June 23, 1931. H. B. TARBOX 1,810,990

LEVER MECHANISM

Filed Dec. 9, 1927 2 Sheets-Sheet 1

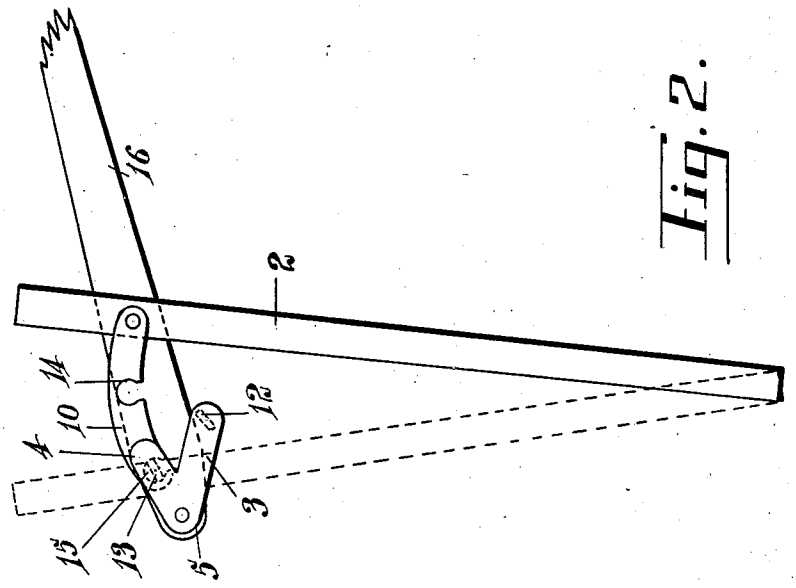


Fig. 2.

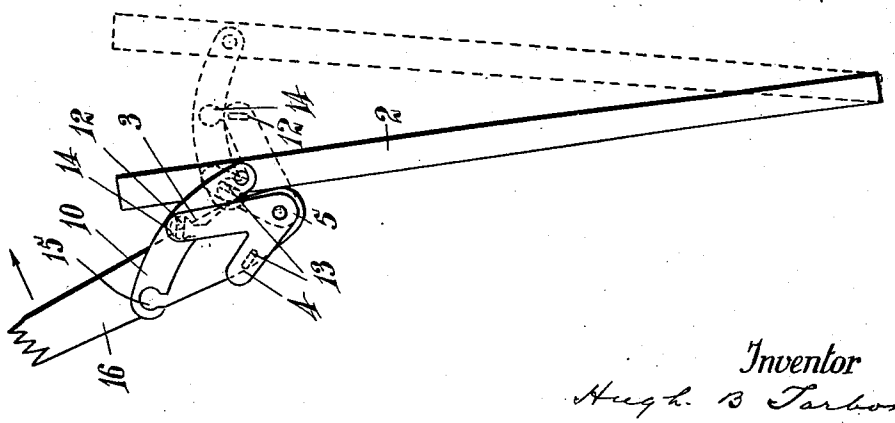


Fig. 1.

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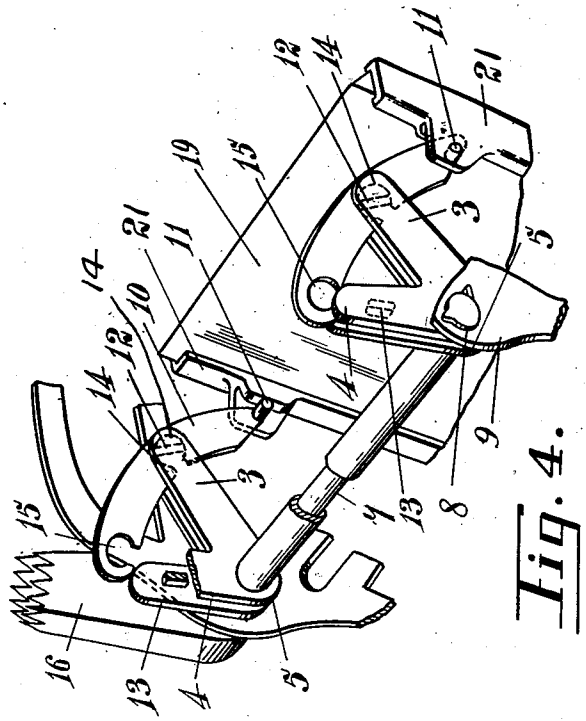


Fig. 4.

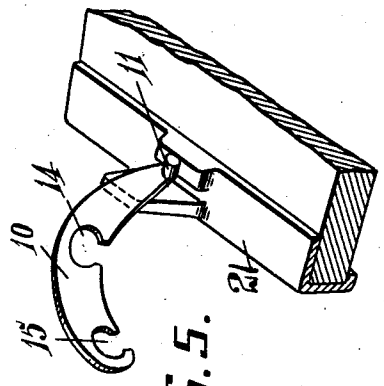


Fig. 5.

