

Nov. 18, 1924.

1,516,143

H. L. BLOOD ET AL

TOOL FEEDING MECHANISM

Filed Nov. 6, 1922

2 Sheets-Sheet 1

Fig. 10.

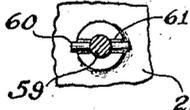


Fig. 1.

Fig. 9.

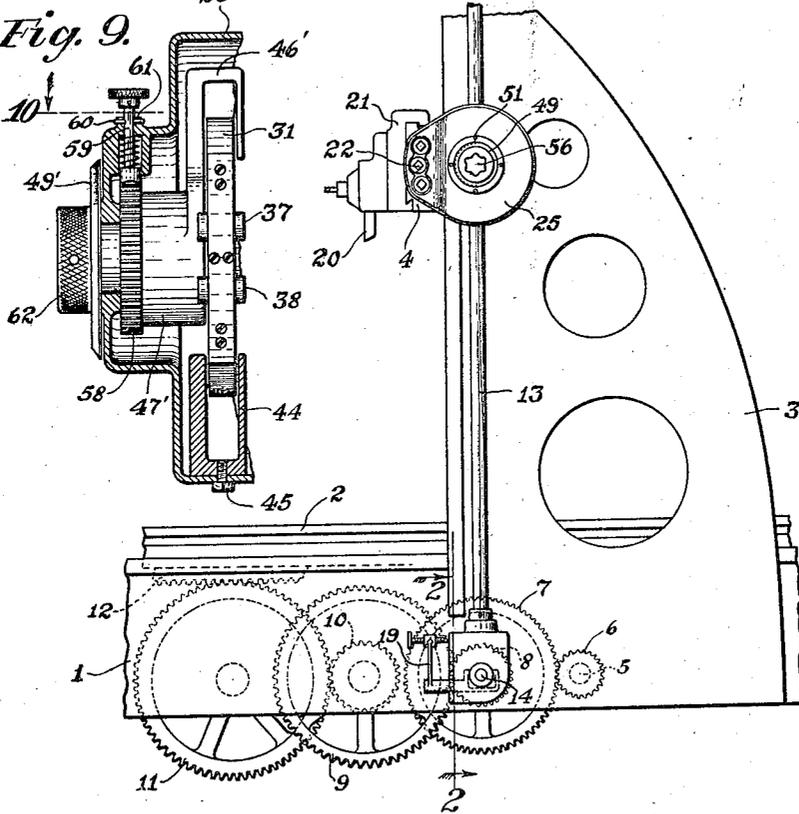
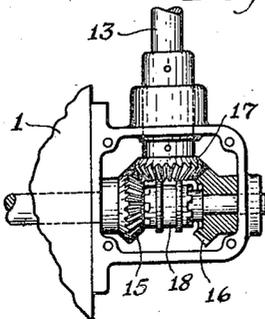


Fig. 2.



