J. PARKER.

FEEDING MECHANISM.

APPLICATION FILED JULY 24, 1915.

1,295,583.

Patented Feb. 25, 1919.

2 SHEETS—SHEET 1.

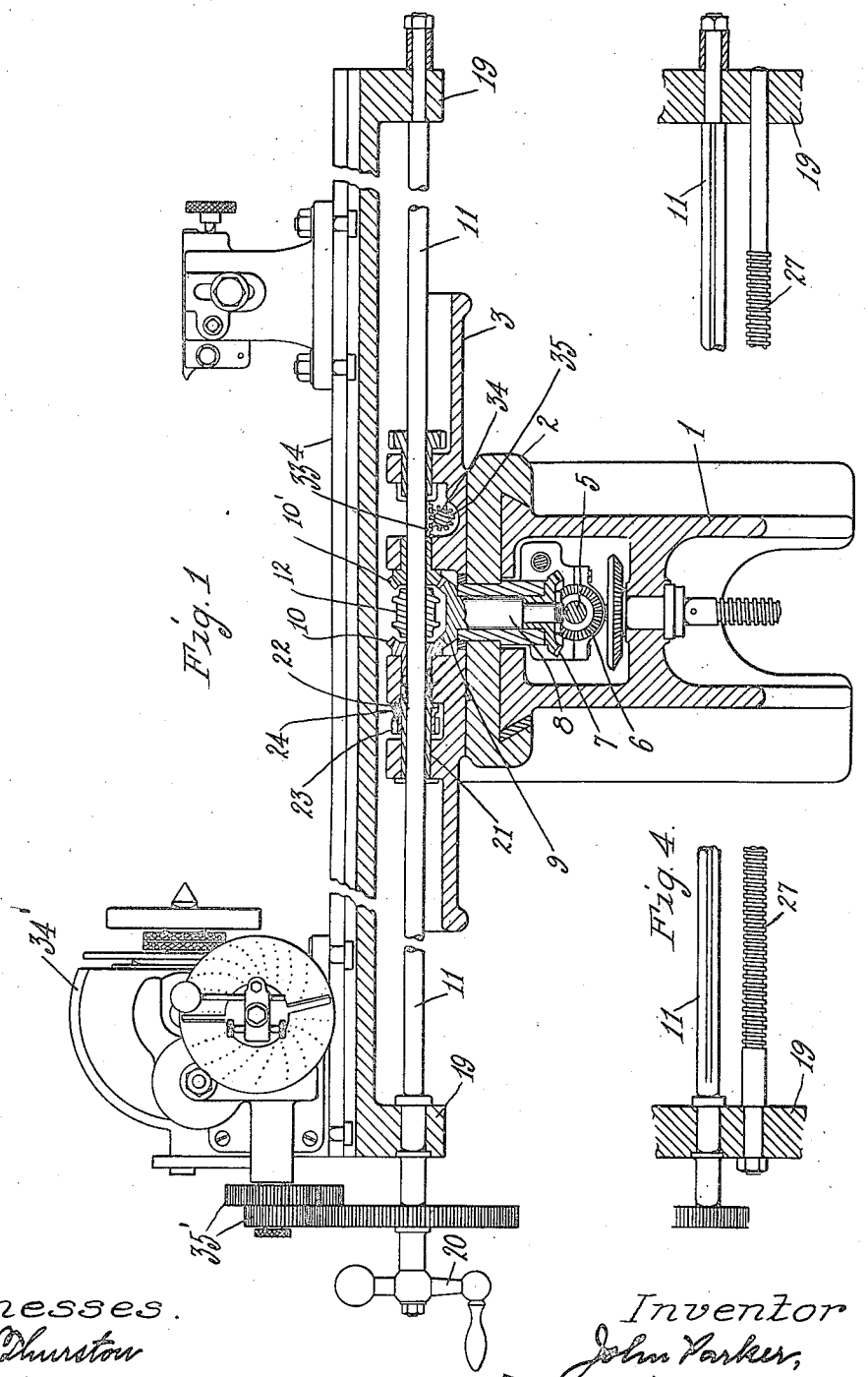


Fig. 1

Fig. 4.

