No. 702,371. Patented June 10, 1902.

H. A. MEYER.

MOTOR DRIVEN DEVICE OR MECHANISM.

(Application filed July 12, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

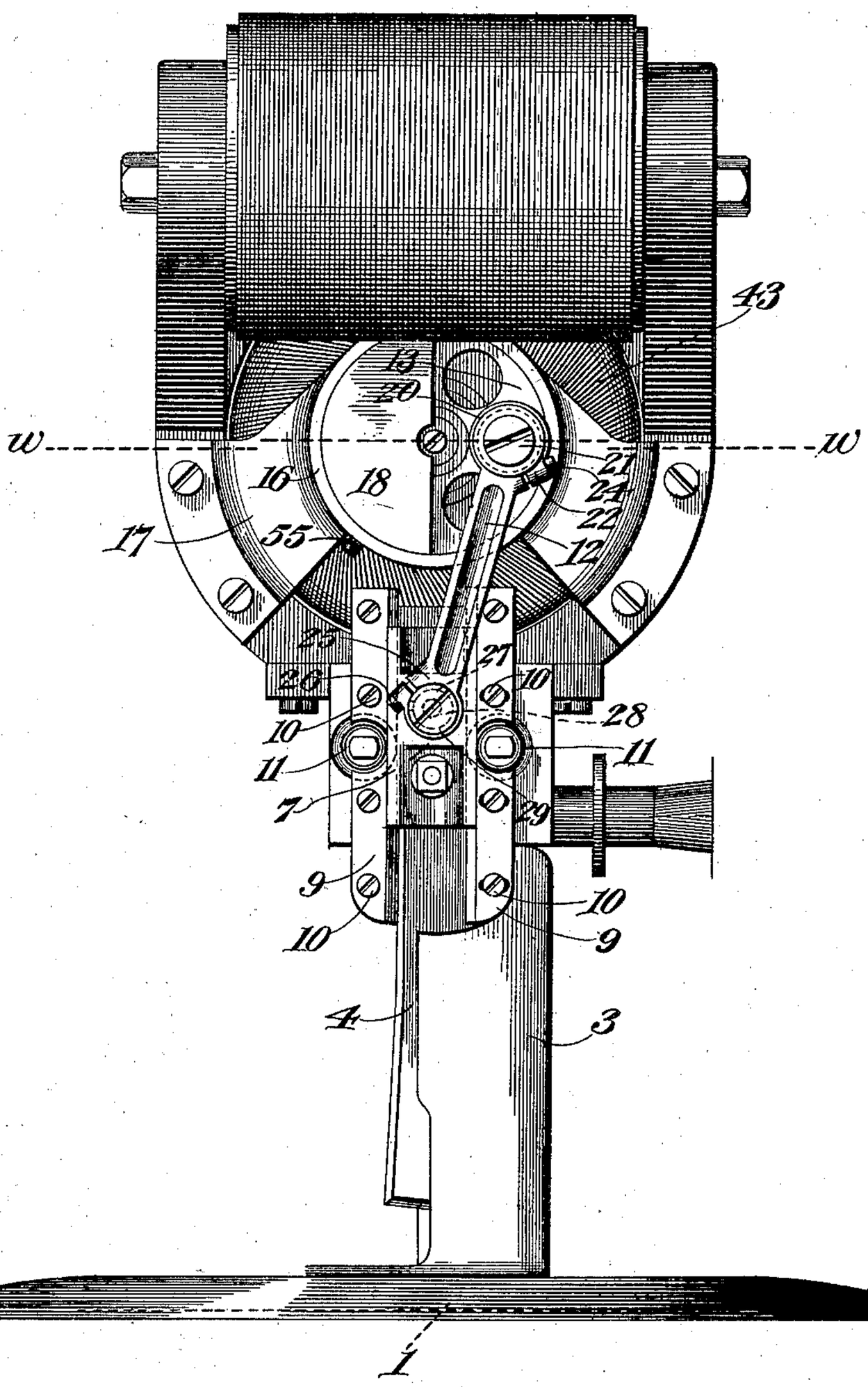

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Fig. 2.

