H. F. KELLEMEN.

FEEDING DEVICE FOR MILLING MACHINES.

APPLICATION FILED DEC. 30, 1907.

957,562. Patented May 10, 1910.

2 SHEETS—SHEET 1.

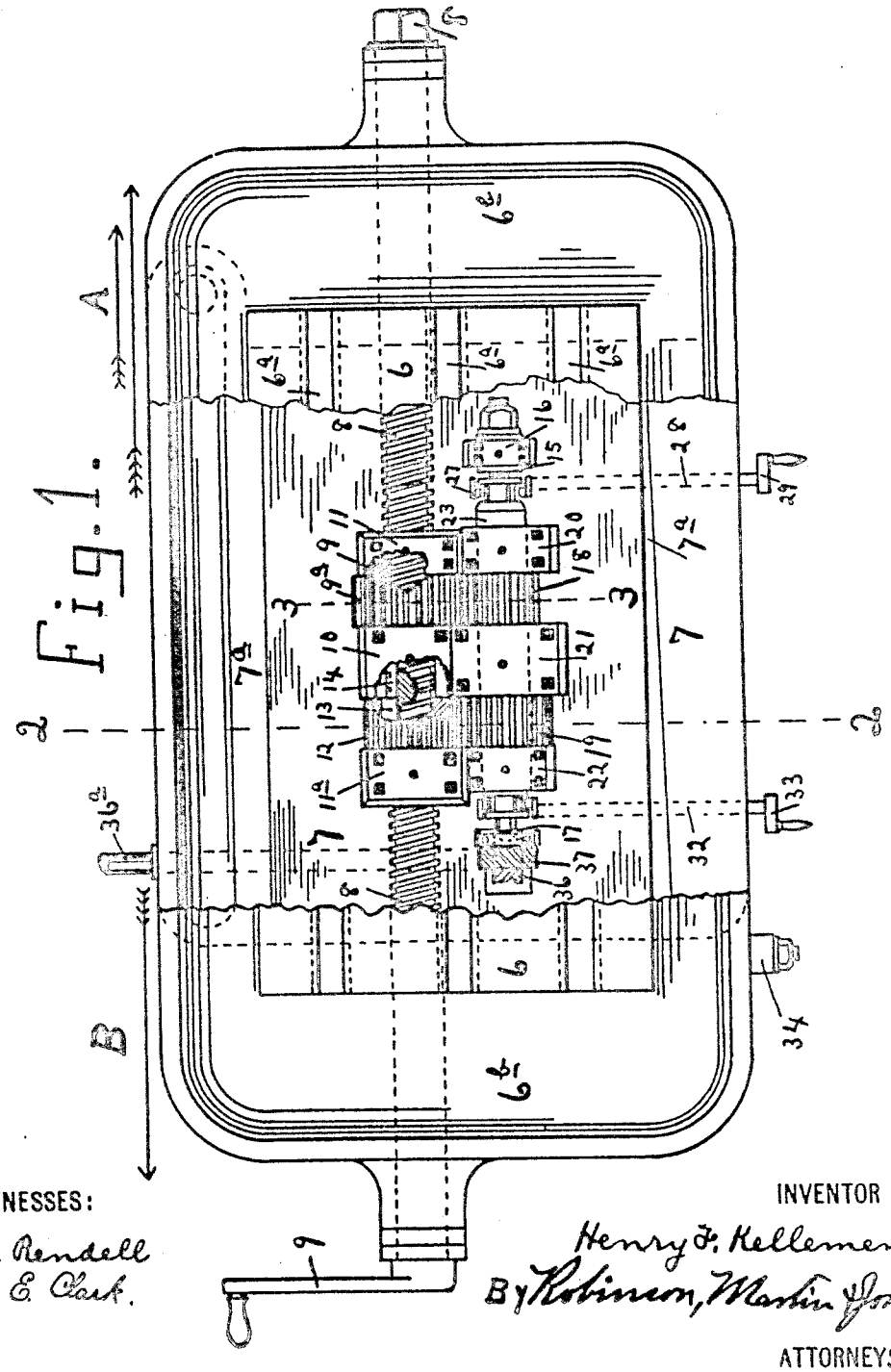

Fig. 1.

