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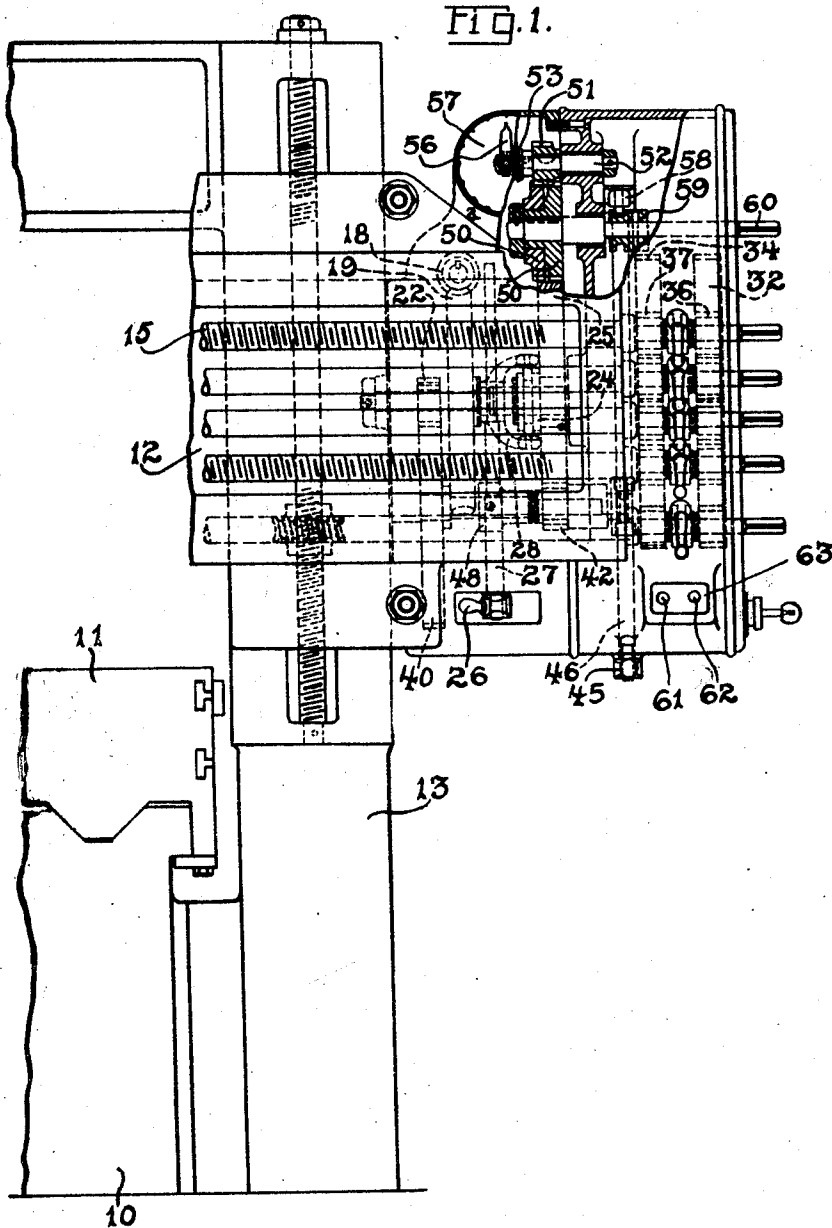
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MANUALLY CONTROLLED FEEDING MECHANISM FOR PLANERS

