No. 892,387.

PATENTED JUNE 30, 1908.

A. L. DE LEEUW.

TOOL FEEDING MECHANISM.

APPLICATION FILED JULY 11, 1907.

3 SHEETS—SHEET 1.

Fig. 1.

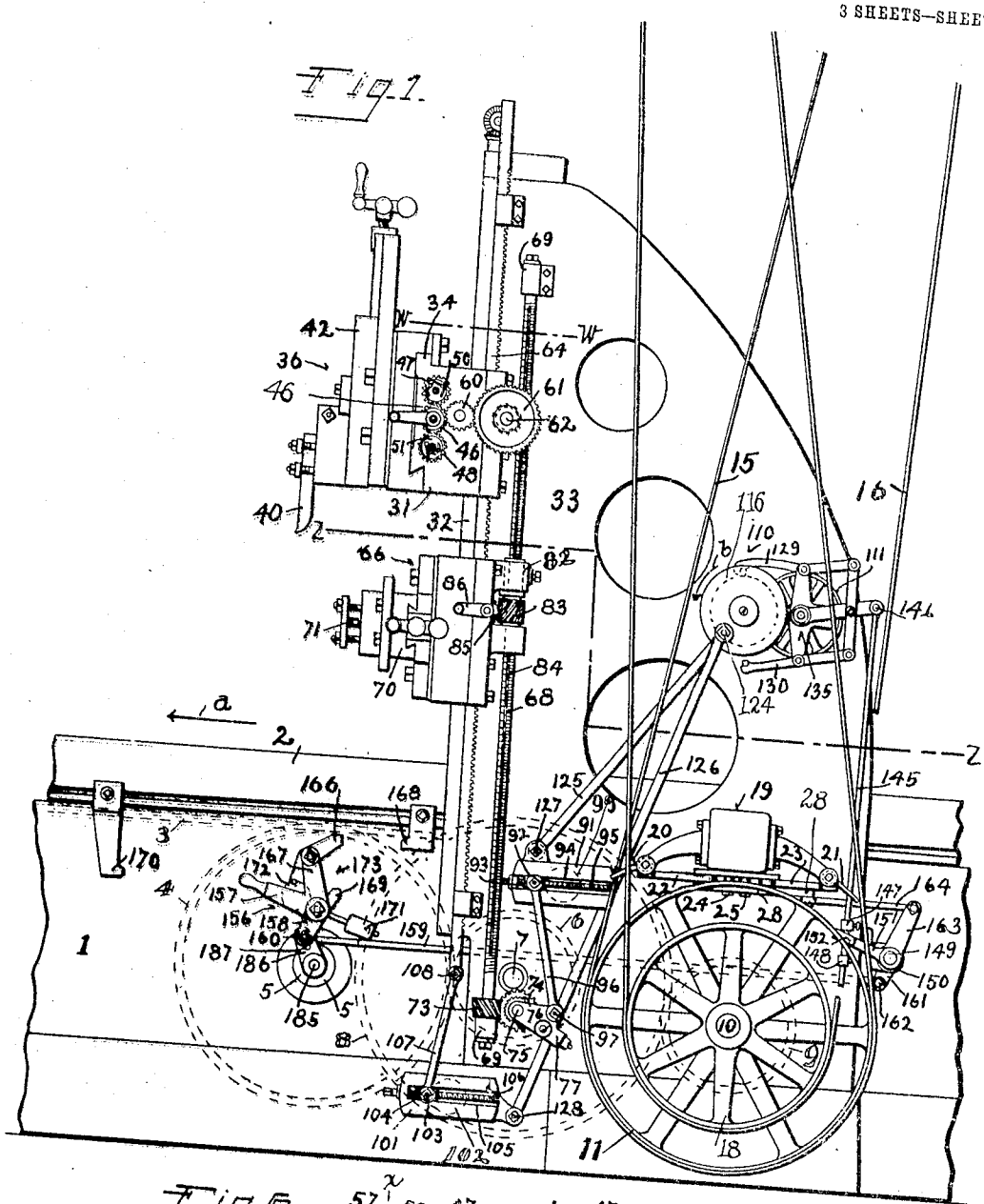


Fig. 6.