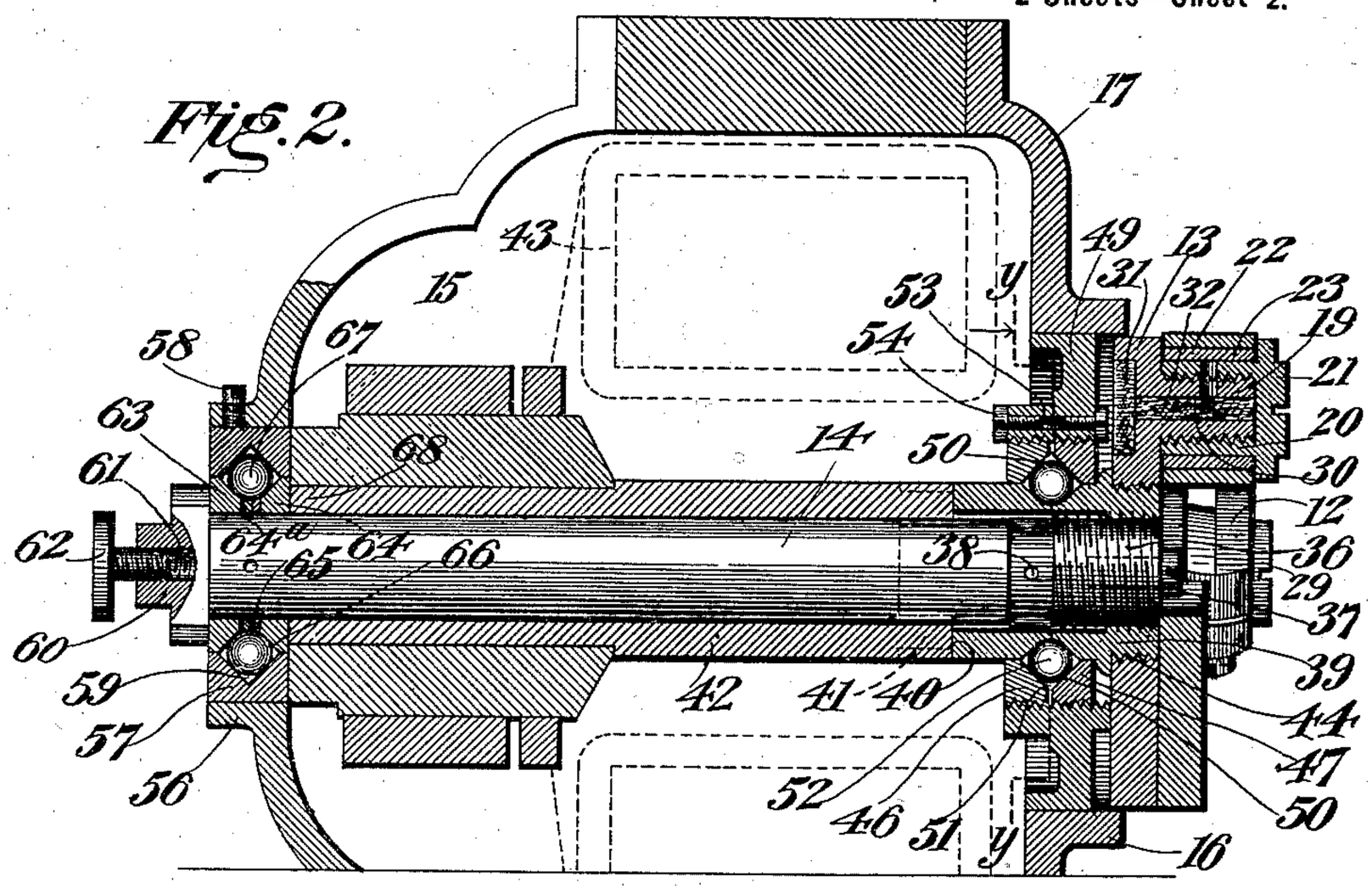


Fig. 3.

