a transverse flange 11 and shown with

a gear 12. The gear serves to communicate motion to the wheels for feeding the material or fur through the machine. Only those parts of the mechanism necessary to illustrate the invention are shown in the drawings, and the wheels are omitted. The disc 10 is mounted on a shaft 13 which is suitably supported in the machine. The flange, as shown, is preferably constructed of circular exterior and interior peripheries providing bearing surfaces.

The invention includes a lever element 14 which is cut away at 15 to provide a slotted or forked end so as to snugly embrace the shaft 13 and to rotate back and forth on the shaft loosely and with the shaft as a pivot. The lever 14 is provided with a groove 16 which is cam shaped and of varying width changing gradually from one end to the other. A loose member such as a roller 17 is positioned in the cam groove and is constantly urged to the narrow end of the groove as by a spring 18, the spring in turn being acted upon by an idle roller 19 which, in turn, is subjected to a plunger 20 positioned in a housing 21 containing a spring 22 for influencing the plunger and roller 19. The rollers 19 and 17 engage the outer periphery of the flange 11. The housing 21 is disposed at the side of the lever where the wide end of the cam groove occurs, is detachably assembled and forms a detachable closure for the groove, permitting, when removed, access to the groove and parts therewithin for inspection, repair and renewal of parts conveniently. A groove 23 is also placed in the lever and carries rollers 24 which rotate idly on small stationary shafts 25 associated with the lever and carried thereby. The rollers 24 engage the inner surface of the flanges 11 and merely act as idle rollers to insure smooth operation, and maintain the correct dispostion of lever and disc in service.

The means for preventing the reverse rotation of the disc include a block 26 which is stationarily mounted as on a post 27 or similar stationary portion of the machine and which also contains a cam groove 28 in which a roller 29 or similar member is loosely disposed. This roller is also constantly biased or urged into the narrower end of the groove 28 by a plunger 30 under the influence of a spring 31. As shown in Figure 3, the plunger is guided in a small post 32 and the spring 31 abuts against the post and against the plunger so that the roller is constantly urged into the narrow end of the cam groove.

The parts may be shaped, as shown, for assembly, but the design is optional and may be changed in practice. A detachable collar 33 is preferably placed on the shaft 13 for assembling the lever against the disc and the disc against a shoulder 34 on the shaft. This provides a rigid, sturdy assembly and construction.

It will be noted that, when oscillations are imparted to the lever 14, the roller, 17, by virture of the wedging action in the cam groove 16, engages the exterior surface of the flange 11 during the movements of the lever in one direction—counter clockwise as seen in Figs. 1 and 3. This engagement is positive, as the roller 17 is wedged in tightly in the narrow portion of the groove and grips the flange very firmly. The disc is consequently caused to rotate counter-clockwise during movements of the lever 14 counter-clockwise, as seen in Figs. 1 and 3. On the other hand, when the movements of the lever are in the other direction—clockwise, as seen in Figs. 1 and 3,—the roller 17 moves into the wider portion of the cam groove 16, no longer grips the periphery of the flange 11, and, thus, no longer causes any rotation to the flange or the disc 10. Consequently, the disc remains stationary during these periods and during the clockwise movements of the lever, as seen in Figs. 1 and 3. The oscillations of the lever thus impart an intermittent counterclockwise rotation to the disc.

To insure against any reverse rotation of the disc, the block 26 and its associated parts have been provided. During the counterclockwise or active oscillations of the lever, the roller 29 is caused by friction to occupy a position in the wider portion of the cam groove 28, and consequently does not act to retard the movements of the disc. During the inactive movements of the lever, however, that is, the clockwise movements, any tendency of the disc to move in reverse or clockwise direction is prevented by the roller 29 which now occupies a position in the narrow end of the cam groove so as to wedge against the surface of the flange 11 and prevent the reverse rotations and movements following the return or clockwise movements of the lever.