Witnesses.
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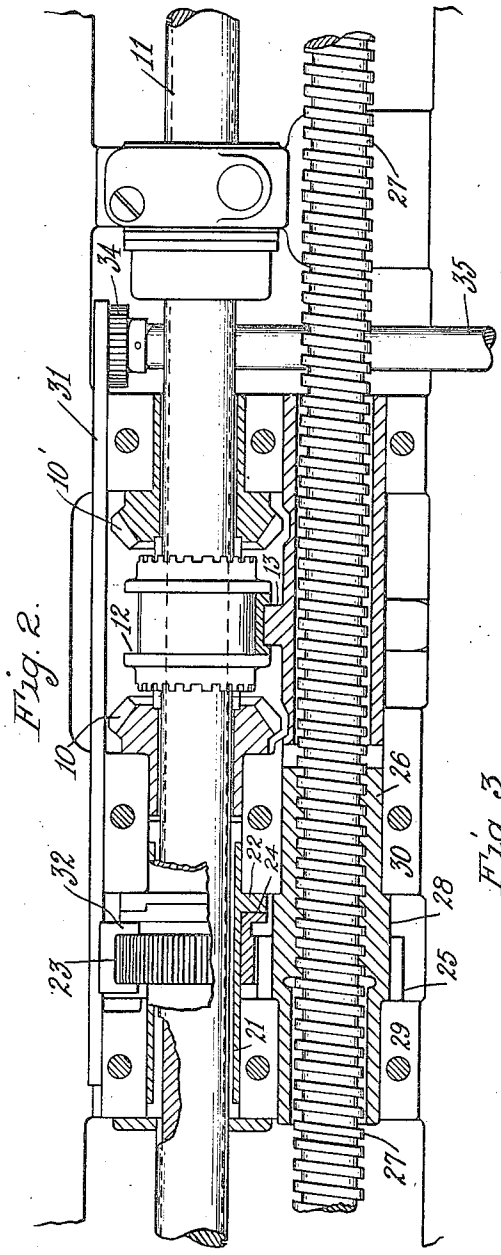


Fig. 2.

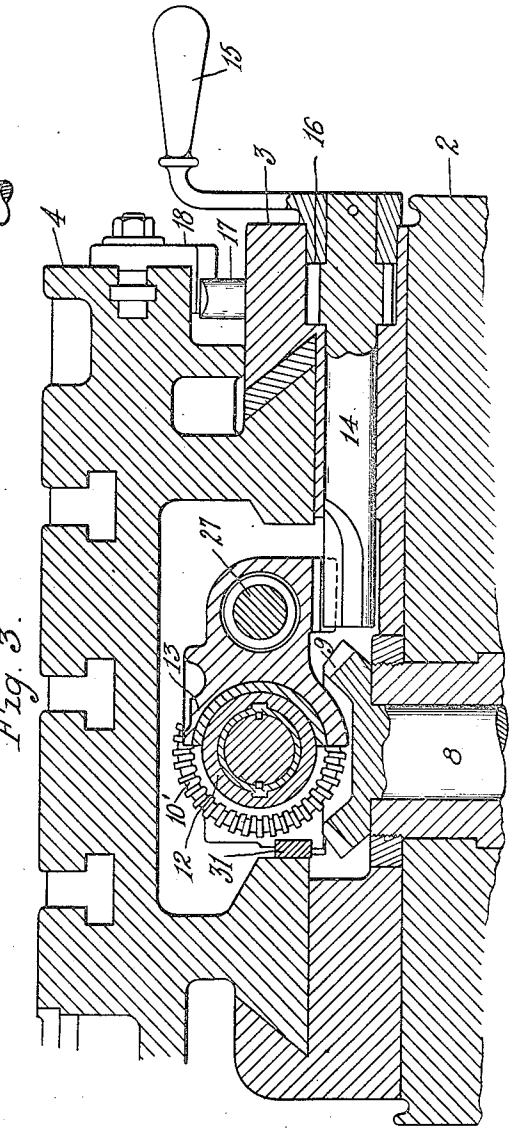


Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN PARKER, OF CRANSTON, RHODE ISLAND, ASSIGNOR TO BROWN & SHARPE MANUFACTURING COMPANY, OF PROVIDENCE, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

FEEDING MECHANISM.

1,295,583. Specification of Letters Patent. Patented Feb. 25, 1919.

Application filed July 24, 1915. Serial No. 41,649.

To all whom it may concern:

Be it known that I, JOHN PARKER, of the city of Cranston and county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Feeding Mechanism; and I do hereby declare the following specification, taken in connection with the accompanying drawings, forming a part of the same, to be a full, clear, and exact description thereof.

The present invention relates to mechanism for effecting the feed of a carriage, table, or other member of a machine. In the accompanying drawings the invention is shown as applied to a milling machine for feeding the work-carrying table, but the invention is equally applicable for use in other machines where it is desired to feed a part of the machine, and particularly where the part of the machine to be moved is of great size and weight.