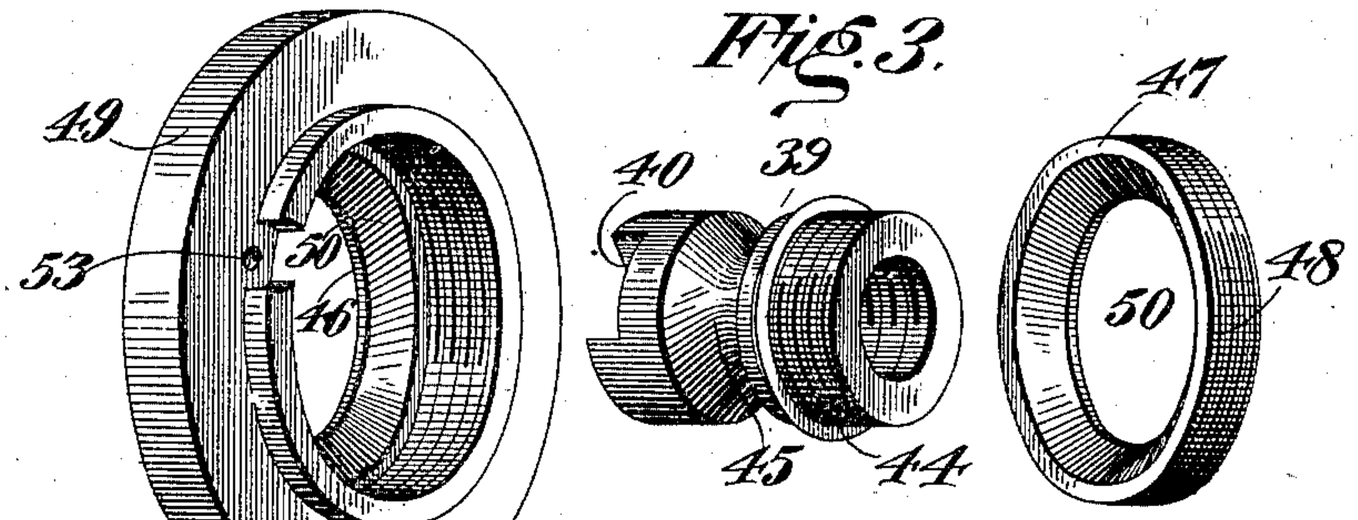


Fig. 4.

