Nov. 29, 1927. 1,651,052

E. L. ACKERMAN ET AL

CLUTCH DEVICE

Filed June 3, 1927

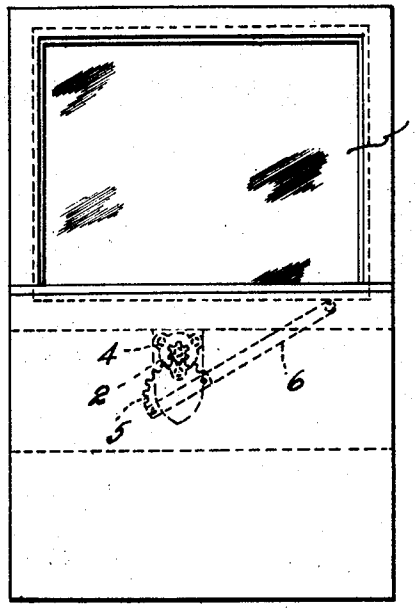


Fig. 1

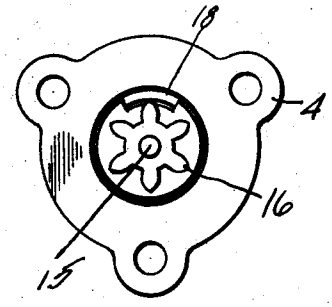


Fig. 3

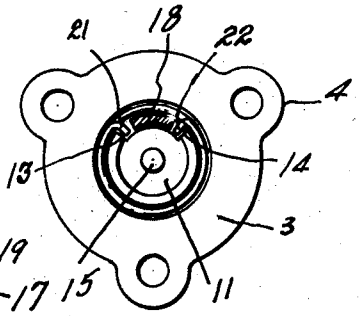


Fig. 4

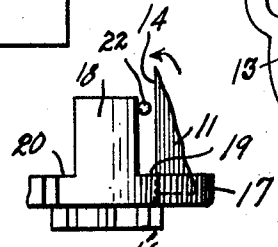


Fig. 8

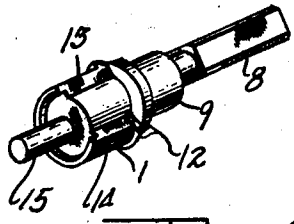


Fig. 6

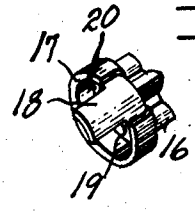


Fig. 7

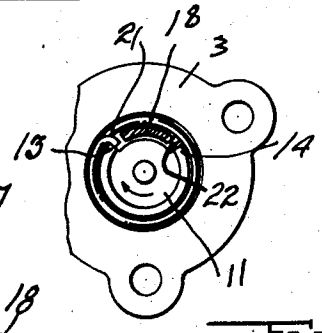


Fig. 5

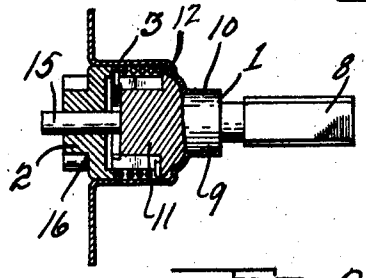


Fig. 2

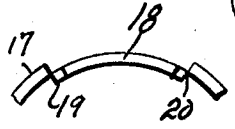


Fig. 9

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UNITED STATES PATENT OFFICE.

EDWARD L. ACKERMAN AND ALOIS J. ZWIERZINA, OF DETROIT, MICHIGAN, ASSIGNORS TO ACKERMAN-BLAESSER-FEZZEY, INC., OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

CLUTCH DEVICE.

Application filed June 3, 1927. Serial No. 196,181.

