No. 661,693. Patented Nov. 13, 1900.

C. E. HAZELHURST.

MECHANICAL MOVEMENT.

(Application filed Mar. 3, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

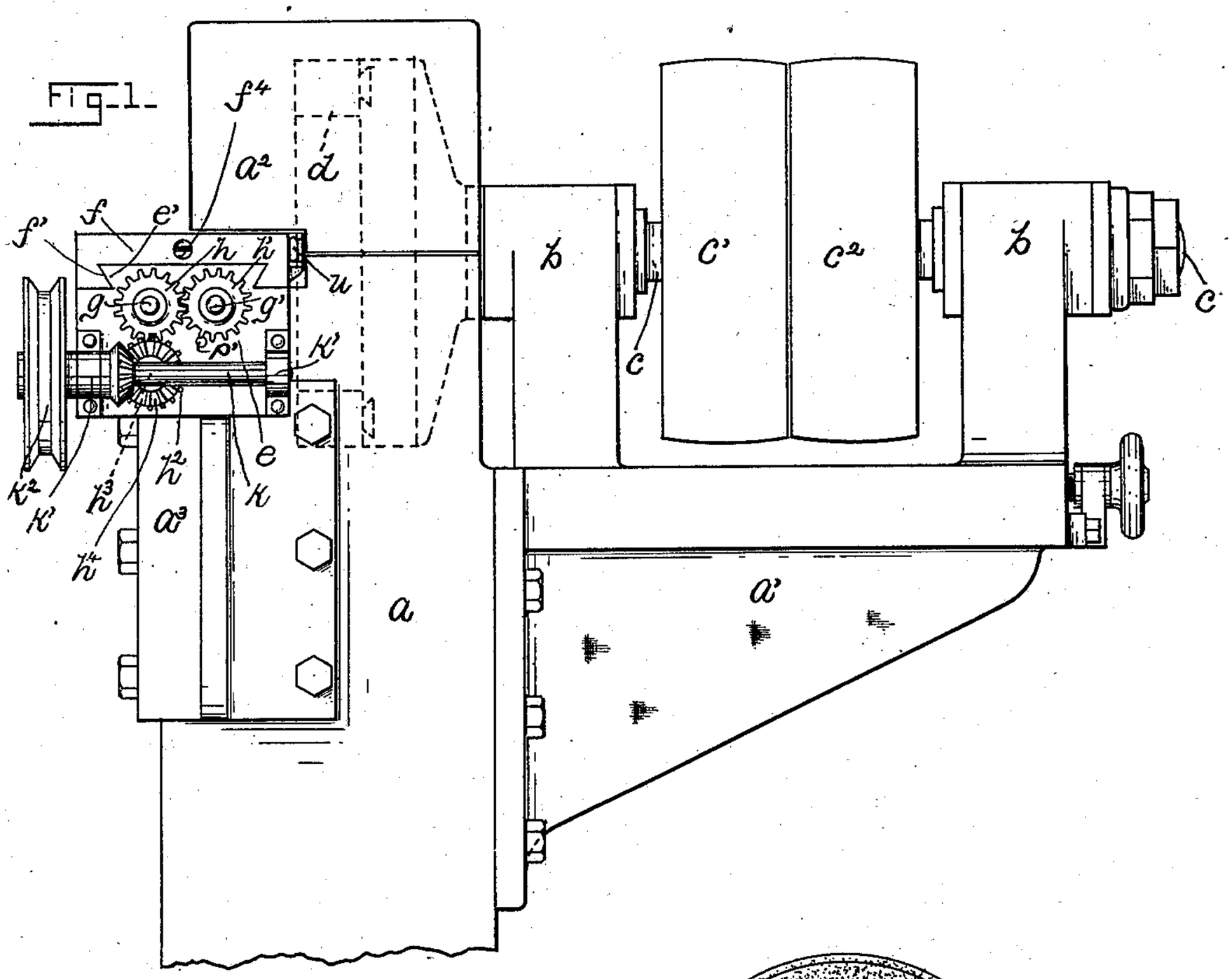
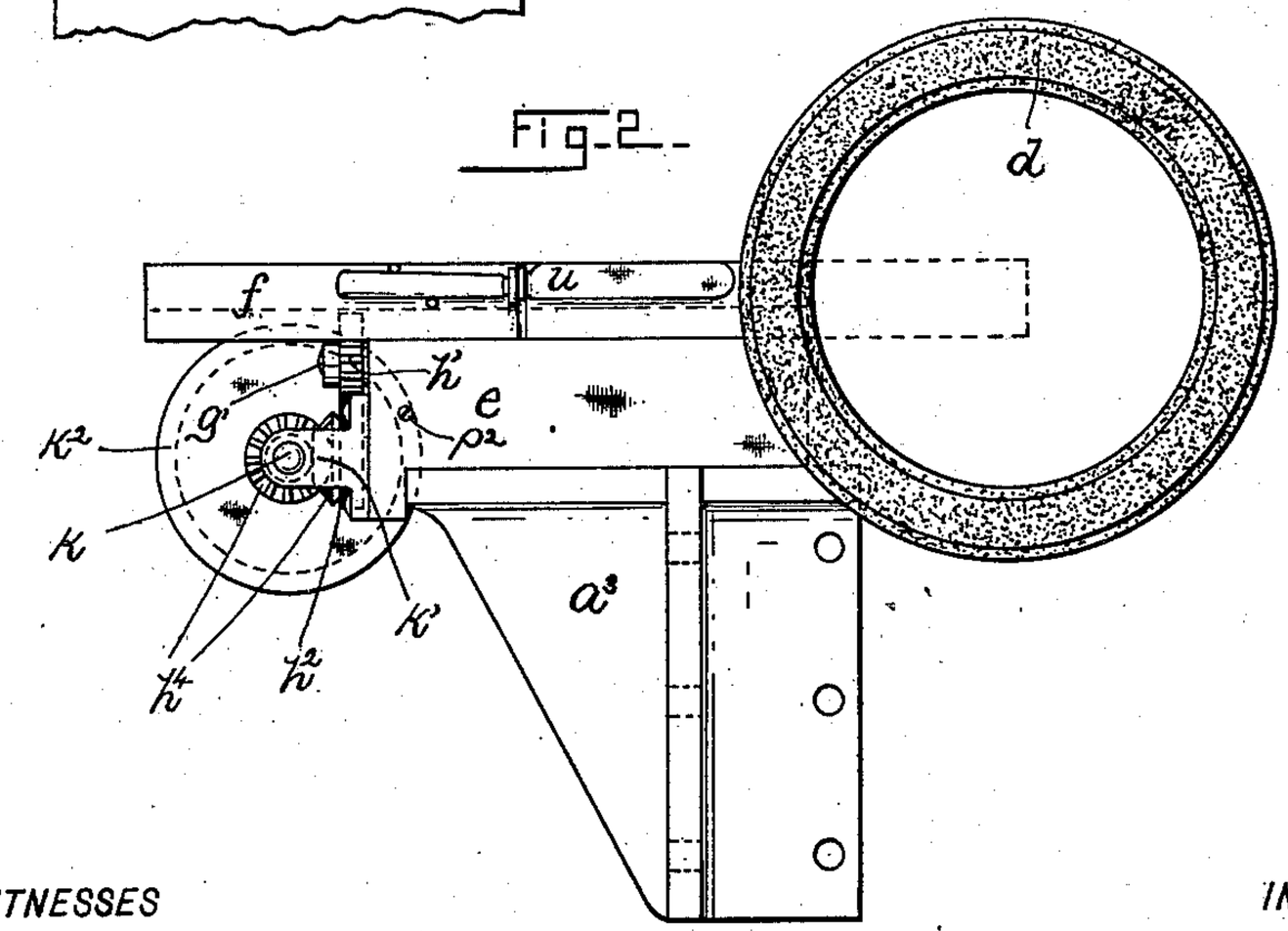


Fig. 2.