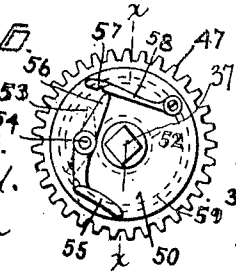
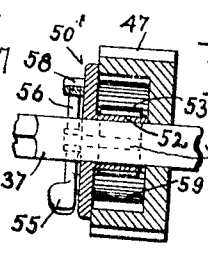


Fig. 7.



Witnesses.
Homer Bradford.
Florence Quinn

Inventor.
Adolph L. de Leeuw
by R. F. Herbolsheimer
His Attorney.

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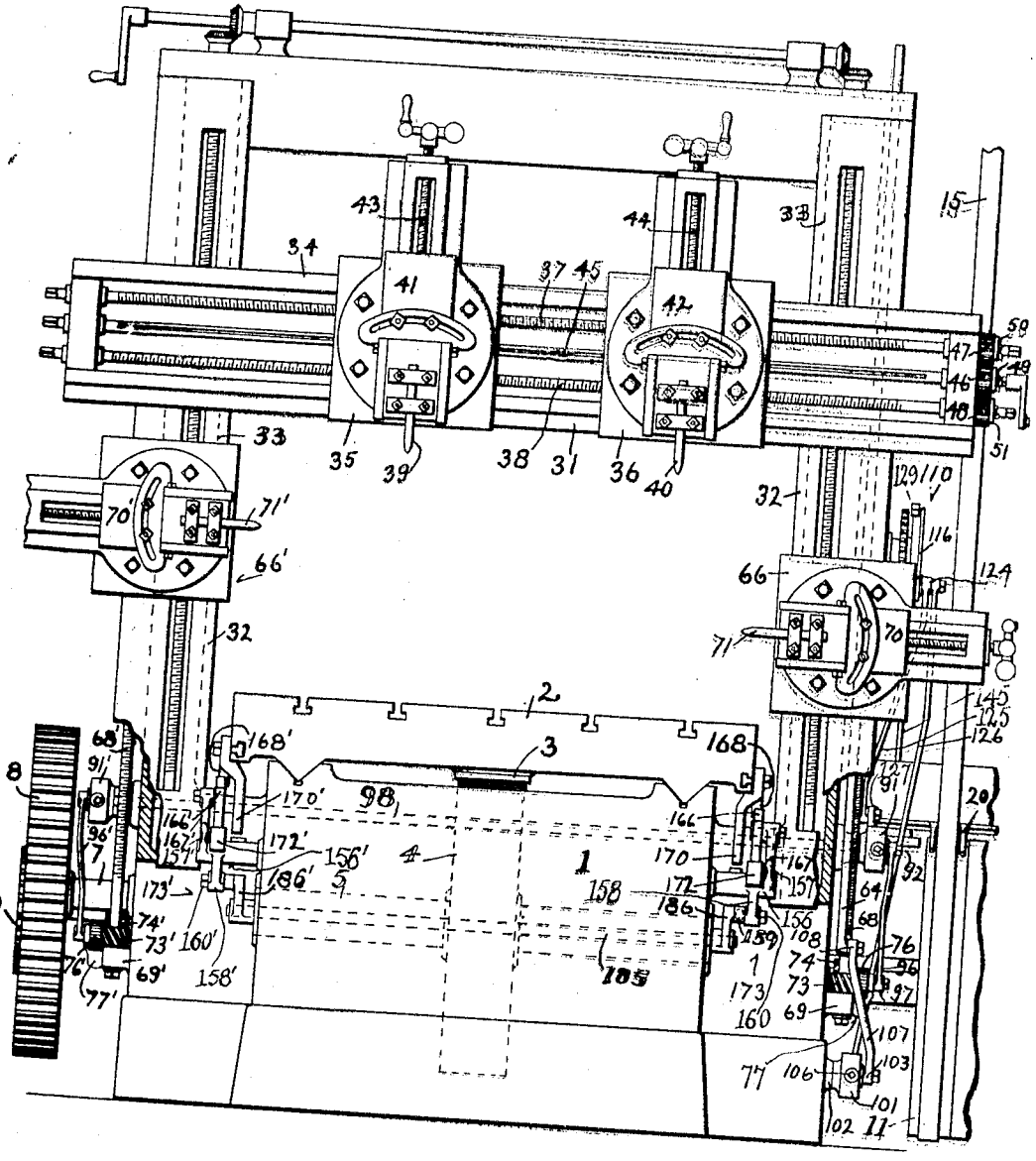
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3 SHEETS—SHEET 2.