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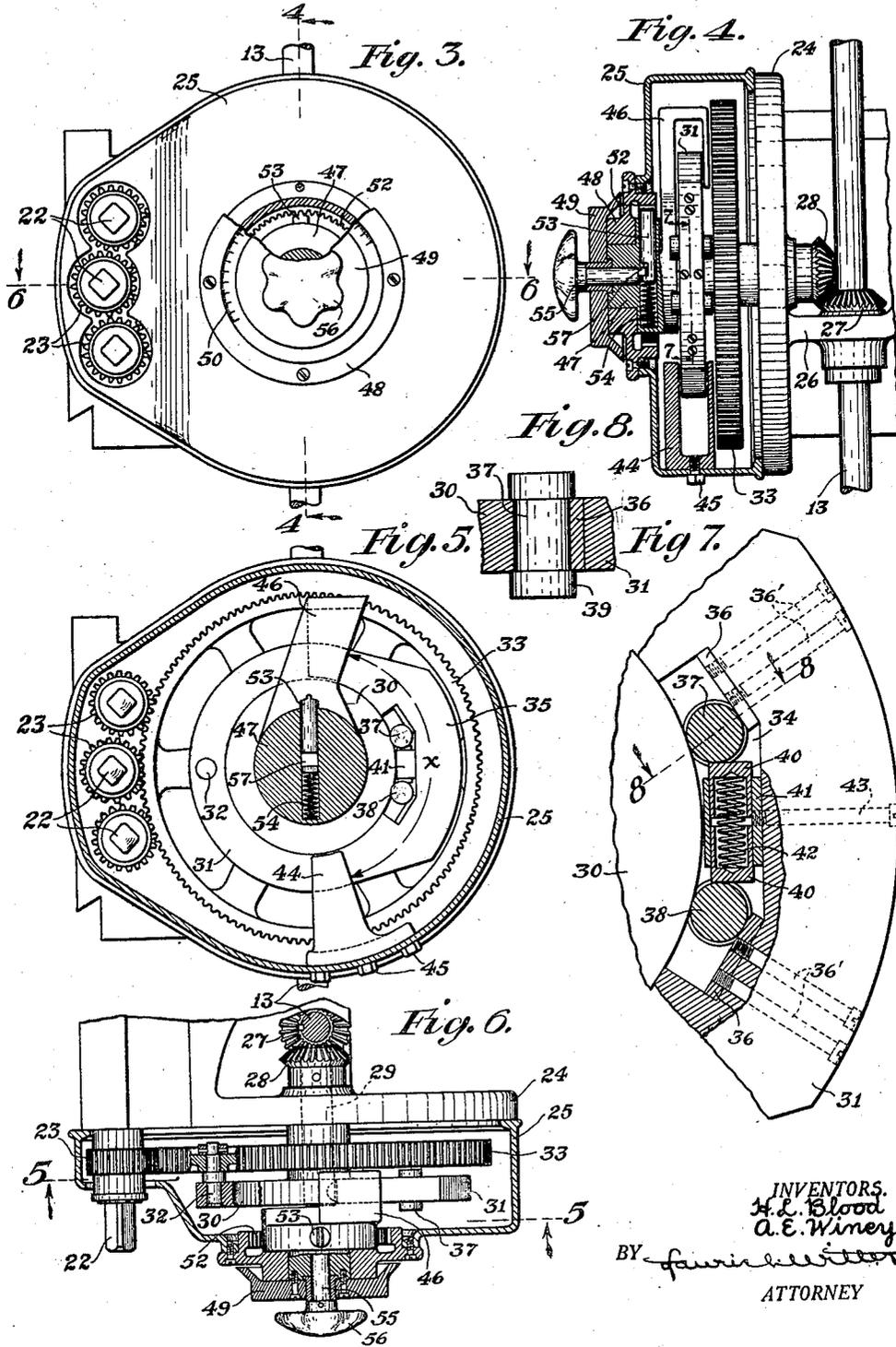
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

HAROLD L. BLOOD, OF NORTH PLAINFIELD, AND ARTHUR E. WINEY, OF PLAINFIELD, NEW JERSEY, ASSIGNORS TO NILES-BEMENT-POND COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

TOOL-FEEDING MECHANISM.

Application filed November 6, 1922. Serial No. 599,293.

To all whom it may concern:

Be it known that we, HAROLD L. BLOOD and ARTHUR E. WINEY, citizens of the United States, and residents of North Plainfield, in the county of Somerset, and Plainfield, in the county of Union, respectively, and in the State of New Jersey, have invented certain new and useful Improvements in Tool-Feeding Mechanisms, of which the following is a specification.

This invention relates to tool feeding mechanisms of the type commonly used in planers for intermittently feeding the tool after each cutting stroke of the work table. It is the primary object of the invention to provide an improved mechanism of this type which is comparatively simple in form but very efficient and accurate in operation.

It is an object of the invention to provide an improved tool feeding mechanism of the above type including a roller clutch for intermittently and automatically feeding the tool through a desired distance from the usual vertical table oscillated feed shaft, an adjustable stop being provided for disengaging the clutch to limit the feeding amount as desired.

A further object of the invention is to provide an improved tool feeding mechanism as described including a driving and a driven element of a clutch and a rotatably adjustable element carrying a stop for disengaging the clutch to limit the feeding movement of the tool as desired, the stop carrying element being rotatable to any desired position and adapted to be secured in such position by means comprising a plurality of teeth and a latch cooperating therewith, the said teeth and latch being carried one by a stationary part of the machine and the other by said rotary element.

With the above and other objects in view, our invention consists in the features of construction and operation set forth in the following specification and illustrated in the accompanying drawings. In such drawings annexed hereto and forming a part of this specification, we have shown certain embodiments of our invention but it will be understood that the invention can be otherwise embodied and that the drawings are not to be construed as defining or limiting the scope of the invention, the claims appended

to this specification being relied upon for that purpose.

Referring to the figures of the drawings: Figure 1 is a fragmentary side elevation of a planer embodying our improved tool feeding mechanism.