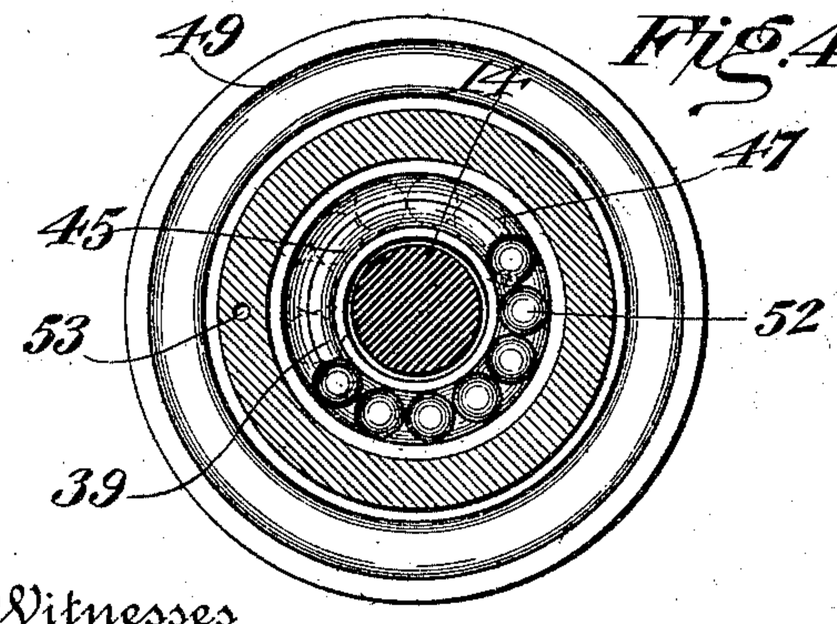
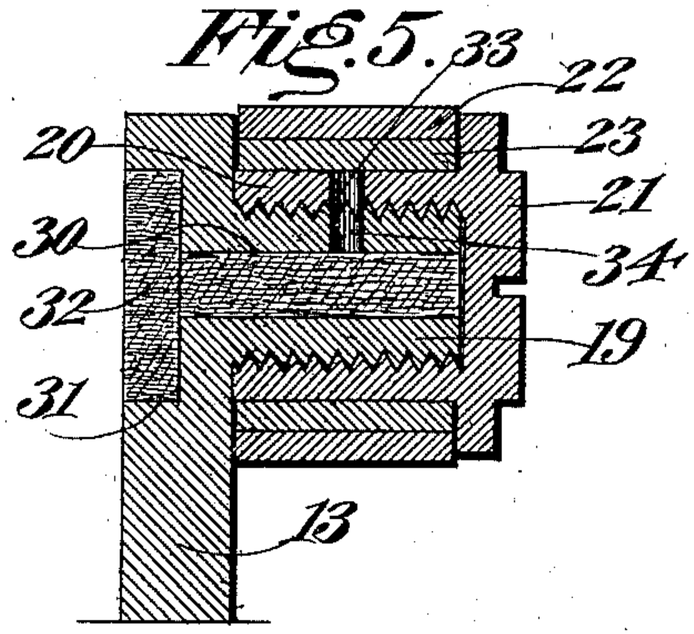


Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY ANDREW MEYER, OF CINCINNATI, OHIO.

MOTOR-DRIVEN DEVICE OR MECHANISM.

SPECIFICATION forming part of Letters Patent No. 702,371, dated June 10, 1902.

Original application filed April 13, 1901, Serial No. 55,729. Divided and this application filed July 12, 1901. Serial No. 68,103. (No model.)

To all whom it may concern:

Be it known that I, HENRY ANDREW MEYER, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Motor-Actuated Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to motor-driven mechanism, and is applicable to a great many different machines, but has especial reference to mechanism for operating reciprocatory devices or tools—such, for instance, as the reciprocatory knife of a fabric-cutting machine of the general type shown and described in a former application filed by me on the 13th day of April, 1901, and bearing Serial No. 55,729, of which the present case is a division.

The principal objects of my invention are to provide a simple and efficient motor-driven mechanism practically noiseless in operation and composed of few parts which may be readily fitted together or replaced when worn; to provide perfect bearings for the driving-shaft of the motor and means for adequate adjustments to compensate for wear between the shaft and its bearings, as well as that which takes place between the shaft and pitman connections carried thereby; to prevent undue vibration of the reciprocatory knife or other device operated by the mechanism; to render the driving connections light and strong; to reduce the wear of the parts, thereby increasing their longevity, and to provide for perfect lubrication between the parts without accumulation of dust at the joints thereof.

The invention will hereinafter be first fully described with reference to the accompanying drawings, which form a part of this specification, and then more particularly pointed out in the claims following this description.

In said drawings, in which corresponding parts in the several views are designated by like characters of reference, Figure 1 is a side elevation of a typical electrically-operated fabric-cutting machine having my present invention embodied in connection therewith; and Fig. 2 is a horizontal sectional view, partly broken away, taken through the armature-shaft and the driving connections thereon on the line *w w* of Fig. 1. Fig. 3 is a view in perspective of the several separate parts or elements constituting the driving connections on one end of the armature-shaft, including the clutch member by which the said parts are caused to revolve with the shaft and its armature. Fig. 4 is a part sectional view on the line *y y* of Fig. 2. Fig. 5 is an enlarged sectional view in detail showing more clearly the construction of the wrist-pin of the driving crank and connections with the pitman for actuating the device to be reciprocated.