Fig. 2.



Witnesses.
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No. 892,387.

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APPLICATION FILED JULY 11, 1907.

3 SHEETS—SHEET 3.

Fig. 3.

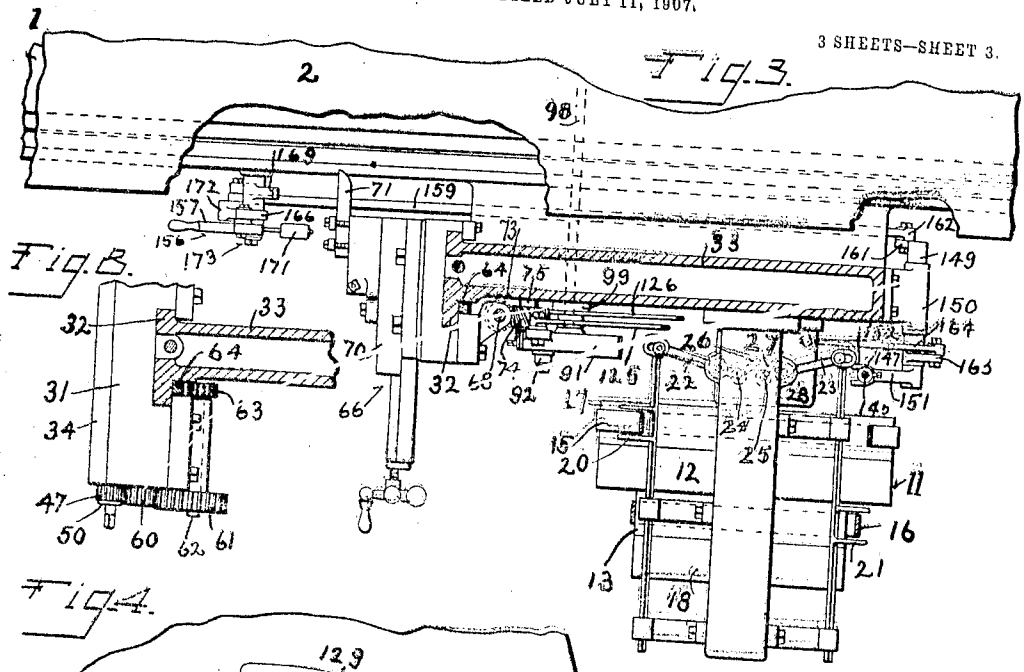


Fig. 8.

Fig. 4.

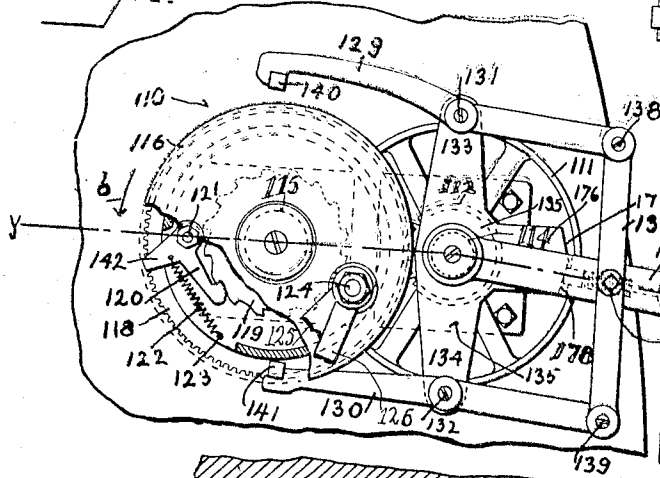


Fig. 9.