WITNESSES

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Fig. 3.

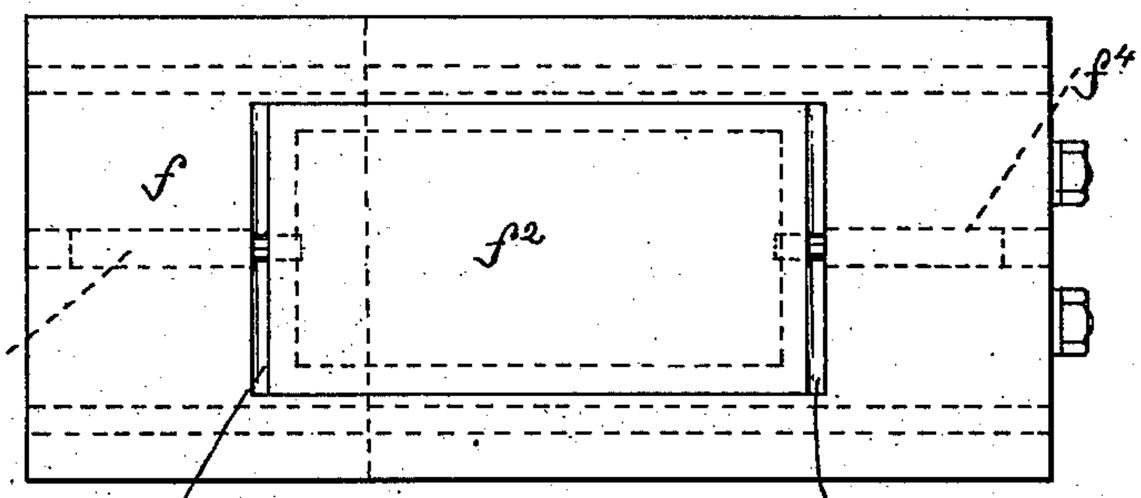


Fig. 7.

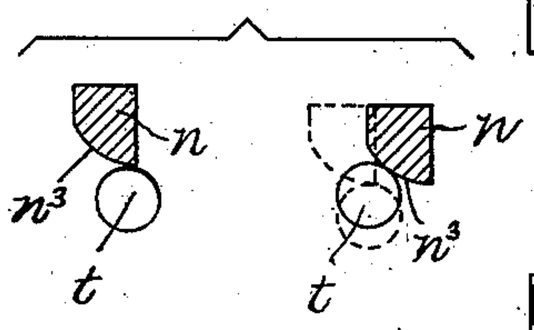


Fig. 4.