Fig. 2 is a fragmentary view taken on line 2—2 of Fig. 1 and showing the tool feed reversing mechanism.

Fig. 3 is an enlarged front elevation of our improved mechanism.

Fig. 4 is a side elevation thereof partially in section on line 4—4 of Fig. 3.

Fig. 5 is a front elevation thereof partially in section on line 5—5 of Fig. 6.

Fig. 6 is a plan view partially in section on line 6—6 of Fig. 3.

Fig. 7 is an enlarged fragmentary detail view in section on line 7—7 of Fig. 4.

Fig. 8 is a fragmentary detail view taken on line 8—8 of Fig. 7.

Fig. 9 is a view similar to Fig. 4 but showing a modified form of the invention.

Fig. 10 is a fragmentary detail view thereof taken on line 10 of Fig. 9.

The tool feeding mechanism comprising this invention is particularly adapted to be used in connection with planers. Certain types of planers are ordinarily provided with a vertical feed shaft oscillated synchronously with or directly from the reciprocation of the work table. Ordinarily the planer tool is fed through a predetermined distance at each idle or non-cutting stroke of the table. Our invention comprises a roller clutch mechanism having a driving member alternately rotated in opposite directions by the said feed shaft and adapted to drive a driven member of the clutch through a pair of rollers interposed between the said members, the said driven member being connected to the tool feeding screw. Two stops are provided for disengaging the said rollers at the end of a predetermined feeding movement of the said members in both directions whereby the oscillatory movement of the screw-driving driven member is limited. Movement of this member in one direction is transmitted to the screw through the usual ratchet mechanism. Means including a latch is provided for adjusting one of the stops whereby to vary the oscillatory movement of the said driven member and

thereby vary the amount of tool feed. Means are furthermore provided for feeding the tool upon movement of the work table in either direction. The embodiments of our invention illustrated in the drawings will now be described in detail.

Referring to the drawings, 1 indicates the planer bed, 2 the reciprocating work table thereon, 3 an upright at one side of the table and 4 the usual cross rail supported for vertical movement on the uprights. The table is adapted to be reciprocated from a shaft 5 alternately rotated in opposite directions by any of the well known means. A gear 6 on the shaft 5 and intermittent gears 7, 8, 9 and 10 are adapted to oscillate a driving gear 11 meshing with the usual table rack 12.

A vertical feed shaft 13 is adapted to be alternately rotated in opposite directions from the shaft 14 on which gears 7 and 8 are mounted. A pair of bevel gears 15 and 16 loose on shaft 14 mesh with a gear 17 fixed to the feed shaft. A clutch 18 operated by a handle 19 is adapted to be shifted into engagement with either gear 15 or 16 whereby to drive the feed shaft in one direction or the other relative to the table reciprocations as hereinafter described. The planer tool 20 is supported on a tool head 21 slidable along the cross rail and is operatively connected for feeding movement to shafts 22 extending along the rail in the usual manner, such shafts being adapted to be rotated in one direction or the other from gears 23 and the usual ratchet mechanisms between such gears and their shafts. The mechanism as thus far described is not new but comprises features heretofore known and used in machines of this type. The mechanism comprising our improvements will now be described.

A bracket 24 supported on the cross rail carries our improved tool feeding mechanism, such mechanism ordinarily being enclosed by a casing 25. The feed shaft 13 extends upwardly through a horizontal portion 26 of this bracket and a bevel gear 27 splined to the shaft is rotatably mounted in this bracket portion. The bevel gear 27 meshes with a bevel gear 28 on a horizontal shaft 29. Keyed to the shaft 29 within the casing 25 is an annular bushing or ring 30 which constitutes the driving member of the before mentioned roller clutch. Loosely mounted on this member 30 is a second annular member 31 which constitutes the driven member of the said clutch. A pin 32 secures the driven member 31 to a large gear 33 loose on shaft 29 and meshing with the before mentioned ratchet gears 23.

A recess 34 is formed within a radially projecting portion 35 of the member 31. The bottom walls of each end of this recess are made slightly inclined and a hardened shoe 36 is mounted on each such incline by

screws 36'. A pair of rollers 37 and 38, one adapted to ride on each of such shoes, provides a driving connection between the said two members 30 and 31. The ends of the rollers are flanged at 39 whereby the same are held against axial movement within the recess 34. A pair of plungers 40 slidably mounted in a holder 41 and normally forced apart by a spring 42 normally keeps the rollers in driving contact with the periphery of the member 30 and the shoes 36. The plungers and holder are held in place within the recess by means of screws 43 extending through the member 31 and threaded into the holder.