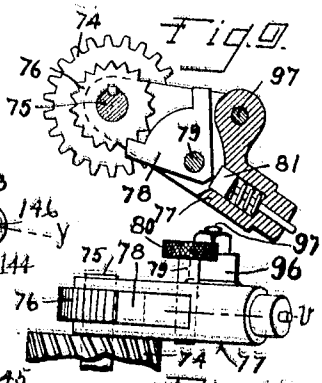
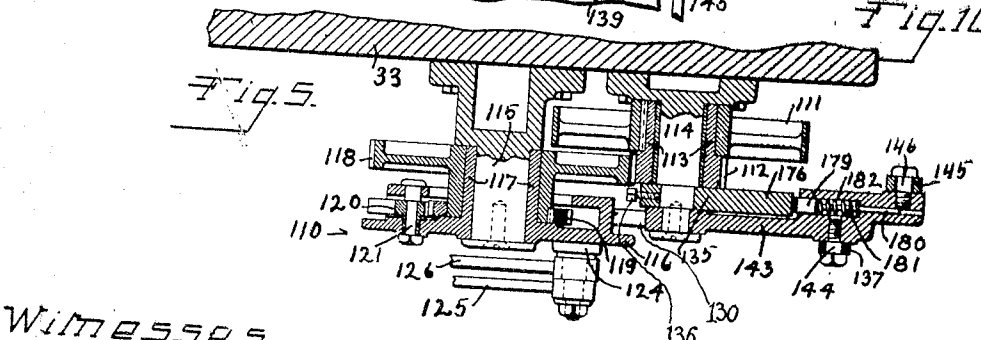


Fig. 10.

Fig. 5.



Witnesses.
Homer Bradford.
Florence Quinn

Inventor
Adolph L. de Leeuw,
by P. Alexander
his Attorney

UNITED STATES PATENT OFFICE.

ADOLPH L. DE LEEUW, OF HAMILTON, OHIO, ASSIGNOR TO THE KNECHT PLANER COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

TOOL-FEEDING MECHANISM.

No. 892,387. Specification of Letters Patent. Patented June 30, 1908.

Application filed July 11, 1907. Serial No. 383,252.

To all whom it may concern:

Be it known that I, ADOLPH L. DE LEEUW, a citizen of the United States, residing at Hamilton, in the county of Butler and State of Ohio, have invented certain new and useful Improvements in Tool-Feeding Mechanism, of which the following is a specification.

My invention relates to tool feeding mechanism, such as employed for feeding the tool or tools in metal planing machinery, and has for its object the providing of feeding means actuated by a motive agent having constant rotation in a given direction from a source independent of the reciprocating table and reciprocating actuating parts for the table, and constructed for performing the tool-feed at approximately the end of either the cutting or backing movement of the table, irrespective of the direction of the feed of the tools, *i. e.* feeding the tools at either end in either direction, and arranged so that the tool-feed may be accomplished or not as desired when manually tripping the table-drive for reciprocating the table for short or partial strokes, for instance when testing the position of the tool, and the invention will be readily understood from the following description and claims, and from the drawings, in which latter:

Figure 1 is a side elevation of my improved device applied to a metal planing machine, the latter being shown partly broken away. Fig. 2 is an end elevation of the same. Fig. 3 is a horizontal section taken on the line *z*—*z* of Fig. 1. Fig. 4 is a side elevation of the operating head of my improved device; and, Fig. 5 is a cross-section of the same on the line *y*—*y* of Fig. 4. Fig. 6 is a side elevation of one of the ratchet and pawl-boxes. Fig. 7 is an axial section of the same on the line *x*—*x* of Fig. 6. Fig. 8 is a detail, showing the feed-rack connection to the ratchet and pawl-boxes, shown on the section line *w*—*w* of Fig. 1. Fig. 9 is a side elevation, partly in section on the line *v* of Fig. 10, showing the ratchet-housing for the side-head feed-screw; and, Fig. 10 is a bottom view of the same.

I have exemplified my improved device as applied to a metal planing machine provided with a pair of tool-heads on the cross-rail, the tools being mounted on slides, the heads and slides being moved by the usual screws and splined rod, actuated by the usual feed-rack, the machine being further provided with side-heads actuated by the usual feed-screws. The tool-slide of the side-heads may also be fed by power in any usual manner. These parts may be of ordinary or usual construction and any one or more of the same may be employed, or tools of different character and having different moving agencies may be employed without departing from the spirit of my invention. Thus 1 represents the frame on which a table 2 is caused to reciprocate forward and back in any ordinary or well known manner, as by means of the ordinary table-rack and bull-wheel drive, comprising, for instance the table-rack 3, with which the bull-wheel 4 on a shaft 5 meshes, a pinion 6 on a shaft 7 engaging the bull-wheel and having thereon a gear 8 engaged by the gear 9 on a suitable driving shaft 10 having secured thereto an ordinary step-pulley 11 having the driving faces 12 13 with which belts 15 16 are adapted to engage for driving the drive-shaft alternately in opposite directions, for respectively causing the table to move across the tools for performing the cutting operation on the stock carried by the table or returning the table to initial position ready for a succeeding cut upon the stock by the tools. At the respective sides of the step-pulley, loose pulleys 17 18 rotate loosely about the shaft 10 for receiving the belts in ordinary manner.