Filed July 11, 1925

2 Sheets-Sheet 1



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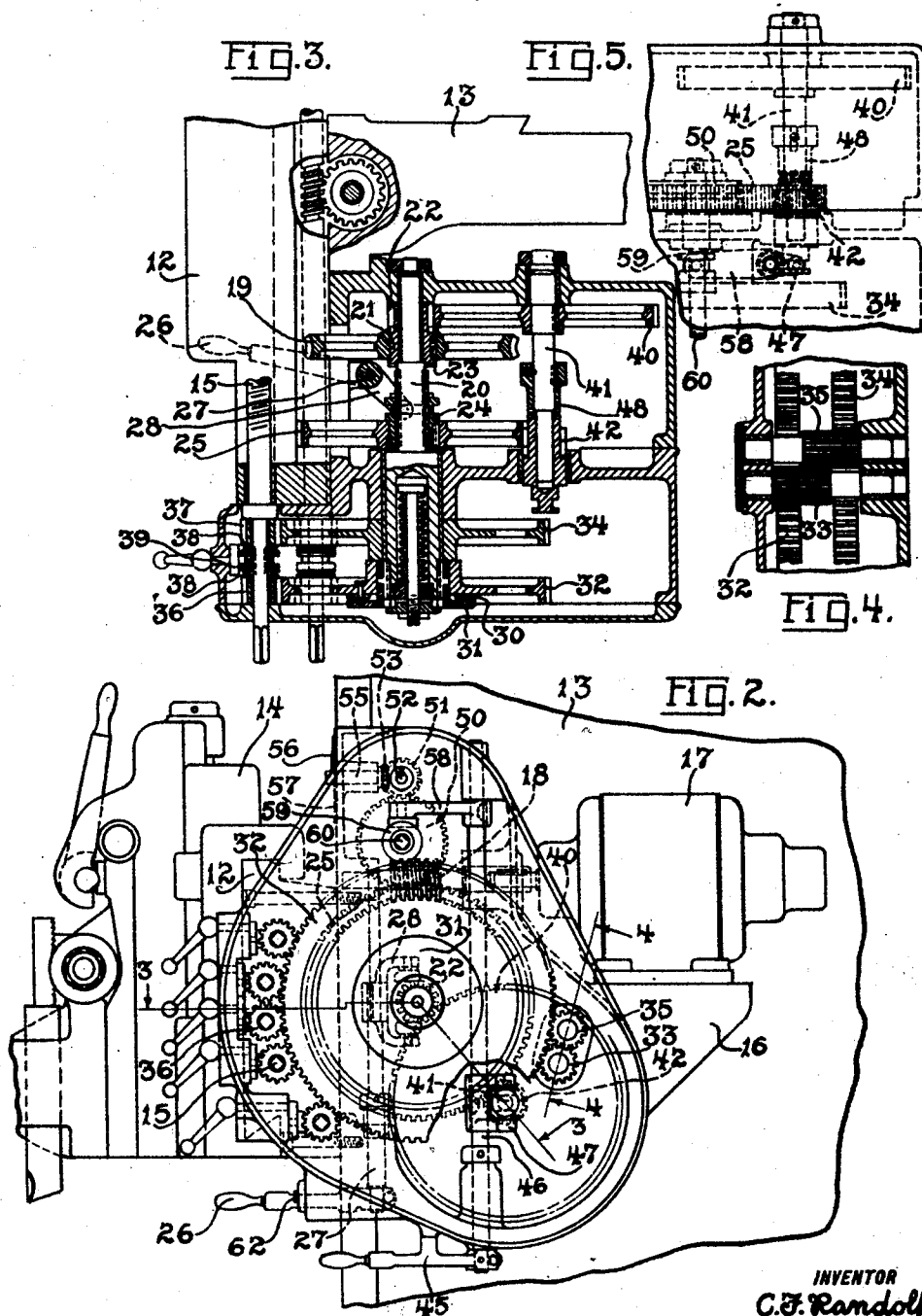
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MANUALLY-CONTROLLED FEEDING MECHANISM FOR PLANERS.

Application filed July 11, 1925. Serial No. 43,022.

This invention relates to planers and in particular to a simplified form of tool feeding means adapted for heavy duty planers.

It is an object of the present invention to provide a simplified form of planer tool feeding means and having but few parts. Preferably it may be actuated by an electric motor and provided with manually operated controlling means whereby the operator may feed the tool variable distances by varying the time the motor is allowed to rotate, depending on the particular part of the work being operated upon.

One feature which enables me to accomplish the above named object is that a motor, preferably mounted at one end of the cross rail carrying the planer tool, and associated mechanism is connected to a feed screw for moving the tool head by geared connections, the motor being stopped and started by means of a conveniently located manually operated switch to regulate the length of feeding or traversing movement.