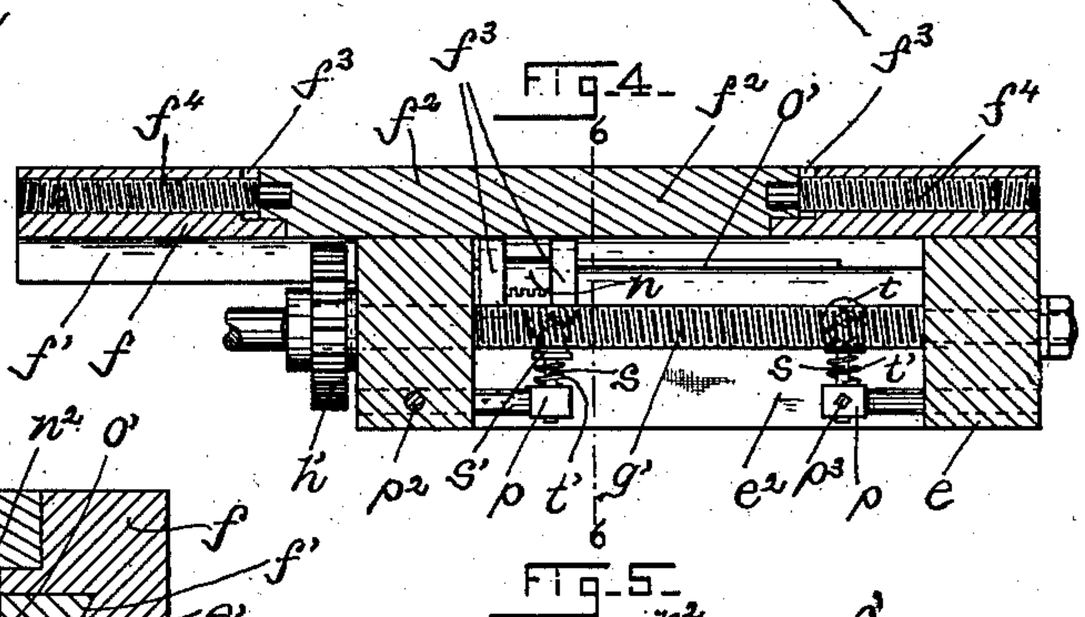


Fig. 6.

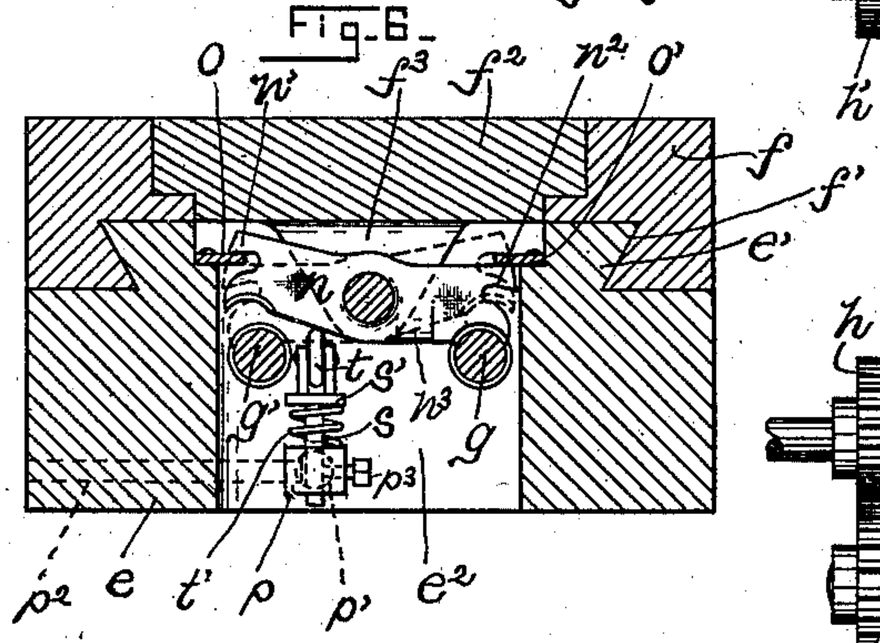
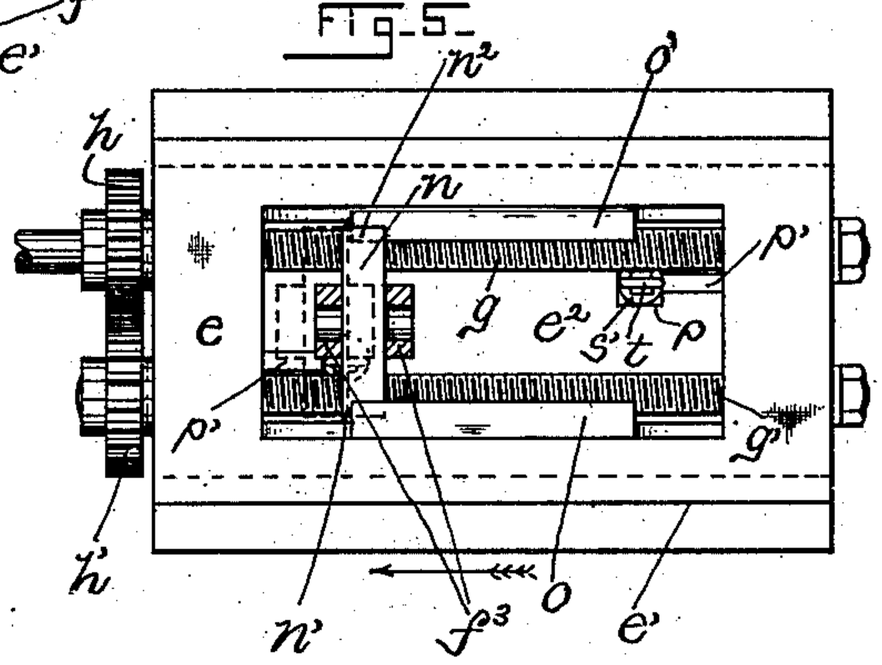