There is a belt-shifter 19 having shifting forks 20 21 articulated with levers 22 23 having pins 24 25 received by slots 26 27 of a sliding plate 28.

31 represents a cross-rail adjustable up and down on guide-ways 32 of the column 33 of the machine in any ordinary or well known manner. This cross-rail is adapted to have one or more tool-heads slide laterally thereon on a guideway 34. I have shown these tool-heads at 35 36, adapted to be fed laterally on the saddle by means of adjusting screws 37 38. The tools 39 40 are secured to tool-slides 41 42 adapted to be fed on the heads by means of screws 43 44, and adapted to be fed by hand or by power in ordinary manner from a splined shaft 45.

46 is a pinion on the shaft 45 and engages pinions 47 48 on the adjusting screws 37 38. These pinions 46 47 48 are caused to have operative engagement with their respective shaft or screws for operating the latter in either direction by means of the ordinary

ratchet and pawl-boxes 49 50 51 arranged to move the rod and screws in either direction or to run idle according to the position in which the pawls may be set, in usual manner, for feeding the tool-heads and slides in either direction. Thus each of the ratchet and pawl-boxes may comprise a collar 52 fast on the rod or screw, on which collar a double pawl 53 on a pin 54 rocks, a handle 55 being on the pin 54 and having a finger 56 adapted to engage a notch 57 in a spring 58 secured to the collar for setting both teeth of the double pawl in neutral position with relation to an internal ratchet-wheel 59 on the pinion which is normally loose on the shaft. When the finger 56 is forced out of its notch, either of the teeth of the double pawl is caused to have operative engagement with the ratchet-wheel for placing the pinion into operative engagement with the rod or screw.

A pinion 60 engages the pinion 46 and is meshed by a gear 61 on a shaft 62 having a pinion 63 thereon engaged by a feed-rack 64.

66 is a side-head movable up and down on the guideway 32 by means of a feed-screw 68 journaled in bearings 69 on the frame. The side-head carries a side tool-slide 70 having a side-tool 71 secured thereto. The feed-screw 68 carries a spiral gear 73 which is meshed by a spiral gear 74 on a stud 75. The spiral gear 74 has a ratchet-wheel 76 fast thereon, which ratchet-wheel is operated in either direction from a ratchet-housing 77.

The ratchet-housing 77 is pivoted about the stud 75. It has a double pawl 78 thereon on a pin 79 whose outer end carries a hand-wheel 80 for rocking the pawl into neutral position or so that either tooth of the pawl engages the ratchet-wheel for operating the latter in either direction. A spring-pressed plug 81 bears against the rear faces of the pawl for holding the same in adjusted position.

The feed-screw 68 is threaded in a nut 82 secured to the side-head, and for permitting hand-feed if desired there is a spiral-gear 83 which has spline-connection with the feed-screw, as see the spline 84 in the feed-screw, the spiral-gear 83 being meshed by a spiral-gear 85 on the side-head operated by a handle 86.

There may be a side-head with its attending feeding mechanism at the other side of the machine, and I have shown such parts, designating the same by similar but primed reference numerals. These side-heads may also be provided with ordinary ratchet and pawl-feeds for the tool-slides thereon, operated from the feed-rack 64 or the feed-screw 68 in any usual manner.

91 is a crank-housing having a crank-pin 92 whose block 93 is adjustable longitudinally of the slot 94 by means of an adjusting screw 95.

A link 96 articulates the crank-pin of the crank-housing with a pin 97 of the ratchet-housing 77. The crank-housing is pivoted intermediate of the ends of its slot so as to position its crank-pin at either side of its rocking axis. This permits its feeding stroke for advancing the tool to take place at either side of its rocking axis. The crank-housing is secured to a rock-shaft 98 journaled in bearings 99 of the frame and having a crank-housing 91′ secured thereto at the other side of the machine, which connects with the ratchet-housing 77′ by means of a link 96′. This permits the feed of the tools of the respective side-heads to be accomplished in equal or different proportion and in the same or different direction.