Heretofore in milling machines it has been customary to employ a table-feeding mechanism embodying a shaft arranged parallel with the feed-screw, said shaft and feed-screw being connected by gears located at the outer ends thereof. With this construction the connection between said shaft and feed-screw in the large size machines is at a considerable distance from the bevel-gears which drive said shaft, and the result is that a great amount of torsion is set up in the shaft, which is objectionable for obvious reasons.

It is the primary object of the present invention to obviate this objectionable feature by providing a connection between the shaft and feed-screw which is located adjacent and in close proximity to the bevel-gears which drive said shaft, thereby producing a stronger and more efficient feeding mechanism.

To this end the invention consists in the novel construction, combination and arrangement of parts hereinafter described and more particularly set forth in the claims. In describing the invention in detail reference will be made to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section through the work-table of a milling machine;

Fig. 2 is an enlarged longitudinal horizontal section through a portion of the work-table just above the feed-screws;

Fig. 3 is an enlarged transverse vertical section through the central portion of the work-table.

Fig. 4 is a broken detail view.

Referring to the drawings, 1 represents a portion of the knee of a milling machine, 2 the clamp-bed, 3 the saddle and 4 the swivel work-table, all of the usual construction and arrangement.

The shaft 5 which is usually driven from the spindle of the milling machine and from which the power is taken for the cross-feed of the saddle and for the feed of the work-table is provided at its end with a bevel-gear 6, which meshes with the bevel-gear 7 upon the short shaft 8 mounted in the bed-plate.

The shaft 8 carries at its opposite end another bevel-gear 9 which meshes with two bevel-gears 10 and 10′, loosely mounted upon a driving shaft 11. A shifting clutch 12 is mounted upon the shaft 11 between the bevel-gears 10, 10′ and connected to said shaft by a spline-and-groove connection, so as to revolve with the shaft, but so as to be capable of sliding thereon. The clutch 12 is arranged to be operated by a clutch-shoe 13 which is adapted to be engaged by one end of a rock-shaft 14. The other end of said rock-shaft is provided with a hand-lever 15 and with a pinion 16 which is engaged by a rack upon plungers 17, which are arranged to be operated by dogs 18, all as shown in Fig. 3. The parts thus far described are of the usual construction.

The shaft 11 is journaled in lugs 19 upon the bottom of the work-table and is provided at its forward end with a ball-crank 20. Keyed upon the shaft 11 adjacent the bevel-gear 10 is a sleeve 21 having a clutch-member 22 formed thereon. Loosely mounted upon the sleeve 21 is a gear 23 having a clutch-member 24 formed thereon and arranged to engage and disengage clutch-member 22. The gear 23 meshes with a gear 25 formed upon the exterior of a rotatable feed-nut 26, which is mounted to revolve upon the stationary feed-screw 27. The feed-nut 26 is provided with an external shoulder 28, the ends of which are arranged to engage the ends of the bearings 29 and 30 and prevent longitudinal movement of said feed-nut. The feed-screw 27 is rigidly secured in the lugs 19, as shown in Fig. 4.

The clutch-member 24 is arranged to be moved into and out of engagement with the

clutch-member 22 by means of a sliding bar 31, provided at one end with a yoke 32 which straddles the gear 23 and at the other end with a rack 33, arranged to be engaged by a pinion 34 upon the end of a rock-shaft 35 leading to a convenient point on the machine for access by the operator.

The operation of the mechanism above described is as follows:—When a feed of the work-table is to be effected the clutch-members 22 and 24 are moved into engagement with each other and the clutch 12 is moved into engagement with one of the bevel-gears 10 or 10′, depending upon whether a forward or reverse feed of the table is desired. With the parts in this position, it will be seen that the shaft 11 will rotate the gear 23 which will in turn rotate the feed-nut 26 upon the stationary feed-screw 27 and cause the work-table 4 to be fed.

When it is desired to utilize the shaft 11 to drive the spiral head or some other portion of the machine while the work-table remains stationary, the clutch-members 22 and 24 are disconnected by the sliding bar 31 and its operating mechanism. The shaft 11 will then drive the spiral-head 34′ through the train of gears 35′ and there will be no feed to the work-table.

With the above construction, it will be seen that a table-feeding mechanism is produced which not only embodies the advantages of the feed-screw and parallel shaft construction, but also the advantage of having the connection between said feed-screw and shaft located within the saddle and in close proximity to the connection between said shaft and its driving mechanism, thereby eliminating the torsional strain upon both the shaft and the feed-screw.

It will be seen that said novel construction provides a very powerful and efficient feeding mechanism for use in machines of large size which employ a very large and heavy work-table and operate upon very large and heavy pieces of work. It will be understood that I do not intend to limit myself to the exact construction and arrangement of details shown and described and that various changes may be made in said details without departing from the spirit and scope of the invention as defined by the appended claims.