Another feature of advantage is that in the connections between the motor and the screw a toothed safety clutch is interposed so that no breakage of parts will occur should the tool head strike against an obstruction during operation of the motor.

Another object of the invention is to provide simple means for obtaining either a short and relatively slow feeding movement of the tool between successive cutting strokes or a relatively rapid traversing movement of the tool to position it for operation or to return it to its initial position. These means comprise, in the preferred embodiment of the invention, a pair of back gears included within the driving connections between the motor and screw which may be quickly moved to their operative or inoperative position.

Another object of the invention is to provide indicating means movable with movements of the tool head so that the distance moved by the tool during its feeding movement is at once visible to the operator.

With the above and other objects in view, my invention consists in the features of construction and operation set forth in the

following specification and illustrated in the accompanying drawings.

In the accompanying drawings, I have shown my invention embodied in a planer for railroad frogs and switches, 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.

In the drawings:

Figure 1 is a front elevation of the tool-head feeding and traversing mechanism mounted upon the outer end of a planer cross rail.

Fig. 2 is an end view of the cross rail with the feeding and traversing mechanism thereon.

Fig. 3 is a sectional view taken upon line 3—3 of Fig. 2.

Fig. 4 is a detail view of certain gear connections taken upon line 4—4 of Fig. 2, and

Fig. 5 is a fragmentary plan view of parts of the gearing.

In the above mentioned drawings I have shown but one embodiment of the invention which is now deemed preferable, but it is to be understood that changes and modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

Briefly and in its broadest aspect my invention comprises the following principal parts: first, a cross rail suitably mounted for vertical movement upon the uprights of a planer; second, a motor preferably mounted directly upon one end of the cross rail; third, one or more tool heads movable along ways on the cross rail; fourth, screws engaging the tool heads for moving them along the rail; fifth, driving connections between the motor and two adjacent gears, the driving connections for these gears being so arranged that they rotate in opposite directions and may be driven at different speeds; sixth, pinion gears rotatably mounted on the end of the screw; seventh, a clutch member splined to the end of the

screw and adapted to be engaged with either of the pinion gears; eighth, a safety clutch, preferably of the toothed type, in the driving means for the oppositely rotating gears adapted to have its teeth disengaged when undue strains are placed upon the motor; and ninth, an indicator adapted to be moved with movement of the tool head when moved for feeding the tool, whereby the distance moved may be readily determined.

Referring more in detail to the figures of the drawing, I provide a planer 10 having a reciprocatory work supporting table 11 and an adjustable cross rail 12. This rail 12, as usual, and as shown in Fig. 1, is vertically adjustable upon side housings 13, one of which is shown in Figs. 1 and 3. On the cross rail 12 one or more tool heads 14 are adapted to be movably mounted, one of such tool heads 14 being shown in Fig. 3. Each tool head 13 engages a screw 15 extending the entire length of the cross rail 12 so that rotation of the screw 15 in opposite directions will move the tool head 14 back and forth along the rail.

Upon a bracket 16 mounted upon the outer end of the cross rail 12 and preferably in rear thereof, is an electric motor 17. This motor 17 is drivingly connected with a worm 18 in alignment with its armature shaft. Engaging this worm 18 is a worm gear 19 upon an intermediate shaft 20. Preferably, and as shown clearly in Fig. 3, the worm wheel 19 is mounted upon a sleeve 21 rotatably mounted on this intermediate shaft 20, the sleeve 21 being provided with a pinion gear 22 on one side and with clutch teeth 23 on the opposite side. Adapted to be engaged with these clutch teeth 23 are teeth on a corresponding clutch member 24 suitably splined to this intermediate shaft 20. A large spur gear 25 is directly keyed to this clutch member 24. In order to move this clutch member 24 into and out of engagement with the clutch teeth 23, a hand lever 26 is provided at the lower end of a vertical shaft 27, a yoke member 28 being mounted on this shaft 27 engaging a groove in this clutch member 24. With the clutch member 24 engaging the teeth 23, rotation of the worm wheel 19 serves to rotate the intermediate shaft 20 at a relatively high speed.