101 is the crank-housing for the feed-rack and swings on a stud 102. The crank-pin 103 of this crank-housing is on a block 104 adjustable lengthwise of the slot 105 by means of an adjusting screw 106. The crank-housing 101 is also pivoted intermediate of the length of the slot 105 so as to position its crank-pin to either side of its rocking axis, thereby permitting its feeding stroke for advancing the tool to take place at either side of its rocking axis. A link 107 articulates the crank-pin 103 with a pin 108 on the feed-rack.

I have provided means rotating in a given direction for rocking the crank-housings, one or more of which latter may be employed in connection with my improved device. Thus 110 is a feeding-head. The prime mover or driving member for the feeding-head rotates constantly in a given direction, and is shown as a pulley 111, although it is obvious that it may take any desirable form as for instance a separate motor, a gear, a counter-shaft which rotates constantly in a given direction, or other suitable device. The pulley 111 is connected with a pinion 112, as by both being secured to a sleeve 113 rotating about a stud 114 suitably secured to the machine. 115 is a stud, also suitably secured to the machine, about which a crank-casing 116 is journaled, the crank-casing having a hub 117 upon which a gear 118 is journaled. This gear 118 meshes the pinion 112 and has a ratchet-wheel 119 secured thereto. A pawl 120 is pivoted on the crank-casing, as on a pin 121, and normally engages the teeth of the ratchet-wheel, a spring 122, secured to the pawl and to a pin 123 on the crank-casing, normally urging the pawl into engagement with the ratchet-wheel.

The crank-casing carries a crank-pin 124 upon which one or more links shown at 125 126 are articulated, the link 125 being shown as connecting with the pin 127 on the crank-housing 91 for rocking the same, and the link 126 being shown as articulated with the pin 128 on the crank-housing 101 for rocking the latter. The crank-casing 116 rotates with the ratchet-wheel during engagement of the pawl with the ratchet-wheel under the influ-

ence of the constant prime-mover for the tool-feeding mechanism. This engagement is temporary only, preferably at the ends of the reciprocating movements of the table, for feeding the tools instantly and positively during engagement of the pawl with the ratchet-wheel.

The crank-casing, in the present exemplification, makes one-half revolution at approximately the end of each cutting and backing stroke of the planer-table, the tool-feed being effected during one of said movements of the crank-casing and the return of the tool-feeding parts to initial position taking place during the other of said movements. By the proper positioning of the crank-pins of the crank-housings at the proper sides of the rocking axes of the latter and the proper engagement of the ratchets and pawls in the ratchet and pawl mechanisms, the tool-feed may be effected in either direction at the end of either stroke of the planer-table from a prime mover rotating in a constant direction. Means are also provided for quickly and accurately and positively causing disengagement between the pawl and ratchet-wheel, whereupon the feeding movement of the feeding head is instantly stopped. This pawl tripping mechanism is preferably composed of a pair of trippers shown as arms 129 130 pivoted respectively at 131 132 to the arms 133 134 of a bracket 135 shown as clamped to the stud 114 as by means of a set-screw 136. A link 137 connects the tripper-arms for combined movement as by being articulated therewith on pins 138 139. The respective tripper-arms are preferably provided with striking-blocks 140 141, which the heel 142 of the pawl is adapted to alternately strike for causing disengagement between the pawl and ratchet-wheel.

A lever 143 is pivoted about the stud 114 and is articulated with the link 137 at 144. A rod 145 is articulated with the lever 143 at 146. This rod has tappets 147 148 adjustably secured thereto. A rock-shaft 149 rocks in a bearing 150. An arm 151 is secured to the rock-shaft, a fork 152 of which takes about the rod 145 and is adapted to engage the tappets 147 148 for alternately moving the rod and the tripper-arms 129 130 in opposite directions for alternately bringing these tripper-arms into the range of movement of the heel of the pawl 120, the movement being such that when the striking block on one tripper-arm is moved out of the range of the heel, the other striking-block is moved into such range. The rod 145 may also be manually moved endwise for tripping the pawl 120 by hand, and the rod may be slipped sidewardly out of the fork 152 which is open-sided, for the purpose.

The rock-shaft 149 for moving the rod 145 is operated by a rocking member which has a handle as a source of movement for effecting partial or complete rocking of the rock-shaft for selectively effecting table-drive only, or table-drive and tool-feed as may be desired, so that either of these resultants may be selectively had when manually tripping the table-drive for short or partial strokes, as when testing tool-positions, or the said rocking member may also have a power source of movement.