Before proceeding with a more detailed description it may be stated that in order to explain the operation of my present invention I have illustrated herein an electrically-operated fabric-cutting machine of the reciprocatory-knife type, although it will be understood that my present invention is adapted to a great many other kinds of machines in which a reciprocatory element is employed.

Referring to the drawings by the reference-numerals, 1 represents the base or foot plate, and 2 the cloth-lifting plate, of a fabric-cutting machine, and 3 is an upright or standard on said base or foot plate, between the sides of which is arranged the vertically-reciprocatory knife or cutter 4, of any desired form. Said knife or cutter is removably attached in any preferred way to a sliding block or cross-head 7, which works up and down between suitable vertical guides therefor, shown in the present instance constituted of plates 9 9, attached to the standard by means of screws or other fastenings 10, the said plates being preferably provided with antifriction-bearings 11 (specifically described in my other pending application) for the vertical edges of said sliding block or cross-head. For the purpose of imparting a vertically-reciprocatory movement to the said block and knife I employ a pitman or connecting-rod 12, operated from a crank 13, carried at one end of the armature-shaft 14 of an electric motor 15, which is suitably supported on a bracket at the upper part of the standard and which is properly connected up electrically and derives its

current from any suitable source. The said crank 13 is partially received in a rim 16, formed on the motor-frame 17 at one side of the machine, and thus is said crank guided in its rotation. The latter device is made as light as possible, and it is also preferably provided at the proper point with a suitable weight 18 to increase its momentum to derive the proper driving effect therefrom. It is highly important that the connection between the said crank and pitman be perfectly tight, yet capable of quick action and easy working without noise or rattling of the parts. Hence I form integrally with the crank a screw-threaded crank-pin 19, upon which is fitted a removable or threaded bushing 20, closed at the outer end by a cap 21, adapted to receive a screw-driver or similar implement and having a peripheral flange or extension for properly retaining the pitman-bearings. The upper end of said pitman or connecting-rod 12 is formed with a split bearing 22, preferably having a split lining 23 to receive the wear, and said bearing 22 fits the bushing 20 and is adjusted to any degree of tightness by means of the screw 24, the said lining 23 readily conforming thereto. The lower end of the pitman or connecting-rod is provided with a similar split bearing 25 and an adjusting or tightening screw 26 therefor, as well as a split lining 27, the said bearing fitting upon a pin 28, formed with and projecting from the outside of the cross-head or block. A screw 29 serves to secure the said split bearing 25 in place upon the said pin 28, which latter is hollow and screw-threaded to receive said screw. It will thus be seen that all wear between the upper end of said pitman or connecting-rod and the crank-pin 19 is borne by the lining 23 and the removable bushing 20 and that it is only necessary to replace one or the other of these parts whenever the connection finally becomes too loose or too much worn to be remedied by simple adjustments thereof. Thus, too, is obviated the necessity of removing the entire crank, either to replace it by another or to fit or provide the same with a new crank-pin, as would otherwise be necessary. It is also highly important in such a construction and arrangement of parts that the movable connection between the crank and pitman be thoroughly and perfectly lubricated in such manner that no injury to the fabric will occur by leakage or escape of the oil or other lubricant. For this purpose I construct the said crank-pin hollow, as shown at 30, the inner end thereof leading to and communicating with a cavity or recess 31, formed on the inner side or surface of the crank, and in both the opening 30 and the said cavity or recess 31 I place a block or quantity of felt or other suitable material 32, packed in place and kept saturated with oil or other lubricant, which finds its way to the different working surfaces through suitable openings 33 and 34, Fig. 5, formed in the bushing and the hollow crank-pin, respectively. The lubricant can be injected into said openings from time to time, if desired, by which to keep the felt saturated. In some instances I have found it sufficient to use said felt in the pin only, in which case I then fill up or close the recess 30 with a plug of metal or any other suitable material which can be removed whenever it is desired to remove or place the felt in the pin. If desired, I may use a similar lubricating device for the lower end of the pitman or connecting-rod, but this is not necessary in most instances.