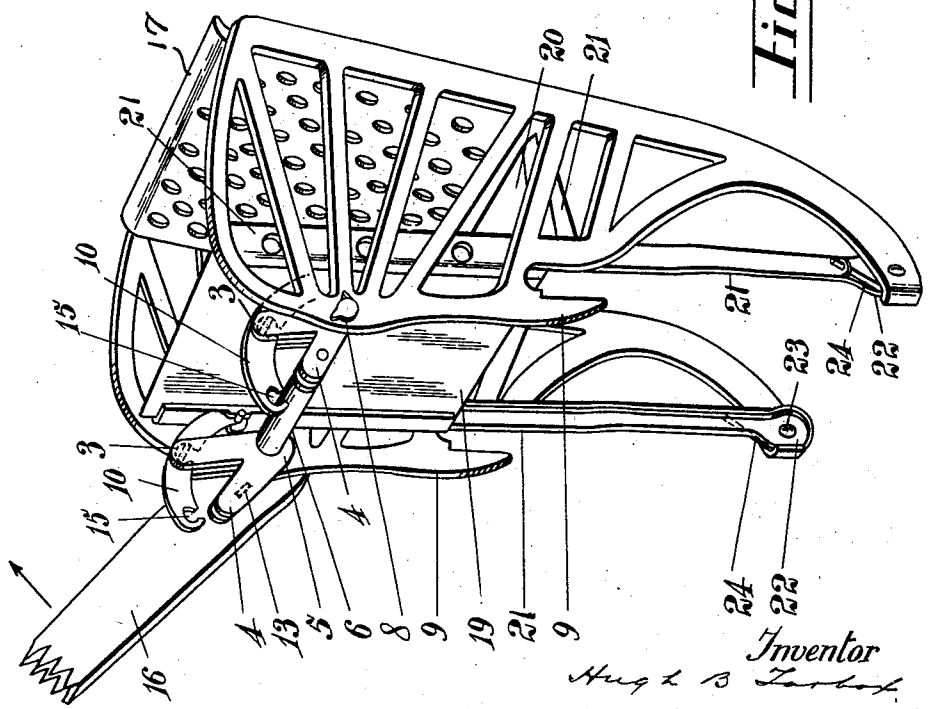


Fig. 3.

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Patented June 23, 1931

1,810,990

REISSUED

UNITED STATES PATENT OFFICE

HUGH BOGART TARBOX, OF TORONTO, ONTARIO, CANADA

LEVER MECHANISM

Application filed December 9, 1927. Serial No. 238,788.

My invention relates to a lever mechanism comprising a plurality of arms, unitedly rotatable, in clockwise or counter-clockwise direction, a link interposed between the arms and the object to be moved alternately engaged and released by each of the arms in succession as they rotate for the step by step movement of the link, and means for actuating the arms in one direction, and imparting forward motion and pressure to the link and through it to the object and, in the opposite direction, reverse motion and release of pressure.

The shape of the link is dependent on the cooperating parts and the extent of motion and pressure to be applied to the object; and it may take the form of a straight bar, a bell crank, or an arc. The arms may all be of the same length for moving the link at uniform speed and exerting uniform pressure, or they may be of different lengths for moving the link at variable speeds and exerting variable pressure, and in either case provision is made for establishing an engaging and disengaging connection of each arm, in succession, with the link. This connection may take the form of a key on each arm and in that case the arm engaging face of the link is provided with a recess for each arm into which the corresponding key enters and from which it recedes during the rotation of the arms.

For an understanding of the invention reference is to be had to the following description and to the accompanying drawings, in which:

Fig. 1 is a diagrammatic view showing the active position of the arms and link with the first arm and the link engaged and the second arm disengaged for the initial forward or final reverse step of the link movement,

Fig. 2 is a similar view to Fig. 1 showing the first arm disengaged and the second arm and link engaged for the final forward or the initial reverse step of the link movement,

Fig. 3 is a perspective view showing the practical application of the lever mechanism to a mop wringer,

Fig. 4 is a perspective view of the lever mechanism shown in Fig. 3, and

Fig. 5 is a perspective view showing the link pivoted to the swinging frame of a mop wringer.

Like numerals of reference refer to like parts throughout the specification and drawings.

The lever mechanism comprises a plurality of arms or sets of arms rotatable on a fixed fulcrum, the number of which is limited only by the cooperating parts and the purpose of the movement. Two sets of arms 3 and 4 are employed in the practical application of this lever mechanism for moving the swinging frame of a mop wringer, this being sufficient for the purpose of explaining the invention. Each pair of arms 3 and 4, as shown in the drawings, takes the form of a bell crank, and these arms are united by an elbow 5, the elbows 5 of the two sets being connected by a shaft 6. One set of arms is located at or near each end of the shaft and the angle formed by each arm of each set with the axis of the shaft is the same as the angle formed by the corresponding arm of the other set, so that similar movement will be simultaneously effected by the arms of the two sets and similar pressure will be simultaneously exerted by them on the swinging frame.