Also on this intermediate shaft 20 is a safety clutch comprising opposed plates 30 and 31 having serrations or teeth upon their co-acting surfaces. One of these plates 31 is urged toward the other by means of a helical spring 32 housed within a suitable recess within the intermediate shaft 20. By means of the spring 32 the toothed members of the clutch are held in engagement during normal operation of the planer or when the rail 12 is being raised. As soon, however, as the tool heads 14 or rail 12 encounter an obstacle the members of the clutch will

have their teeth disengaged so that no parts will be damaged or broken. Attached to one of the clutch plates 31 is a spur gear 32 which has a pinion gear 33 in engagement therewith. Adjacent this first spur gear 32 is a second spur gear 34 also having a pinion 35 in engagement therewith. The two pinions 33 and 35 are inter-engaged as shown in Fig. 4. From this description it will be seen that rotation of the first spur gear 32 will rotate the adjacent spur gear 34 in the opposite direction through the pair of co-acting or inter-engaging pinions 33 and 35. Preferably and as shown in the embodiment selected for illustration, the two spur gears 32 and 34 are of the same size.

On the outer end of each of the screws 15 for actuating the tool heads 14 are rotatably mounted pinions 36 and 37 adapted to constantly engage the oppositely rotating spur gears 32 and 34. These pinion gears 36 and 37 are mounted so that they may rotate freely upon the end of a screw and are provided on adjacent ends with clutch teeth 38 adapted to be engaged by corresponding clutch teeth on an intermediate clutch member 39 suitably splined to the screw 15. By placing this clutch member 39 in engagement with one or the other of the pinions 36 or 37, the screw 15 may be rotated in opposite directions depending upon which of the two spur gears 32 or 34 is thus drivingly connected to the screw 15. In this manner the screw 15 may be rotated in either direction at a relatively high speed to traverse the tool head 14 along the cross rail 12.

In order to feed a tool head 14 slowly along the cross rail 12 between operative movements of the table 11 for successive cutting operations, speed reducing gears are interposed between the worm wheel 19 and the intermediate shaft 20. Adapted to engage the pinion 22 keyed to and rotating with the worm wheel 19 is a relatively large spur gear 40 on a second intermediate shaft 41. This shaft 41 is provided with a pinion 42 engaging the spur gear 25 keyed directly upon the clutch member 24 and therefore movable therewith. It will be seen that with the clutch member 24 in the position shown in Fig. 3, the worm wheel 19 will rotate the second intermediate shaft 41 and with the clutch member 24 thereon positioned so that the pinion 42 engages the spur gear 25, the intermediate shaft 20 and the oppositely rotating gears 32 and 34 thereon will be rotated at a relatively slow speed. A hand lever 45 on the lower end of a second vertical rod or shaft 46 provided with a yoke 47 serves for moving the pinion 42 on the second intermediate shaft 41 into or out of operative position. As shown in Fig. 3, this pinion 42 and a clutch member 48 keyed to the shaft 41 have co-acting clutch teeth so that rotation of the shaft 41 posi-

tively rotates pinion 42 when pinion 42 has its teeth in operative position relative to the teeth on member 48.