It will be seen from the construction explained that the working of my improved motor-operated mechanism is rendered most easy and perfect and that no injury to the material operated upon by the knife or other tool can possibly occur from leakage of the oil or lubricant.

I construct the armature-shaft 14 (see Fig. 2) of the motor with an exterior screw-thread 36 for a suitable distance from its inner end, and I also preferably bore the shaft for a short distance from the end to provide a receptacle for the lubricant, which receptacle is closed by a screw-plug 37. An opening 38 in the side of the shaft permits the lubricant to spread over the working or engaging surfaces of the parts, as is evident. Screwing on the inner end of the armature-shaft is a sleeve 39, which is of suitable length and which is notched transversely on opposite sides at the inner end, as shown at 40, and into said notches are received corresponding interlocking projections 41, formed at the adjacent end of the core 42 of the revolving armature 43 of the motor. The sleeve 39 projects somewhat beyond the motor-frame and is formed for a suitable distance with an exterior screw-thread 44, by means of which the crank 13 is securely fastened in place upon said sleeve or clutch member to revolve therewith and with the armature-shaft and armature. In order to reduce the noise and friction of the parts to a minimum, I form the exterior surface of the said sleeve with an annular groove 45, and I provide a circumferentially-divided bearing for the sleeve comprising two rings 46 and 47, each threaded exteriorly at 48 and screwing from opposite sides into a stationary ring 49, seated in the said circular rim in the motor-frame, the said rings being so constructed on their inner surfaces at 50 as to form a groove 51, which unites with the groove of the sleeve or clutch member to form a raceway for a series of antifriction-balls 52. The said stationary ring 49 is formed all the way through at one point with a threaded opening 53, in which is inserted from each side a screw 54, the heads of which screws bear or impinge upon the outer surfaces of the rings 46 and 47, and thus absolutely prevent any backward turning of said rings while the shaft is revolving. The rings 46 and 47 may each be unscrewed to any desired extent and again screwed up tightly by means of a suitable wrench or otherwise, and thus are they also

the means for effecting the adjustment of the bearing, as is obvious. The ring 49 is held stationary by means of a set-screw 55, Fig. 1, entering or passing through the circular rim 16 of the motor-frame. A similar rim 56 is formed or provided in the motor-frame at the opposite end, and in said rim 56 is seated a ring 57, held stationary by a screw 58, the said ring having a groove 59 on its inner surface. Formed on said shaft at its outer end is a nut 60, and at this end also the shaft has an opening 61, having a screw 62 for clamping to the shaft a suitable grinding-wheel (not shown) for the knife. Arranged on said shaft, also at this (outer) end, is an outer beveled or conical ring 63 and an inner ring 64 of similar construction, the two said rings being preferably separated by washers 64ª 65 and between them forming an annular groove 66, which unite with the groove 59 in ring 57 to form a raceway for antifriction-balls 67, and thus it will be seen that a similar bearing is also provided for the said outer end of the said armature-shaft. It will be understood that this shaft may be screwed up more tightly in the sleeve by application of a wrench to the said rigid nut 60, which latter is also an abutment for said outer ring. The said rings 63 and 64 are confined in place between the end 68 of the armature-core and the said nut 60, and it is evident that when the armature is rotated the core thereof, as well as the armature-shaft, the sleeve, and the crank, all revolve therewith. It will also be seen that the working of the parts or elements is most easy and regular and that either or all of them can be replaced by others when so far worn as to become unfit for further use. It is to be remarked, however, that in virtue of my improved construction and arrangement of mechanism the longevity of each of the parts or elements thereof is greatly increased, and hence the entire embodiment is available for use for a considerable length of time.