156 is a rocking member, shown as a bell-crank lever, having a handle 157 and an arm 158, to which latter a link 159 is articulated on a pin 160, the link being also articulated to an arm 161 at 162, the arm 161 being fast on the rock-shaft 149. An arm 163 is also secured to the rock-shaft, a link 164 being articulated with said arm and with the belt-shifting plate.

The rock-shaft 149, when operated by power, is preferably operated from one of the reciprocating stock-moving parts. I have shown it operated from the table and as constituting one of the elements of the belt-shifting mechanism. This belt-shifting mechanism is an exemplification of a reversing mechanism for the table, in this instance shown as driven from belts moving respectively in opposite directions, although other moving and reciprocating agency for the planer-table may be employed. Thus 166 is a belt-shifting trip pivoted on an arm 167 of the rocking member, with which trip a tappet 168 adjustable lengthwise of the table is adapted to engage for tripping the trip. The tappet 168 is shown as the cutting-stroke tappet for initiating the cutting stroke of the table. The rocking member also comprises an arm 169, which also forms a belt-shifting trip and is adapted to be engaged by a tappet 170 adjustable lengthwise of the planer-table. The tappet 170 is shown as the backing tappet for initiating the backing-stroke of the planer-table. The rocking member has a weight 171 and the trip 166 has a weight 172 thereon for aiding the trips in assuring and retaining their positions. I have designated these belt-shifting trips and attendant parts by the general reference numeral 173 for indicating a table reversing control.

When the rocking member is moved in one direction by one of the tappets on the reciprocating table, the rod 145 is rocked in one direction, thereby affecting the position of the trippers in the feeding head, and when said rocking member is moved in the opposite direction by the other of said tappets on the table, the rod 145 is moved in the opposite direction. For maintaining the feeding-head trippers in position I provide the bracket 135 with a lug 176 having engaging faces 177 178, with which latter a plug 179 on the lever 143 is adapted to engage, the plug having a stem 180 about which there is

a spring 181 in a socket 182 of the lever 143 for pressing the plug against either face 177 178 for holding the lever 143 in assumed position.

If desired there may be a table reversing control and attendant parts at the other side of the machine, indicated by similar but primed reference numerals, which may be in connection with the table reversing control 173 by means of a shaft 185 having arms 186 186′ at its respective ends. The arm 186 has a slot 187 into which the end of the pin 160 is received and slides for causing combined movement of the rocking member and arm 186, there being similar connections at the other side of the machine between the rocking member 156′ and the arm 186′, for causing transference of movement across the machine from the table reversing control 173′ to the belt shifter 19.

By means of my improved device, I obtain a quick and positive feed for the tools which is independent of driving connection with the reciprocating parts of the machine, and by means of my improved device I further obtain accurate feeds which may be definitely gaged.

As illustrating the advantages of my improved device, it may be stated that by its employment the tool-feed may be accomplished at either end of the stroke of the planer-table, that is to say, the tool-feed may take place at the end of the cutting stroke or at the end of the backing stroke, and also be in either direction at any of the tools. If now the planer-table is set in motion and it is moving on its backing stroke in the direction of the arrow *a*, the cutting-stroke tappet 168 will engage the trip 166 at approximately the end of the backing movement of the table for shifting the belts for initiating the cutting stroke of the table. While this belt-shifting is being accomplished the rock-shaft 149 is being rocked, thereby also rocking the arm 151 which operates between the tappets 147 148 on the rod 145 for striking one of the tappets and initiating movement of the crank-casing of the feeding-head, in the direction of the arrow *b*. It will be noticed however, that these tappets 147 148 are spaced apart on the rod 145 and that the arm 151 has movement between said tappets before it strikes either of the same for shifting the rod. The positions at which these tappets are set upon the rod determines the moment at which the feeding-head trips are moved for releasing the pawl of the feeding-head for initiating the movement of the crank-casing of the feed-head.

The tripper-arms of the feed-head are operated by the last fraction of movement of the rocking member or shifting lever of the table-control, and the moment of movement of the tripper-arms relatively to the table-reversal is determined by the positioning of the tappets on the rod 145. This movement of the tripper-arms preferably takes place at the end of the belt-shifting movement. In other words, the belts are substantially shifted for reversing the table-movement before the tripper-arms are tripped for accomplishing the feeding movement. By this means the operator may, if desired, reverse the table-movement for short or partial strokes, as for instance in testing the tool-position, by means of the hand-lever, without effecting any feed of the tools, by shifting the hand-lever only partially, or, if desired, the operator may shift the hand-lever to its limit of movement for effecting both short or partial strokes of the table and feeding movements of the tools.