Means are provided for limiting the movement of the driven member 31 relative to the driving member 30 whereby the tool may be fed through the desired distance. This means comprises a pair of stops adapted to disengage the rollers respectively at different points in the rotation of the members. One stop 44 secured to the casing by means of bolts 45 is adapted to be engaged by the roller 38. The other stop 46 is adjustably mounted as hereinafter described and is adapted to be engaged by the roller 37. It will be noted that each stop is U-shaped in a manner to straddle the member 31 and engage the flanged ends of its roller to disengage the same.

The stop 46 is preferably an integral part of an element 47 rotatably mounted within an element 48 secured to the casing 25. A dial 49 pinned to the outer end of the element 47 is provided with graduations cooperating with a zero mark 51 on the element 48 whereby the rotary position of the element 47 and its stop 46 may be observed. The element 48 is provided with internal teeth 52 adapted to be engaged by a latch plunger 53 slidable radially in the element 47. A spring 54 normally holds the latch in its engaged position. A shaft 55 mounted coaxially in the elements 47 and 49 has a hand knob 56 on its outer end and an eccentric projection at its inner end engaging within a notch 57 in the latch whereby to withdraw the same against the action of spring 54.

In operation, the shaft 13 and the driving member 30 are alternately rotated in opposite directions as the work table 2 reciprocates. The driving member 30 carries the driven member 31 along therewith in both directions until the rollers 37 and 38 abut against the stops 46 and 44 respectively. The driven member is therefore oscillated through a distance x determined by the position of the stop 46, the stop 44 being stationary. To adjust the stop 46 toward or from the stop 44, the operator rotates the knob 56 to withdraw the latch 53. The dial 49 may then be rotated to move the stop 46 to the desired position, the latch there-

after being re-engaged with the teeth 52. The limited oscillation of the driven member 31 is transmitted to gear 33 and from thence through the ratchet gears 23 to rotate the tool feeding screws in the desired direction in the usual manner. The direction of rotation of the shaft 13 and therefore the feed of the tool relative to the table reciprocations may be changed by shifting the clutch 18 as will be readily understood.

The operation of the mechanism shown in the modified form of the invention (Figs. 9 and 10) is substantially the same as that already described. In this form of the invention, the adjustable stop 46' is preferably an integral part of a rotatable adjustable element 47' having a gear or toothed element 58 thereon. A spring pressed latch 59 mounted in the casing 25' normally holds the element 47' against rotation. After withdrawing the latch 59 from engagement with the toothed element 58 a slight rotation of the latch moves the pin 60 therein to a position out of registry with the slot 61 in the casing 25' whereby the latch is held in its disengaged position. The position of the element 47' and stop 46' may be observed by a dial 49'. The element 47' may be rotatably adjusted by means of a knob 62.

What we claim is:

1. In a planer, the combination of a reciprocating table, a cross rail, a tool support on the rail, a shaft intermittently rotated in opposite directions synchronously with the table reciprocations, and means including a roller clutch mechanism for automatically feeding the tool support through a desired distance from said shaft at each rotation thereof in one direction.

2. In a planer, the combination of a reciprocating table, a cross rail, a tool support on the rail, a feed screw operatively connected to the support, a shaft intermittently rotated in opposite directions synchronously with the table reciprocations, and means including a roller clutch mechanism for automatically rotating the feed screw a desired amount from the said shaft at each rotation thereof in one direction.

3. In a planer, the combination of a work table, means for reciprocating the table, a cross rail, a tool support on the rail, a feed screw operatively connected to the support, a shaft intermittently rotated in opposite directions from the table reciprocating means, means for reversing the direction of movement of the shaft relative to the table reciprocations, and means including a roller clutch mechanism for automatically rotating the feed screw a desired amount from the said shaft at each rotation thereof in one direction.

4. In a planer, the combination of a re-

ciprocating table, a cross rail, a tool support on the rail, a feed screw operatively connected to the support, a gear operatively connected to the screw, a shaft intermittently rotated in opposite directions synchronously with the table reciprocations, an element rotated in opposite directions by the shaft, roller clutch means for driving the said gear from the element, a stop for disengaging the roller clutch means upon movement of the element in one direction, and an adjustable stop for disengaging the roller clutch means upon movement of the element in the opposite direction.