I do not wish to be understood as limiting myself to the precise details herein shown and described, since departures therefrom can be made without departing from the spirit or scope of my invention.

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

1. In a motor-actuated mechanism, driving and driven members, and a wrist connection therebetween comprising a pin on one member, and a removable bushing, constituting the bearing for the other member, fitted on said pin and having an outer integral retaining-flange, substantially as described.

2. In a motor-actuated mechanism, driving and driven members, and a wrist connection therebetween comprising a threaded pin on one member, and an interiorly-threaded bushing constituting the bearing for the other member screwed upon said pin and having an outer peripheral flange, substantially as described.

3. In a motor-actuated mechanism, driving and driven members, and a wrist connection therebetween comprising a threaded pin on one member, and an interiorly-threaded bushing, constituting the bearing for the other member, screwed upon said pin and having a screw-headed cap provided with a peripheral retaining-flange, substantially as described.

4. In a motor-actuated mechanism, driving and driven members, and a wrist connection therebetween comprising a hollow pin adapted to contain a lubricant and having a lateral oil-port, and a removable bushing, constituting the bearing for the other member, fitted on said pin and having integrally therewith an outer cap and peripheral retaining-flange, substantially as described.

5. In a motor-driven mechanism, including an electric motor, the combination with the armature having a core, of the shaft inclosed within said core, a sleeve fitting on said shaft and coupling the same with the core, a crank driven by said shaft, and a block or cross-head reciprocated from said crank, substantially as described.

6. In a motor-driven mechanism including an electric motor, the combination with the armature having a core, of the shaft, a coupling member fitting one end of the shaft and engaging the latter with said core, a crank fitting on said coupling member, a block or cross-head, and reciprocating connections between the latter and the crank, substantially as described.

7. In a motor-driven mechanism including an electric motor, the combination with the armature and its core, of the shaft screw-threaded at one end, a coupling member screwing thereon and notched at one end to engage said core, said clutch member being threaded exteriorly at its other end, a crank screwed thereon, a block or cross-head, and reciprocating connections between the latter and said crank, substantially as described.

8. In a motor-driven mechanism, the combination with the motor-shaft, of a coupling member on one end thereof locking the shaft to the motor, said coupling member being grooved externally, and antifriction-bearings comprising adjustable grooved rings and rotatable balls confined between the grooves of said rings and coupling member, substantially as described.

9. In a motor-driven mechanism including an electric motor, the combination with the armature-shaft, and the motor-frame having the circular frame at each side thereof, of the coupling member between the shaft and the armature, the same having an external groove, the stationary rings in said rims, the duplicate rings in each stationary ring uniting in forming raceways containing antifriction-balls, a crank driven by the shaft, a block or cross-head, and reciprocating connections between said block and the crank, substantially as described.

10. In a motor-driven mechanism including

an electric motor, the combination of the armature-shaft having a core, a coupling member locking the core to the shaft, a crank fitted on said coupling member and operating a device, and antifriction ball-bearings for each end of said shaft, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY ANDREW MEYER.

Witnesses:
E. P. MAIDMENT,
FRED KLEIN.

Correction in Letters Patent No. 702,371.

It is hereby certified that in Letters Patent No. 702,371, granted June 10, 1902, upon the application of Henry Andrew Meyer, of Cincinnati, Ohio, for an improvement in "Motor-Driven Devices or Mechanisms," was erroneously issued to said "Meyer" as owner of said invention; whereas the said Letters Patent should have been issued to *The Wolf Electrical Promoting Company, of Cincinnati, Ohio, a corporation of Ohio*, as owner of the entire interest in said invention, as shown by the assignments of record in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of July, A. D., 1902.

[SEAL.]

F. I. ALLEN,

Commissioner of Patents.