To indicate the distance which the tool head 14 is moved during the feeding operation, the following mechanism is provided. In engagement with spur gear 25 on the intermediate shaft 20 is an intermediate gear 50 preferably directly above it as shown in dotted lines in Fig. 2. This intermediate gear 50 is keyed to a shaft 60 and is in engagement with a small spur gear 51 on a short shaft 52 having a bevel gear 53 at its inner end. This bevel gear 53 meshes with a corresponding bevel gear 54 on a forwardly extending stud 55 carrying a pointer 56 on its forward end. A dial 57 on the frame of the cross rail 12 is provided with graduations, and with numerals if desired, adjacent the free end of the pointer 56. These markings are so graduated that they correctly indicate the distance moved by the tool head 14 when actuated by rotation of the intermediate shaft 20 at its relatively slow speed. As it is not necessary to indicate the movement of the tool head 14 during the rapid traversing movement, means are provided to disengage the indicator mechanism when the rapid traversing mechanism is being used. For this purpose the vertical rod 46 carrying the yoke 47 for actuating the pinion 42 and its clutch member is provided with an arm 58 engaging a groove in a member 59 on the indicator driving shaft 60. With the hand lever 45 in position to move the pinion 42 and its clutch member out of operative position, the arm 58 moves the indicator driving gears 50 and 50^a to an inoperative position. Preferably also this indicator driving shaft 60 is provided with a squared end so that with a wrench on the shaft 60 it may be used to manually feed the tool heads 14 or to adjust the height of the rail 12. As it is not desirable for the shaft 60 to rotate during the normal operation of the planer, means are provided so that the indicator may be operated while no rotation of the shaft 60 takes place. For this purpose a hub is formed on the gear 50 on which is rotatably mounted a similar gear 50^a. During normal operation of the planer the shaft 60 may be withdrawn so that the gear 50 is out of engagement with the gear 25. By manual operation therefore with the parts in these positions, the screws 15 may be rotated without rotation of the motor 17 and worm wheel 19.

The motor 17 may be of conventional type and is preferably wired so that it may readily be reversed. For this purpose two push buttons 61 and 62 controlling operating switches are provided mounted on or adjacent the cross rail 12 in a suitable switch box 63. When one of these buttons 61 or

62 is depressed the motor 17 is rotated in one direction and, when the other button is depressed, in the opposite direction. Normally, when the buttons 61 or 62 are not depressed, the motor 17 is stationary and rotates only while one of the buttons is held in depressed position. If desired the motor 17 may be wired so that it rotates always in the same direction and thus but one button is required. This requires, however, that the clutches 38 on the screws be shifted each time the direction of feed or traverse is changed. With the motor 17 controlled as shown, the tool heads, such as that shown at 14, may be moved in either direction while the motor 17 continues to rotate in the same direction by selecting the proper pinion gear 36 or 37.

What I claim is:

1. Feed mechanism for planers comprising in combination, a cross rail, a tool head movable thereon, a screw on said rail engaging said head, a motor, a shaft on said cross rail, two driving connections between said motor and shaft for rotating said shaft at two different speeds in the same direction, a pair of oppositely rotating gears driven from said shaft, pinions directly driven from said gears, a clutch splined to said screw and adapted to engage either of said pinions to rotate said screw in either direction, manual means to engage either of said driving connections for said shaft, an indicator for determining movement of said head, and means to connect and disconnect said indicator simultaneously with engagement with one or the other of said driving connections.

2. Feed mechanism for planers comprising in combination, a cross rail, a tool head movable thereon, a screw on said rail engaging said head, a motor on said cross rail, a shaft on said cross rail, two driving connections between said motor and shaft for rotating said shaft at two different speeds in the same direction, a pair of oppositely rotating gears driven from said shaft, pinions rotatably mounted on said screw and connected respectively to said gears, a clutch splined to said screw and adapted to engage either of said pinions to rotate said screw in either direction, manual means to engage either of said driving connections for said shaft, an indicator for determining movement of said head, and means to connect and disconnect said indicator simultaneously with engagement with one or the other of said driving connections.

3. Feed mechanism for planers comprising in combination, a cross rail, a tool head movable thereon, a screw on said rail engaging said head, a motor, a shaft on said cross rail, two driving connections between said motor and shaft for rotating said shaft at two different speeds in the same direction a pair of oppositely rotating gears driven

from said shaft, pinions driven by said gears, a clutch splined to said screw and adapted to engage either of said gears to rotate said screw in either direction, manual
5 means to operate said clutch, manual means to engage either of said driving connections for said shaft, an indicator for determining movement of said head, and means to connect and disconnect said indicator simultaneously with engagement with one or the
10 other of said driving connections.

In testimony whereof, I hereto affix my signature.

CLIFFORD F. RANDOLPH.