5. In a tool feeding mechanism, the combination of a feed screw, a driven element of a roller clutch operatively connected to the screw, a driving element of the clutch coaxial with the driven element, roller means providing a disengageable driving connection between the elements, a pair of stops for disengaging the said roller means, and means for adjusting one of the stops toward and from the other stop whereby to vary the feeding movement imparted to the screw.

6. In a tool feeding mechanism, the combination of a feed screw, a driven element of a roller clutch operatively connected to the screw, a driving element of the clutch coaxial with the driven element, a pair of rollers mounted in one of the elements and providing a disengageable driving connection between the elements, a pair of stops adapted to engage the ends of the rollers for disengaging the same, and means for adjusting one of the stops toward and from the other stop whereby to vary the feeding movement imparted to the screw.

7. In a tool feeding mechanism, the combination of a feed screw, a driven element of a roller clutch operatively connected to the screw, a driving element of the clutch coaxial with and within the driven element, a pair of rollers mounted in the driven element and providing a disengageable driving connection between the elements, a pair of U-shaped stops each straddling the driven element and adapted respectively to engage the ends of a roller for disengaging the same, and means for adjusting one of the stops toward and from the other stop whereby to vary the feeding movement imparted to the screw.

8. In a tool feeding mechanism, the combination of a feed screw, a driven element of a roller clutch operatively connected to the screw, a driving element of the clutch coaxial with and within the driven element, a pair of rollers mounted in the driven element and providing a disengageable driving connection between the elements, the said rollers having flanged ends whereby the same are held against axial movement in the driven element, spring means between the

rollers normally forcing them apart and into driving engagement with the elements, a pair of U-shaped stops each straddling the driven element and adapted respectively to engage the flanged ends of a roller for disengaging the same, and means for adjusting one of the stops toward and from the other stop whereby to vary the feeding movement imparted to the screw.

9. In a tool feeding mechanism, the combination of a supporting frame, a feed screw, a driven element of a clutch operatively connected to the screw, a driving element of the clutch coaxial with the first element and adapted in operation to be alternately rotated in opposite directions, means forming a disengageable driving connection between the elements, a stop for disengaging the said means upon movement of the elements in one direction, a stop for disengaging the means upon movement of the elements in the other direction, a rotatably adjustable element carrying one of the stops, and means comprising a plurality of teeth and a latch cooperating therewith for securing the rotatably adjustable element in adjusted position, the said teeth and latch being carried one by the said frame and the other by the said rotary adjustable element.

10. In a tool feeding mechanism, the combination of a supporting frame, a feed screw, a driven element of a clutch operatively connected to the screw, a driving element of the clutch coaxial with the first element and adapted in operation to be alternately rotated in opposite directions, means forming a disengageable driving connection between the elements, a stop for disengaging the said means upon movement of the elements in one direction, a stop for disengaging the means upon movement of the elements in the other direction, a rotatably adjustable element carrying one of the stops, a toothed element on the frame, a latch carried by the rotatably adjustable element and adapted to engage the toothed element to secure the rotatably adjustable element in different adjusted positions.

11. In a tool feeding mechanism, the combination of a supporting frame, a feed screw, a driven element of a clutch operatively connected to the screw, a driving element of the clutch coaxial with the first element and adapted in operation to be alternately rotated in opposite directions, means forming a disengageable driving connection between the elements, a stop for disengaging the said means upon movement of the elements in one direction, a stop for disengaging the means upon movement of the elements in the other direction, a rotatably adjustable element carrying one of the stops, an internally toothed element on the frame and surrounding the rotatably adjustable element, a plunger carried by the rotatably adjustable element and adapted to engage the toothed element to secure the rotatably adjustable element in different adjusted positions, and an operating means for the plunger comprising a manually operable member rotatably mounted in the frame and having an eccentric portion thereon for withdrawing the plunger.

12. In a tool feeding mechanism, the combination of a supporting frame, a feed screw, a driven element of a roller clutch operatively connected to the screw, a driving element of the clutch coaxial with the driven element, roller means providing a disengageable driving connection between the elements, a stop for disengaging the roller means upon movement of the elements in one direction, a stop for disengaging the roller means upon movement of the elements in the other direction, a rotatably adjustable element carrying one of the stops, and means comprising a plurality of teeth and a latch cooperating therewith for securing the rotatably adjustable element in adjusted position, the said teeth and latch being carried one by the said frame and the other by the said rotary adjustable element.

In testimony whereof, we hereto affix our signatures.

HAROLD L. BLOOD.
ARTHUR E. WINEY.