Any suitable means may be employed for the purpose of imparting the oscillations to the lever and I have indicated the means as a link 35 which is pivoted to the free end of the lever. This link is driven from the machine and in synchronism with the stitching operation in such a way that the active or counterclockwise movements of the lever occur when the needle is out of engagement with the material and the inactive or clockwise movements occur when the needle is in engagement with the lever. As above stated, the intermittent rotation of the disc 10 is communicated to the feeding wheels, which act in correspondence therewith to intermittently feed the material through the machine and to feed only during the periods when the needle is out of engagement with the material. The mechanism may be applied to other uses than that indicated, however.

In Figs. 5 to 10 inclusive, I have illustrated several modifications of my invention. In Figs. 5 and 6, for example, I employ a ball 36, instead of the previously described roller 17; and a second ball 38 in place of roller 29. The action is substantially the same as has been described; spring 22, plunger 20, roller 19 and spring 18 tending to push ball 36 into contact with the face of groove 16 and flange 11.

In Figs. 7 and 8, I show a further modification, in which I use a wedge-shaped piece 40, instead of roller 17 or ball 36. A second wedge 42, replaces roller 29 or ball 38. Fig. 9 is a perspective view of one of these wedges. As shown in Fig. 7, groove 16*a* may, though it need not necessarily, have a slightly different shape from that shown in Figs. 1 to 6, in that it is adapted to contact with the wedge throughout its length, thereby giving a greater surface of contact, with a consequent greater efficiency of operation.

Fig. 10 is a detail view of a modified form of flange, which may be optionally used, if a ball is substituted for a disc. As shown, flange 11*a* is provided with an upper, or contact surface, 11*b*, which is semi-circular in cross section, to correspond with the diameter of ball 36, thereby giving a better contact between the elements.

A corresponding curved surface 44 may be provided for the upper face of groove 16.

The apparatus of this invention, as distinguished from the prior friction apparatus, is positive in operation and no slipping can occur. It is a very reliable mechanism and does not require any attention. Little, if any, wear occurs during the use of this mechanism. The flange 11 and the disc and gear 12 are preferably of cast material, such as cast iron, but by virtue of the cold rolling on the surfaces of the flange, the material thereof is converted into a very hard substance and the surfaces become very smooth and resistant to wear. Another feature of the invention resides in the fact that the surfaces may be thoroughly lubricated and the mechanism will act efficiently, irrespective of the amount of lubricant on the parts. The use of the idle rollers 24 insures smoother operation and minimizes the friction to which the lever is subjected in operation.

The springs for biasing the rollers to the narrow portions of the cam grooves provide for operation without lag or lost motion. They insure that the rollers are always in the narrow end of the cam grooves, except when friction is urging them to the wider portions of the grooves. The rollers are thus always in position to instantly grip the flange of the disc upon appropriate movements of disc and lever.

The specific embodiment herein described, while preferred, may be altered and varied in detail without departing from the invention, and I desire to be limited only by the state of the prior art and the scope of the appended claims.

I claim as my invention:—

1. A device of the class described comprising a disc, having a flange of substantially circular inner and outer peripheries, a lever for operating the disc, said lever having a cam groove of varying width on the side of one of said peripheries and another groove on the side of the other periphery, a loose roller in the cam groove, idle rollers in the other groove, said rollers being adapted to bear against the respective peripheries of the flange, and means for oscillating the lever.

2. A device of the class described comprising a shaft, a disc mounted on said shaft, a concentrically arranged flange on said disc, a lever having a forked end fitting over said shaft, means on said shaft to hold said forked end in position, means on said lever fitting over said flange to form a groove on each side of said flange, one of said grooves being a cam groove of varying width, a movable member in said cam groove adapted to grip said flange when urged into the relatively narrower end of said cam groove, means for urging said movable member into the relatively narrower end of said cam groove, and a rotatably mounted roller in the other groove adapted to contact said flange.

3. A device of the class described comprising a shaft, a disc mounted on said shaft, a concentrically arranged flange on said disc, a lever having a forked end fitting over said shaft, means on said shaft to hold said forked end in position, means on said lever fitting over said flange to form a groove on each side of said flange, one of said grooves being a cam groove of varying width, a movable member in said cam groove adapted to grip said flange when urged into the relatively narrower end of said cam groove, means for urging said movable member into the relatively narrower end of said cam groove, and rotatably mounted spaced rollers in the other groove adapted to contact said flange.

THOMAS C. MLADINICH.