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

1. In a machine of the character described, the combination, with the work-table, of a feed-screw, a shaft arranged parallel with said feed-screw, center driving mechanism for said shaft, means for connecting said driving mechanism with said shaft and means located in close proximity to said mechanism for connecting said shaft and feed-screw.

2. In a machine of the character described, the combination with the work-table, of a feed-screw, a shaft arranged parallel with said feed-screw, center driving mechanism for said shaft, a shifting clutch for connecting and disconnecting said driving mechanism and means adjacent said clutch for connecting said shaft and feed-screw.

3. In a machine of the character described, the combination with the work-table and saddle, of a feed-screw and a parallel shaft mounted in said work-table and passing through said saddle, center driving mechanism for said shaft and means located in said saddle for connecting said shaft and feed-screw.

4. In a machine of the character described, the combination with a swivel work-table of a feed-screw, a rotatable shaft arranged parallel with said feed-screw, center driving mechanism for said shaft, a rotatable nut mounted upon said feed-screw and means for rotating said nut.

5. In a machine of the character described, the combination with the work-table, of a spiral-head, a feed-screw mounted in said work-table, a feed-nut mounted to rotate upon said feed-screw, a shaft mounted in said work-table parallel with said feed-screw, means connecting said shaft with said spiral-head, means for driving said shaft, and means for rotating said feed-nut.

6. In a machine of the character described, the combination with the work-table, of a feed-screw and a rotatable shaft mounted in said work-table, means connecting said shaft and feed-screw, center driving mechanism for said shaft, and means for moving said connecting means into operative or inoperative positions.

7. In a machine of the character described, the combination with the work-table, of a spiral-head, a feed-screw and a rotatable shaft mounted in said work-table, means connecting said shaft and spiral-head, means connecting said shaft and feed-screw, means for driving said shaft, and means for operating said spiral-head without operating the means connecting said shaft and feed-screw.

8. In a machine of the character described, the combination with the work-table and saddle, of a feed-screw and a rotatable shaft mounted in said work-table and passing through said saddle, a feed-nut rotatably mounted upon said feed-screw and held against longitudinal movement in said saddle, a gear upon said feed-nut, a sliding gear upon said shaft arranged to operate said feed-nut, means for moving said sliding gear into operative or inoperative positions and center driving mechanism for said shaft.

9. In a machine of the character described, the combination with the work-table and saddle, of a feed-screw and a rotatable shaft

mounted in said work-table and passing through bearings in said saddle, a feed-nut rotatably mounted upon said feed-screw and provided with an external shoulder adapted to engage the ends of two of said bearings, an external gear formed upon said shoulder, a sliding gear upon said shaft arranged to mesh with the gear upon said feed-nut, means for moving said sliding gear into position to operate said feed-nut and out of said position, and means for driving said shaft.

10. In a machine of the character described, the combination with the work-table and saddle, of a feed-screw and a rotatable shaft mounted in said work-table, a feed-nut rotatably mounted upon said feed-screw, a gear upon the exterior of said feed-nut, a sliding gear mounted upon said shaft and arranged to mesh with the gear upon the feed-nut, a clutch-member upon said sliding gear, a second clutch-member keyed upon said shaft, and center driving mechanism for said shaft.

11. In a machine of the character described, the combination with the work-table and saddle, of a feed-screw and a rotatable parallel shaft mounted in said work-table and passing through bearings in said saddle, a feed-nut rotatably mounted upon said feed-screw and provided with an external annular shoulder arranged between two of said bearings, an external gear formed upon said shoulder, a sleeve keyed upon said shaft and provided with a clutch-member, a sliding gear loosely mounted upon said sleeve and in mesh with the gear upon the feed-nut, a clutch-member upon said sliding gear, means for moving said sliding gear to engage and disengage said clutch-member, and means for driving said shaft.

12. In a machine of the character described, the combination with the work-table and saddle, of a feed-screw and a rotatable parallel shaft mounted in said work-table and passing through bearings in said saddle, a feed-nut rotatably mounted upon said feed-screw and provided with an external annular shoulder arranged between two of said bearings, an external gear formed upon said shoulder, a sleeve keyed upon said shaft and having a clutch-member formed thereon, a sliding-gear loosely mounted upon said sleeve and in mesh with the gear upon the feed-nut, a clutch-member formed upon said sliding-gear, sliding-bar provided at one end with a yoke straddling said sliding gear and at the other end with a rack, a rock-shaft provided with a pinion arranged to engage said rack, and means for driving the rotatable shaft.

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