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES E. HAZELHURST, OF NORWICH, CONNECTICUT, ASSIGNOR OF ONE-THIRD TO WILLIAM A. BREED AND FREDERIC L. OSGOOD, OF SAME PLACE.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 661,693, dated November 13, 1900.

Application filed March 3, 1900. Serial No. 7,252. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. HAZELHURST, a citizen of the United States, residing at Norwich, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a full, clear, and exact description.

This invention is in that class of mechanism for converting rotary motion into reciprocatory motion which includes two parallel screws and nuts adapted to be alternately rocked into engagement with said screws. The object of said invention is to improve the means for rocking said nuts and also to provide a certain independent means of adjustment of the carriage to which the said nuts are secured, as I shall explain in detail hereinafter. Mechanism of this class is valuable for use with various kinds of machinery—such as cutlery-grinding machinery, gear-cutting machinery, and the like—in which it is desired to provide automatic reciprocatory motion. In this present case I have shown my said improvements as applied to cutlery-grinding machinery.

To assist in explaining my invention, the accompanying sheets of drawings have been provided, illustrating the same, as follows:

Figure 1 is an elevation of the upper portion of a grinding-machine fitted up with the newly-invented mechanism. Fig. 2 is a side elevation of the knife carriage or table and elements immediately related thereto as seen from the right hand of Fig. 1. Fig. 3 is a plan view of a table or carriage similar to that shown in Figs. 1 and 2. Fig. 4 is a longitudinal sectional view of the carriage of Fig. 3 and also of a bed upon which it travels. Fig. 5 is a plan view of the just-mentioned bed, the work-table being removed therefrom. Fig. 6 shows the table and bed in cross-section and on a somewhat enlarged scale, the said view being taken on the line 6 6 of Fig. 4 looking toward the left. Fig. 7 embraces two views illustrating the manner of operation of certain elements of the mechanism comprising the newly-improved mechanical movement.

Referring to the drawings, the letter a denotes the upper portion of the stand of a grinding-machine, and a' a bracket secured thereto, supporting bearings b of a shaft c, which latter bears fast and loose pulleys c' c^2, and at one end, within a suitable casing, (denoted by a^2,) the said shaft c bears the usual grinding-wheel d. The cutlery to be ground is introduced to the face of the grinding-wheel d, and to accomplish this end I suitably secure such cutlery to a horizontally-reciprocating table driven by my newly-invented mechanism and arranged to travel toward and away from the said grinding-wheel. My said mechanism is shown as supported by a bracket a^3, secured to the frame a and bearing a rectangular block e, extending at right angles to the shaft c and having mounted thereon the above-mentioned table or carriage, (denoted by the letter f.) The table f is adapted to travel upon the block e, and said block and table are respectively provided with ways e' and grooves f', as shown. The block e has a rectangular opening e^2 therethrough, which is bridged by two parallel screws g g', journaled in suitable bearings in the end walls of the opening e^2 and bearing, respectively, gears h h' adjacent to the outer face of one end of the block e, which said gears are in mesh with each other and the former of which is in mesh also with a spur-gear h^2, mounted upon a stud h^3, projecting from said end wall, the gear h^2 having secured thereto one of a pair of miter-gears h^4, the companion gear of said pair being mounted upon a shaft k, having bearings k' secured to the block e and bearing a driving-pulley k^2. Upon the revolution of the driving-pulley k^2 motion is imparted from its shaft k through the pair of bevel-gears h^4 to the spur-gear h^2 and from the latter to the gear h and the gear h', resulting in revolving the screws g g' in opposite directions.