This invention relates to clutch devices, and the object of the invention is to provide a simple clutch device adapted for use with various types of mechanism and, as shown, is arranged to provide a clutch device by rotation of which a window sash may be raised or lowered and that upon release of the operating handle, the clutch by reason of the weight of the sash is actuated to hold the mechanism from self-operation and releasable only by rotation of the handle in one direction or the other.

The particular features of the invention are involved in the peculiar arrangement of the parts and, while in its broadest scope it is similar to our pending application Serial No. 178,667 filed March 26, 1927, it distinguishes therefrom in the various details of construction as is hereinafter more specifically pointed out and claimed.

The construction of a device embodying the features of our invention is shown in preferred form in the accompanying drawings in which—

Fig. 1 is an elevation of a sash and the frame in which it is slidable showing our improved clutch device in conjunction therewith.

Fig. 2 is an elevation partly in section of our improved clutch device.

Fig. 3 is an end elevation thereof.

Fig. 4 is an end elevation partly in section showing the clutch spring with the parts in neutral position.

Fig. 5 is a similar elevation showing the same parts in position when the clutch spring is expanded.

Fig. 6 is a view of the driving member on which the spring is mounted.

Fig. 7 is a perspective view of the driving gear.

Fig. 8 is a plan view showing the driving gear and the clutch actuator to which it is secured.

Fig. 9 is an enlarged plan view of a portion of the clutch actuator. Our improved clutch device consists of a driving member 1 and a driven gear 2 mounted in a stationary casing 3 that in the construction here shown is provided with apertured ears 4 for attachment to a stationary part of the window frame and holding the gear teeth in mesh with a segmental gear 5 pivotally supported and carrying a sash operating arm 6. By rotation of the gear 2, the arm and consequently the sash 7 may be raised or lowered in the usual manner. The driving member 1 has a squared or otherwise shaped shank 8 for the attachment of an operating handle (not here shown) and adjacent this shank is a portion 9 rotatably supported in the portion 10 of the casing provided therefor. The body of the driving member indicated at 11 is of greater diameter and located in an enlarged portion of the casing. This body portion is provided with a circumferential rib 12 located at the bottom of the enlarged portion of the casing. This enlarged portion or body 11 of the device has a longitudinal groove providing approximately radial shoulders 13 and 14, as will be understood from Figs. 4, 5 and 6. At the end opposite the squared shank 8 the driving member is provided with an integral rod like extension 15 on which the clutch actuator and gear 16 are rotatably mounted. This clutch actuator and gear is shown in perspective in Fig. 7 from which it will be seen that it is provided with a cylindrical flange 17 fitting over the end of the cylindrical portion 11 as shown in Figs. 2 and 8 and thus the end of the body portion 11 of the driving member lies within this flange 17 and the flange 17 fits within the enlarged portion of the casing further providing a support for the gear member. This gear and clutch actuator 16 is further provided with an inset projecting finger or lug 18 which lies in the groove of the body between the shoulders 13 and 14 thereof. This lug or finger 18 is formed by pressing the wall of the member 17 inwardly after the manner indicated in enlarged form in Fig. 9 a distance approximately equal to the thickness of the flange. The portion thus offset inwardly is subtended by a cord of greater length than the cord subtending the projecting portion 18. This provides shoulders 19 and 20 on opposite sides of the member 18 that lie between the shoulders 13 and

14 of the driving member. This member 18 at its widest base part is less than the distance between the shoulders 13 and 14.

A cylindrical coiled spring is mounted on the body 11 of the driving member and one end of this spring is inturned as at 21 to engage over the shoulder 13 of the driver and at opposite ends, as indicated at 22, is likewise inturned to engage over the shoulder 14 of the driving member. This coiled spring is a close fit in the enlarged portion of the casing in which the body 11 of the driving member is located and as will be understood from Fig. 2 the rib 12 is also practically free to rotate in the casing and therefore provides a support for the inner end of the spring holding the said end out of contact with the shoulder of casing.