When a hollow shaft is employed to connect the two sets of arms an axle 7 is entered through it and journalled in bearings 8 in the side plates 9 of the stationary frame and the shaft and axle form a fixed fulcrum for the rotation of the arms.

When a solid shaft 6 is employed to connect the two sets of arms, this shaft is journalled in the bearings 8 and they likewise form a fixed fulcrum for the rotation of the arms.

As shown in the drawings the arm 3 is longer than, and during the forward rotation is in advance of, the arm 4 for imparting quick action to the swinging frame during the initial step of the movement, as during this step less power is required than during the final step. At the completion of the initial step the arm 3 expends its effort and the arm 4 then comes into action and completes the movement initiated by the arm 3. Co-acting with each set of arms 3 and 4 is a link 10 one end of which is pivoted at 11 to the cor-

responding side of the swinging frame 2, and the other end is free so that the link will automatically adapt itself to the arc travelled by the arms 3 and 4 as they rotate on their fixed fulcrums.

To maintain an automatic engaging and disengaging connection of the arms with the link each of the arms 3 and 4 is provided with a key 12 and 13 respectively and the arm engaging face of the link is provided with two curved recesses 14 and 15 spaced from each other to successively receive the keys 12 and 13. The recess 15 is at or near the free end of the link and the recess 14 is between the recess 15 and the pivot 11. During the rotation of the arms in a forward direction the key 12 enters the recess 14 and under the influence of the arm 3 causes the forward movement of the link 10, which by means of the pivotal connection 11 automatically adapts itself to the travel of the arm 3 until the key 13 enters the recess 15. The key 12 then recedes from the recess 14 and the key 13 under the influence of the arm 4 continues the movement of the link to the forward limit of travel and remains in the recess 15 for the reverse rotation of the arms during which the arm 4 retracts the link until the key 12 re-enters the recess 14, when it recedes from the recess 15 and the arm 3 and key 12 continue the retraction until the link 10 reaches the reverse limit of travel.

The shaft 6 is provided, as shown in the drawings, with a handle 16 for causing the forward and reverse action of the arms 3 and 4 and this handle may be attached to or form part of one set of arms or it may be fitted to the shaft or hub.

The mop wringer shown in Fig. 3 comprises a stationary frame, consisting of a presser board 17 and downwardly extending forked side walls 9 for straddling a pail, and a swinging frame consisting of an imperforate presser board 19, a floor board 20, and side walls 21 supporting the floor board. The lower ends of the side walls of the stationary and swinging frames are formed with opposing hubs 22. Bolts 23 are entered through the hubs for pivotally connecting the swinging frame to the stationary frame and springs 24 bear respectively on the stationary and swinging frames.

In the practical application of the invention as shown in Fig. 3, the movement of the handle 16, indicated by arrow, causes a corresponding rotation of the arms 3 and 4. The key 12 during this rotation enters the recess 14 and moves the link 10 and swinging frame 2 in a forward direction, the link adjusting itself automatically to the arc described by the travel of the arm, until the key 13 enters the recess 15. The key 12 then recedes from the recess 14 and the key 13 continues the movement of the link until the limit of travel is reached. This causes the movement of the link and divides it into two distinct steps of which the initial step is effected by the arm 3 and the final step by the arm 4, the extent and rapidity of movement of each step being dependent on the relative lengths of the arms.

The recesses 14 and 15 as shown in the drawings are provided with relatively narrow slots 14^a and 15^a for the entrance of the keys 12 and 13. The width of each key is slightly less than the width of the corresponding slot so that it can freely enter its respective recess, when the arm comes into position to exert its force on the slidable link, and freely withdraw from the recess when its force is expended, and its length is greater than the width of the slot so that the key during the intervening period will lie transversely across the slot and lock the arm and link together until the arm reaches the entering or withdrawing position.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent is:

1. A lever mechanism comprising two unitedly rotatable lever arms arranged one in advance of the other, the leading arm being longer than the following arm and provided with a projecting key, a pivoted link having a recess into which the key enters and from which it recedes for causing a partial forward movement of the link during the forward rotation of the lever arms, the other lever arm engaging the link and completing its forward movement when the key recedes from the recess.

2. In the hereinbefore described device the combination of two unitedly rotatable lever arms arranged one in advance of the other, the leading arm being longer than the following arm and each provided with a projecting key, in combination with a pivoted link interposed between the arms and the object to be moved, said link being provided with two recesses one for the key of the leading arm to make a releasable connection with the link for part of its travel, and the other for the key of the following arm to make a releasable connection with the link and continue its travel when the key of the leading arm is released from it.

Dated at the city of Toronto, in the county of York and Province of Ontario, Dominion of Canada, the 25th day of November, 1927.

HUGH B. TARBOX.