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INVENTOR

Henry F. Kellemen

By Robinson, Martin & Jones

ATTORNEYS

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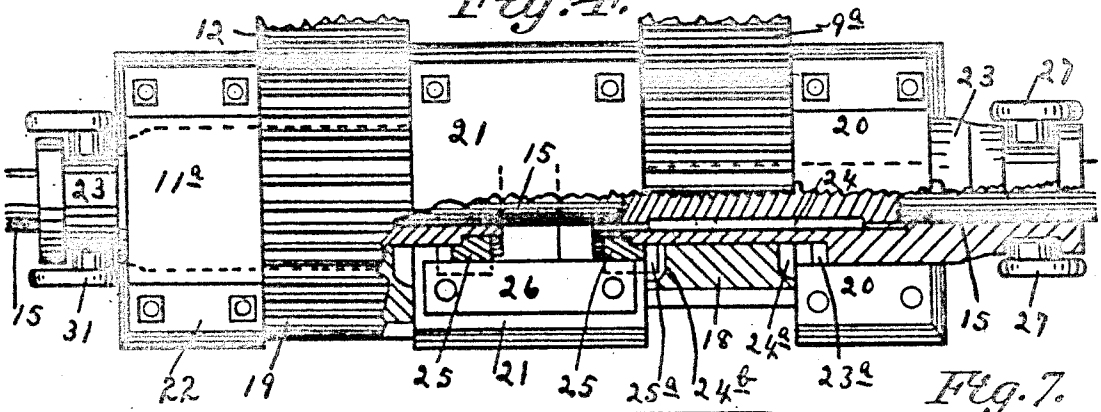
2 SHEETS—SHEET 2.

Fig. 4.



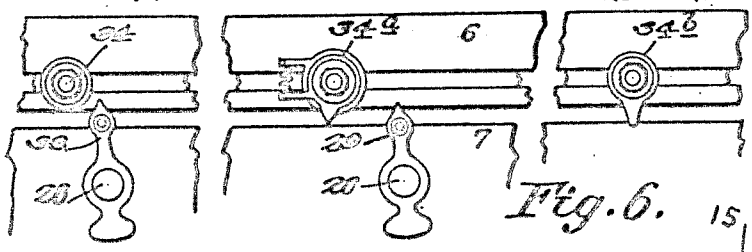
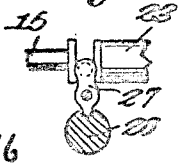
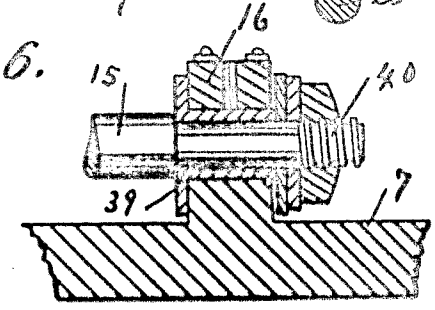


Fig. 6.

Fig. 7.





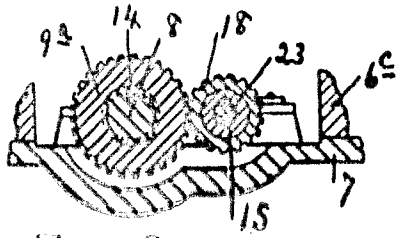


Fig. 3.

Fig. 5.

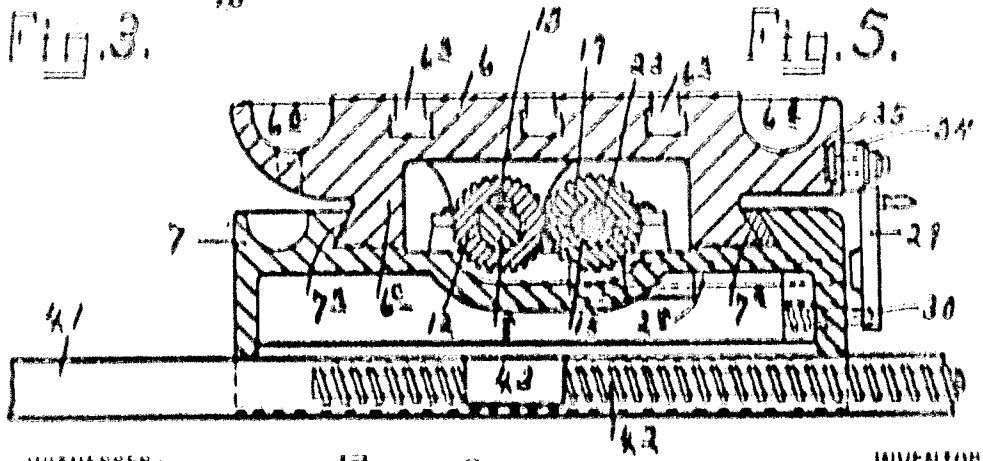


Fig. 2.

WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY F. KELLEMEN, OF UTICA, NEW YORK, ASSIGNOR TO UTICA DROP FORGE & TOOL COMPANY, OF UTICA, NEW YORK, A CORPORATION.

FEEDING DEVICE FOR MILLING-MACHINES.

957,582. Specification of Letters Patent. **Patented May 10, 1910.**

Application filed December 30, 1907. Serial No. 408,681.

To all whom it may concern:

Be it known that I, HENRY F. KELLEMEN, of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Feeding Devices for Milling-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form part of this specification.

The object of my present invention is to provide an improved feeding mechanism for the platen or bed of a milling machine or other machine, which is simple in construction and efficient and performs the duty of rapidly moving the platen or bed from loading position to the cutter or tool, then automatically reducing the feed to a speed suitable during the milling or cutting operation and then after completion of the cut automatically returning the bed or platen rapidly to and stopping at the loading position.

Figure 1 shows a plan view of the bed or platen with the central section broken out, showing plan and sectional views of the mechanism arranged on the platen base immediately under the platen. Fig. 2 is a section taken on line 2—2 of Fig. 1. Fig. 3 is a section taken on line 3—3 of Fig. 1. Fig. 4 is an enlarged detail of a portion of the mechanism employed in the device, with some of the details shown in section. Fig. 5 is another enlarged vertical sectional detail of certain parts of the construction. Figs. 6 and 7 show details of the construction relating to the mechanism for throwing the said mechanism into and out of gear.

Referring to the reference letters and figures in a more particular description, 6 indicates the platen having, so far as the upper surface is concerned, the usual platform portion traversed by grooves 6^a for the reception of fastening devices for securing vises, chucks or articles to the platen, and having the surrounding gutter 6^b to catch the overflow of lubricant and chips. The platen is mounted in slide-ways 7^a of the platen base 7 so as to have a reciprocating movement thereon, the platen being provided with the slide-way projections 6^c engaging with those of the base. Supported at each end on the platen and mounted for free rotation is the main feed screw 8. This screw is held against longitudinal movement with reference to the platen and may be provided on one or both ends with a hand crank 9, by means of which it can be manually rotated. Provided on the screw 8 is a rotatable nut 9 having a portion constituting a gear pinion 9^a. This nut is confined against longitudinal movement with reference to the base 7 by boxes or projections 10, 11 and 11^a on the base 7. Also provided on the screw 8 is a gear pinion 12. This pinion is free to slide along the screw 8, but is capable of rotating the screw by reason of being provided with a feather or key 13 engaging in a longitudinal keyseat or groove 14 in the screw 8.

For the purpose of rotating the screw 8 through the medium of the pinion 12 and the nut 9 through the medium of the gear pinion portion 9^a, there is provided a jack shaft 15 mounted in suitable bearings 16 and 17 on the base 7. On this shaft 15 are loosely mounted the two gear pinions 18 and 19 meshing respectively with the gear portion 9^a of the nut and the gear pinion 12 of the screw. These pinions are held in place laterally by boxes or projections 20, 21 and 22 provided on the base 7. Substantially duplicate mechanism is provided for coupling these pinions 18 and 19 to the shaft 15 when required to be rotated or holding them fixed with reference to the base 7 when their rotation is not required or desired. Inclosing the portion of the shaft 15 which extends through the box or projection 20 is a clutch sleeve 23. This sleeve 23 is longitudinally movable on the shaft 15, but is coupled thereto for rotation by a key or feather 24. The sleeve 23 is provided with clutch teeth 23^a adapted to engage with clutch teeth 24^a in the side of the gear pinion 18 when the sleeve is shifted in one direction. When this engagement takes place the gear pinion 18 will be driven by the shaft 15. When the coupling of this clutch is released, means are provided for securing the gear pinion 18 against rotation. These means consist of a ring 25 mounted and secured on the reduced inner end of the sleeve 23, but free to permit the rotation of the sleeve with reference thereto and provided with clutch teeth 25^a adapted to engage with clutch teeth 24^b in the opposite side of the pinion 18 from the