Depending from the under side of the table f (or rather from a block f^2, adjustably secured to the said table, as hereinafter described) are two downwardly-projecting portions f^3, which enter the opening e^2 of the bed e and have pivotally secured between them that which I term a "clutch-bar" n. The clutch-bar n is pivotally supported midway its length and extends at right angles to the table f, and the opposite ends have tapped

portions (substantially like the half-section of a nut) adapted to engage, respectively, the screws g g'.

By reference to Figs. 5 and 6 it will be seen that when either tapped end of the bar n is in engagement with its adjacent screw g or g' the said end is held in such engagement by the projections n' n^2, which engage, respectively, the upper and under faces of the strips o and o' in the manner shown in the drawings, and it will be understood that when thus in engagement the rotation of the engaged screw will cause the clutch-bar to travel thereon. Assuming the elements under consideration to be, respectively, in the positions shown in Fig. 5 and the clutch-bar-engaging screw g' to be traveling in the direction of the arrow, it will be seen that when the position shown in dotted lines in the said figure is reached the projections n' n^2 will have traveled from engagement with the strips o o'. When the clutch-bar n reaches the position just mentioned, the same may be rocked upon its supporting-pin to cause the end of the bar adjacent the screw g to engage the last-named screw, which, it will be remembered, revolves in the direction the reverse to that of the screw g', and therefore effects the driving of the carriage in the opposite direction to that indicated by the arrow of Fig. 5. It will now be seen that by rocking the clutch-bar n upon the completion of the travel of the carriage in either direction to cause it to leave the screw serving to actuate the carriage in said direction and to engage the companion screw the said carriage will be caused to travel with a reciprocating motion.

In connection with the clutch-bar n automatically-acting mechanism is provided for rocking the said clutch-bar upon the completion of the travel of the carriage in either direction, which mechanism I will now proceed to describe. Located in the rectangular opening e^2 of the block e near each end of the said opening are blocks p, having stem portions p', which enter the end walls of the opening e^2 and serve to support their respective blocks in position. To retain the blocks p against accidental displacement and to prevent rotation of the stems p', set-screws p^2 are located in the block e, the inner ends of which screws engage flattened faces provided on the stems p'. Each block p supports a vertical rod s, which is capable of longitudinal movement in the said block, but is prevented from rotation by means of a set-screw p^3, which screw is located in the block and the inner end of which engages the rod s. The rod s is provided with a head portion s', having journaled in bearings formed thereon a small wheel or roll t. The letter t' denotes a spring which encircles the rod s and the opposite ends of which engage, respectively, the said head t and the block p. The rolls t lie normally in the path of the clutch-bar n, and when the latter is traveling in a given direction the end of said bar that is in engagement with its screw g or g', as the case may be, comes into contact with the roll t just prior to the traveling of the clutch-bar from engagement with the strips o o'.