In previous constructions of this general character the spring seats in the bottom of the enlarged portion of the casing and thus tends to creep in between the driving member and the casing and bind and therefore tends to produce a noise or squeak in operation due to the spring being turned with the driving member while lying in contact with the stationary casing. By our improved arrangement of parts the spring is supported by the rotatable part thru use of the integral rib 12 and such difficulties are thus avoided.

The tongue or lug 18 lies in the space between the shoulders 13 and 14 as above stated and between the inturned ends 21 and 22 of the spring as will be understood from Figs. 4, 5 and 8. When the spring is in its natural condition, these inturned ends 21 and 22 are in reality out of contact with the respective shoulders 13 and 14 of the driving member. It will first be observed that by rotation of the handle the gear and clutch operating member 16 is rotated or driven by a shoulder 14 of Fig. 8, coming into contact with the shoulder 19 of the inset member 18 and thus the gear is driven directly by the driving member. Previous constructions in which a spring clutch of the general type herein described is used are arranged to cause movement of the gear through engagement of a shoulder of the driver with the spring end which in turn contacts a lug similar to the lug 18 here shown and thus, in such construction, the driving of the gear is caused through pressure at some distance from the plane of rotation of the gear. By our improved arrangement, in which the gear is driven through actual contact of the driver with the part to which the gear is attached, the point of pressure is quite close to the plane of rotation of the gear relieving this gear member from side pressure or twist in the casing and therefore in this arrangement with the member 11 being turned in the direction of the arrow in Fig. 8 the gear is driven by the shoulder 14 and in this relationship the clutch spring is in its self-contracted relation and therefore the parts are readily rotatable. Likewise it will be readily understood that the shoulder 13, in rotation of the driver in the opposite direction, would engage the member 20 before it would contact the spring end 21.

The purpose of use of this clutch is between two relatively rotatable parts and the load on the gear member 16 in the particular use of the clutch device here shown is the weight of the sash which would tend to rotate the gear through the segment 5 in Fig. 1. Under this tendency of movement of the gear member the tongue 18 contacts the spring end 21 or 22 depending upon the direction in which the gear member tends to turn and expands the spring causing engagement at each of its turns thereof with the stationary casing in which it is housed and this under the pressure applied to the gear tends to hold the same from movement—in other words—locks the sash at any of the points in which the handle attached to the driving member may release it. Therefore, the inturned points 21 and 22 of the clutch spring are spaced apart a sufficient distance so that when the gear member is turned the spring is expanded before the shoulder 19 or 20 of the member 16 engages the respective shoulder 13 or 14 of the driving member.

Having thus briefly described our invention, what we claim and desire to secure by Letters Patent of the United States is—

1. In a clutch device, a stationary shell, a driving member and a driven member having limited relative rotative movement, the driving member being supported near one end by a bearing provided by the shell and an enlarged portion positioned in a correspondingly enlarged part of the shell, said driving member at its opposite end having a cylindrical extension, the driven member including a gear centrally apertured to engage over the said cylindrical portion of the driving member and further being adapted to fit in the enlarged portion of the shell, said driving member having a longitudinal groove or recess and the driven member having an inset projection engaging therein, said projection being of greater width at its base than in the remaining portion thereof thereby providing shoulders to engage the respective walls of the groove of the driving member, a cylindrical coiled spring on the enlarged portion of the driving member, the end turns of which are inturned providing terminals engaging in the groove of the driver, the narrow portion of the projection of the driven member lying between the said inturned ends and so arranged that relative rotation of the driven member by force applied thereto causes the spring to expand to frictionally engage the wall of

the shell and the shoulders and base of the projection limiting the relative rotation of the driving member and providing a means whereby the driving member may positively turn the driven member by direct engagement therewith.