clutch teeth 24ª. The rotation of the clutch ring 25 is prevented by a bit 26 secured in the box or base projection 21, the edge of which enters a groove or keyseat in the peripheral edge of the ring. This arrangement allows the ring 25 to be shifted laterally in connection with the clutch sleeve 23 to engage and disengage the teeth 25ª and 24ᵇ and still prevent the rotation of the clutch ring 25, while permitting the rotation of the sleeve 23. For shifting the clutch mechanism controlling the gear pinion 18, there is provided the usual fork 27 operated by the inner end of a rock shaft 28 mounted in the base 7, see Fig. 7. At the outer end the shaft 28 is provided with a crank or lever 29 by means of which the clutch mechanism can be manually or automatically operated, and this mechanism may be provided with a spring check or click 30 engaging with the lever 29 to maintain the clutch mechanism in either of its normal positions of adjustment.

For operating the clutch mechanism which controls the gear pinion 19, there is provided the usual clutch fork 31 mounted on the inner end of a rock shaft 32 operated by the base and carrying at its outer end the crank or lever 33. This mechanism is similar in its details to that previously mentioned and more fully illustrated, see Fig. 7.

For automatically tripping or operating the clutch mechanism controlling the gears 18 and 19 through the medium of the levers 29 and 33, there will be provided on the edge of the platen a number of adjustable trips or stops 34, 34ª and 34ᵇ. These may be adjustably secured along the edge of the platen in any desired position by bolts engaging in the longitudinal T-shaped slot 35 provided in the edge of the platen.

For driving the jack shaft 15 there is provided a shaft 36ª extending in part transversely through the base 7. The shafts 36 and 15 may be connected by the spiral or worm toothed gears 36 and 37 provided on the shafts 15 and 36 respectively. In order to more effectively hold the shaft 15 against lateral movement, particularly incident to the use of the spiral gears 36 and 37, the opposite end of the shaft from the gear 37 is somewhat reduced and carries the spool-shaped separable sleeves 39 received in the bearing box 16, and by its flanges engaging with the ends of the box and supported against lateral movement in the box. The sleeves 39 rotate in the box and the end of the shaft 15 is firmly secured to the sleeves preferably by means of a screw and nut 40. The platen base 7 in practice will preferably be mounted on ways 41 on the machine frame for adjustment laterally or transversely to the line of the movement of the platen on the base 7. For accomplishing this lateral adjustment or positioning of the base 7 on the machine frame, there may be provided a manually operated screw 42 engaging in a nut 43 on the base 7. The shaft 36ª may have a telescoping section to compensate for the lateral adjustment of the base 7, but these are details aside from my present invention and further description may be omitted.

It is evident that when power is applied to the jack shaft 15 to rotate the same and the clutch mechanism is adjusted to couple the gear pinion 19 to the shaft 15, that the screw 8 will be rotated, and if the pitch of the screw 8 is in the right direction the platen will be moved in the direction indicated by the arrows A at a relatively rapid speed, inasmuch as a screw of steep pitch will preferably be employed, and in this case the nut 9 held against rotation. This preliminary rapid movement of the platen may be well utilized to move the platen from what is known as the loading position up to the point where the cutting operation is to begin.

It is also obvious that if the clutch mechanism securing the gear 18 is released and this gear is then coupled to the shaft 15 also, that the nut 9 will then be rotated in the same direction as the screw 8 is being rotated. The gear 18, as compared with the gear 9ª of the nut, being relatively smaller than the gear 19, as compared with the screw gear 12, it is obvious that the speed of the rotation of the nut 9 will be less than that of the screw. The rotation of the nut 9, however, counteracts partially, and, as shown, even largely, the action of the screw 8 in feeding forward the platen, and hence the speed of the platen is greatly reduced when the nut 9 is also driven. The speed of the platen at this time will be regulated by the relative size of the several gears employed. This last described speed or feed of the platen may well be utilized for the feeding of the platen during the cutting or milling operation.