By the proper setting of the ratchet and pawl mechanisms and the proper positioning of the crank-pins of the crank-housings at either side of their rocking axes, the feed may be accomplished at will at either end of the table for feeding the tools the desired distances in either direction, which may be accomplished either when tripping the levers by hand or by power.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a tool-feeding mechanism, the combination, with the reciprocating parts, for controlling the reciprocating movement of the stock, of a rotary drive having a source of power other than said reciprocating parts, an intermittently rotating part having tool-feeding connection, intermittent driving connection between said rotary drive and intermittently rotating part, and an adjustable control between said intermittent driving connection and said reciprocating parts, substantially as described.

2. In a tool-feeding mechanism, the combination with the reciprocating stock-moving parts, of a driving member rotatable in a constant direction having a source of power other than said reciprocating stock-moving parts, a driven part having tool-feeding connection, connecting means between the latter and said driving-member, means actuated from one or more of said reciprocating stock-moving parts for influencing the operation of said connecting means, and an intermediate adjustment in said latter means for determining the moment of operation of said connecting means.

3. In a tool-feeding mechanism, the combination with the reciprocating stock-moving parts embracing a controlling means for said reciprocating parts, of a driving member rotatable in a constant direction having a source of power other than said reciprocating stock-moving parts, a driven part having tool-feeding connection, connecting means between the latter and said driving member, means actuated with said controlling means

for influencing the operation of said connecting means, and an adjustment in said latter means for determining the moment of operation of said connecting means.

4. In a tool-feeding mechanism, the combination with the reciprocating parts comprising the table and reciprocating driving parts therefor, of a driving member rotatable in a constant direction from a source of power other than said reciprocating table and parts, a driven member having tool-feeding connection, operating means between said driving member and driven member, and means having connection with one or more of said reciprocating parts for influencing the operative connection in said operating means and causing operation of said driven member at both ends of movement of said reciprocating table, substantially as described.

5. In a tool-feeding mechanism for a metal planer, the combination of a driving member rotatable in a constant direction, a driven member having tool-feeding connection, releasable driving connection between said members, a member for effecting table-reversal, and an operatively spaced connection between said latter member and said releasable driving connection for determining the moment of tool-feed relatively to table-reversal, substantially as described.

6. In a tool-feeding mechanism for a metal planer, the combination of a driving member rotatable in a constant direction, a driven member having tool-feeding connection, driving means between said members, tripping mechanism for effecting operative connection in said driving means, a rod therefor, a member for effecting table-reversal, and an operatively spaced connection between said last-named member and said rod for the purpose described.

7. In a metal planing machine, the combination with a reciprocating table and means for controlling the reciprocations of said table, of a tool-feeding mechanism comprising a driving member rotatable in a constant direction, a driven member having tool-feeding connection, driving means between said members, tripping mechanism for effecting operative connection in said driving means, a rod depending therefrom, a member for effecting table-reversal, and spaced operative connection between said last-named member and rod, substantially as described.

8. In a tool-feeding mechanism for a metal planer, the combination of a driving member rotatable in a constant direction, a driven member having tool-feeding connection, releasable driving connection between said members, a member for effecting table-reversal, and an adjustable connection between said latter member and said releasable driving connection for determining the moment of tool-feed relatively to table-reversal, substantially as described.

9. In a tool-feeding mechanism for a metal planer, the combination of a driving member rotatable in a constant direction, a driven member having tool-feeding connection, driving means between said members, tripping mechanism for effecting operative connection in said driving means, a rod therefor, a member for effecting table-reversal, and adjustable operative connection between said last-named member and said rod for the purpose described.

10. In a metal planing machine, the combination with a reciprocating table and means for controlling the reciprocations of said table, of a tool-feeding mechanism comprising a driving member rotatable in a constant direction, a driven member having tool-feeding connection, driving means between said members, tripping mechanism for effecting operative connection in said driving means, a rod depending therefrom, a member for effecting table-reversal, a tappet-arm operated thereby, and adjustable tappets therefor on said rod, substantially as described.

In testimony whereof, I have subscribed my name hereto in the presence of two subscribing witnesses.

ADOLPH L. DE LEEUW.

Witnesses:

PAUL M. HOOVER,

WM. LIESNER.