2. In a clutch device, a stationary shell, two rotatable members having limited relative movement, one of the members having an enlarged portion within the shell and out of contact therewith and provided with a groove forming spaced edges approximately on a radial line thereof and further being provided with a circular rib adjacent one end thereof, the external diameter of which is nearly the inner diameter of the shell, a cylindrical coiled spring positioned on the said enlarged portion and seating at one end against the said rib, the end turns of the coil being inturned to engage in the space between the said spaced edges of the groove, the other of said members having a lug extending into the said groove and lying between the inturned ends of the spring and in spaced relation therewith whereby on the turning of the second member the spring is caused to expand to frictionally engage the inner face of the shell and on rotative movement of the first rotatable member the spring is permitted to contract and thus freed from material frictional engagement with the shell.

3. In a clutch device, a stationary shell, a driving member and a driven member having a limited relative rotative movement, the driving member being rotatably supported in the shell and having an enlarged portion therewithin and out of contact therewith, said enlarged portion being formed with a groove providing spaced edges approximately on a radial line thereof and further being provided with an integral circular rib adjacent one end thereof approximately of the diameter of the shell and out of frictional engagement therewith, a cylindrical coiled spring positioned on the said enlarged portion and seating at one end against the said rib, the end turns of the coil being inturned to engage in the space between the said spaced edges of the driving member and in spaced radial relation therein, the driven member having a cupped portion providing a cylindrical flange seating in the shell and engaging over the end of the driving member and providing a seat for the opposite end of the coiled spring, said flange having an integral extension inset to lie in the space between the radial edges of the driving member and shaped to lie between the inturned ends of the spring, the width of the portion of the extension between the spring ends being less than the normal distance between the said inturned ends of the spring whereby limited relative movement is permitted between the members and force applied to the driven member to turn the same on its axis causes expansion of the coiled spring to frictional engagement with the enlarged portion of the shell and on rotative movement of the driving member the spring is permitted to contract out of frictional engagement with the shell.

4. In a clutch device, a stationary shell, a driving member and a driven member rotatably supported in the shell, the said driving member having an enlarged portion within a corresponding portion of the shell and out of contact therewith, said enlarged portion being provided with a longitudinal groove forming spaced edges lying approximately on a radial line thereof and having a cylindrical extension of less diameter at the end adjacent the enlarged portion and a shank for connection of a driving means at the apposite end, the driven member including a gear centrally apertured to engage over the said cylindrical extension of the driving member and a cupped member providing a cylindrical flange engaging in the shell at its outer surface and into which the enlarged portion of the driving member extends, a circular rib at the opposite end of the enlarged portion of the driving member, a cylindrical coiled spring on the enlarged portion of the driving member lying in the space between the rib and the flange of the driven member, said flange having an integral extension inset to lie in the groove of the driving member and at its base being less in width than the space between the edges of the groove of the driving member and further having an extending portion of less width lying between the inturned ends of the spring, the arrangement providing that on rotation of the driven member in either direction the spring ends are first engaged to cause an expansion of the spring and then the portion of greatest width of the said extension comes into engagement with one or the other of said edges of the groove depending on the direction of rotation of the driven member before the inturned ends of the spring are moved to engagement with the edges forming the groove and whereby force applied to the driving member will cause one or the other of said edges to drive the driven member by reason of engagement with the lug at its base substantially as described.

5. In a clutch device, a stationary shell, a driving and a driven member rotatably supported thereby and having limited relative rotative movement, said driving member being provided intermediate its ends with an enlarged portion lying within the chamber provided by an enlarged portion of the shell, a coiled spring on the enlarged portion of the driving member within the shell and in normal contracted relation being out of frictional engagement with the shell, the said driving member having a cylindrical exten-

sion on which the driven member is axially mounted, the said spring having inturned bent ends, a lug on the driven member extending therebetween and providing a means whereby the spring is expanded to frictional engagement with the shell through relative rotation of the driven member, and means on the driven member directly engaged by the driving member on rotation thereof releasing the spring to self-contraction and positively driving the driven member.

In testimony whereof, we sign this specification.

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