Referring now particularly to Figs. 5 and 6, in which it is assumed that the clutch-bar traveling in the direction of the arrow of Fig. 5 has just come into engagement with the roll t adjacent the screw g', continued travel of the clutch-bar n in the direction indicated then serves to force the roll t downward, the latter riding upon an inclined face n^3, provided in the clutch-bar, as will be readily understood by reference to the right-hand diagram of Fig. 7. The downward travel of the roll t effects the compression of the spring t' and is continued until the said roll is beneath the clutch-bar, as shown in dotted lines in said Fig. 7. The just-mentioned positions of the clutch-bar and roll are reached substantially simultaneously with the traveling of the bar from engagement with the strip o or o', and when thus disengaged the spring t' at once acts by expansion to force the roll t upward, and thereby effects the rocking of the clutch-bar n from engagement with the screw g' into engagement with the screw g, as will be understood by reference to Fig. 7 and as shown in Fig. 6, the said bar having been rocked from the position shown in dotted lines in the last-named figure to that shown in full lines. The roll t, engaging the clutch-bar in the manner shown in Fig. 6, serves to retain the said clutch-bar in engagement with the screw g until the latter, actuating the clutch-bar to travel in the direction the reverse to that indicated by the arrow of Fig. 5, has caused said clutch-bar to again engage the strips o o', which latter serve to retain the clutch-bar in engagement with the screw g until the opposite end of the strips o o' are reached, when a duplication of the clutch-bar-rocking mechanism acts to again rock the said clutch-bar into engagement with the screw g'. With the described automatically-acting mechanism continuous reciprocatory travel of the carriage is obtained, the amount of such travel being of course regulated by the length of the strips o o'.

I have already mentioned the fact that the projections between which the clutch-bar n is pivoted are not formed directly on the table f, but rather on a rectangular block f^2, adjustably secured to the said table. The block f^2 is located in a rectangular opening f^3 in the table f and is capable of limited endwise movement in said opening. To retain the block f^2 in position, the table f is bored and tapped from each end into the opening f^3 to receive screws f^4, the ends of which are shouldered down and enter the opposite ends of the block f^2, as will be seen in Fig. 3. Upon properly manipulating the screws f^4 the block f^2 may be moved in the table f, thus allowing the table f to be adjusted relatively to the clutch-bar n, carried by the said block f^2, or the said screws may be withdrawn

sufficiently to permit the removal of the block in order that the interior mechanism of the device may be readily assembled or disassembled.

When my newly-invented mechanical movement is applied to cutlery-grinding machinery, as shown in Figs. 1 and 2, a knife u is secured to the side of the carriage f, substantially as shown in Fig. 2, and the driving mechanism is so arranged as to cause the carriage to carry the knife into engagement with the emery-wheel d, the position of the said knife and the extent of travel of the carriage being such that the knife-blade will be ground from its outer end to the bolster.

While I have shown and described two of the strips o o', I do not wish to confine myself to such construction, as it will be apparent that when the clutch-bar projections n' n^2 are adapted to engage both the upper and lower faces of the strips o o' only one such strip is necessary to the successful working of the described mechanism.

It will of course be apparent that the screws g g' need not necessarily be geared together and whether geared together or not that they revolve at the same speed, as it will be seen that they could revolve at different speeds and thus cause the carriage to travel rapidly in one direction and more slowly in the opposite direction, a very desirable feature when my device is utilized with a certain class of machinery. It will also be seen that it is not necessary to the successful working of my invention that the screws g g' and the mechanism for operating the clutch-bar and for holding the same in engagement with said screws be located in the stationary bed or element of the device and the said clutch-bar be carried by the carriage or moving element, as a reversal of this construction would operate equally well.

Having now described my invention, I claim—

1. The combination with two screws, a rocking beam provided with nuts adapted to alternately engage said screws, and having inclined surfaces n^3 as set forth, means for revolving said screws, and means for rocking the said beam consisting of spring-actuated rolls t located in the path of the said inclined surfaces.

2. In combination, a fixed bed, a carriage, a plate f^2 adjustably mounted on said carriage, two screws revolubly mounted in the said bed, a rocking beam fulcrumed in said plate f^2 and having nuts adapted to engage the screws as set forth, and means, consisting of spring-actuated rolls lying in the path of the said beam, for rocking the latter to cause the said nuts to alternately engage the said screws.

Signed at Norwich, Connecticut, this 21st day of February, 1900.

CHARLES E. HAZELHURST.

Witnesses:

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FRANK H. ALLEN.