It is further obvious that if while the nut 9 is being driven the rotation of the screw 8 be stopped and the screw locked, as may be readily accomplished by the clutch mechanism controlled by the lever 33, that then the platen will be moved in the direction indicated by the arrow B. This movement can be advantageously utilized for returning the platen to the starting or loading position and the movement is comparatively rapid, although somewhat slower than the preliminary feeding movement first described.

After the operator has adjusted the work in and secured it on the platen, he throws in the preliminary fast feed by swinging the lever 33 over toward the left, as shown in Figs. 1 and 6. This operation releases the clutch securing the pinions 19 and 12 against rotation and couples the pinion 19 to the

shaft 15, which causes the screw 8 to be rotated. The trip 34^a will be arranged at a suitable point on the side of the platen so as to engage with the lever 29 and operate it to throw in the clutch coupling the pinion 18 to the shaft 15 and release the clutch securing this pinion against rotation previously. When the pinion 18 is also rotating with the shaft 15, the nut 9 will be rotated in the same direction as the screw 8 at a reduced speed, and the platen will be fed forward in the direction indicated by the arrow A at a reduced speed. The trip or stop 34 will be adjusted at a suitable position on the side of the platen to engage and operate the lever 33. This operation will consist in throwing out the clutch which couples the pinion 19 to the shaft 15 and securing this pinion against rotation. When so held the movement of the platen will be reversed by reason of the continued operation of the nut 9 and it will be moved in the direction indicated by the arrow B quite rapidly, relatively speaking. The stop or trip 34^b will be adjusted to a suitable point on the side of the platen so that it will at an opportune time engage the lever 29 and operate the same, and through the medium of the connecting mechanism throw out the clutch, coupling the pinion 18 to the shaft 15, and at the same time secure this pinion against rotation. This brings the platen to a stop.

It is obvious that modifications and changes in and from the construction herein described may be made without departing from the spirit of my invention, or the subject matter intended to be covered by the claims.

It is also obvious that the essential parts of the mechanism may be with or without material modification utilized in planers, drill presses and other machines where a variable feed and return are desirable.

What I claim as new and desire to secure by Letters Patent is:

1. In a feeding mechanism of the character herein described, a base having slideways, a platen mounted on said ways, a rotatable screw connected to the platen for longitudinal movement therewith and arranged parallel with the ways, a pinion for rotating the screw slidably mounted on the screw and laterally confined on the base, a nut mounted on the screw and laterally confined on the base, actuating mechanism for said pinion and said nut, means for operatively connecting said pinion with said actuating mechanism or for holding it against rotation, and means for operatively connecting said nut with said actuating mechanism or for holding it against rotation.

2. In a variable and return feed device, the combination of a longitudinally movable feed screw longitudinally grooved in the threaded portion, a rotatable gear pinion nut mounted on the screw and held against lateral movement, a gear pinion slidably mounted on the threaded portion of the screw and having a bit engaging in the longitudinal groove thereof and held against lateral movement, a driven jack shaft parallel with the screw, independent unequal gear pinions loosely mounted on the jack shaft and meshing with said nut and screw pinion respectively, means fixed against rotation with said jack shaft gears, and independent clutch mechanisms for each of said jack shaft gears, each of said mechanisms adapted, when in one position, to connect its corresponding gear to said jack shaft for rotation therewith, and when in another position to connect said gear with said fixed means for holding it against rotation.

3. In a feeding mechanism of the character herein described, a base having slideways, a platen mounted on said ways, a rotatable screw connected to the platen for longitudinal movement therewith and arranged parallel with the ways and longitudinally grooved in the threaded portion thereof, a rotatable gear pinion nut mounted on the screw and held against lateral movement on the base, a gear pinion slidably mounted on the threaded portion of the screw and having a bit engaging in the longitudinal groove thereof and held against lateral movement on the base, a driven jack shaft mounted in bearings on the base parallel with the screw, independent unequal gear pinions loosely mounted on the jack shaft and meshing with said nut and screw pinions respectively, independent clutch mechanisms for each of said jack shaft gears operable to connect the gear to the jack shaft or to release it from the same, and a set of trips mounted on the platen and adapted to operate said clutch mechanisms, substantially as set forth.

In witness whereof, I have affixed my signature, in presence of two witnesses, this 24th day of December 1907.

HENRY F. KELLEMEN.

Witnesses:
EMMA S. HESSE,
SARAH E. CLARK.