W. T. SEARS.

METAL PLANER.

APPLICATION FILED SEPT. 3, 1910.

987,263. Patented Mar. 21, 1911.

2 SHEETS—SHEET 1.

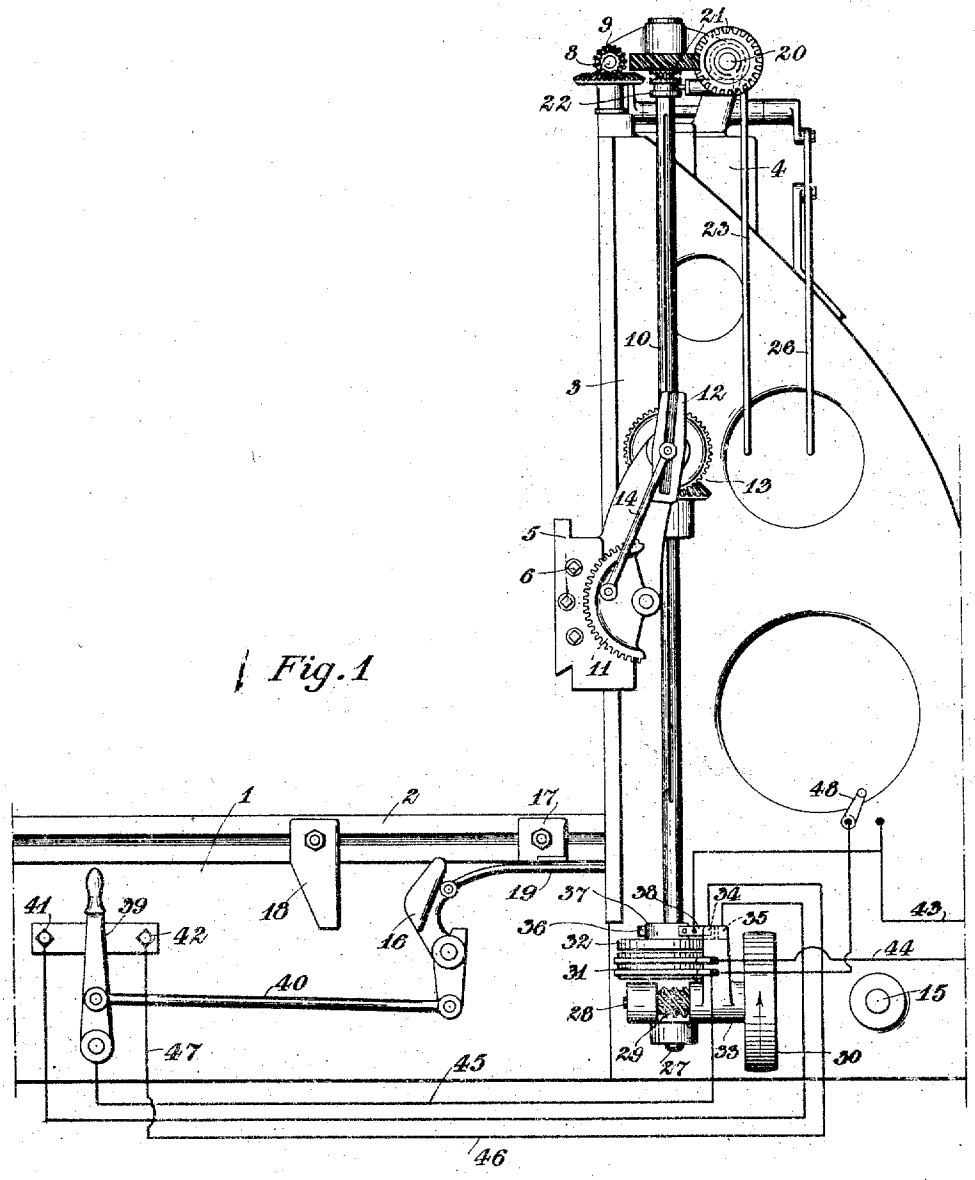

Fig. 1

Witnesses
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2 SHEETS—SHEET 2.

Fig. 2

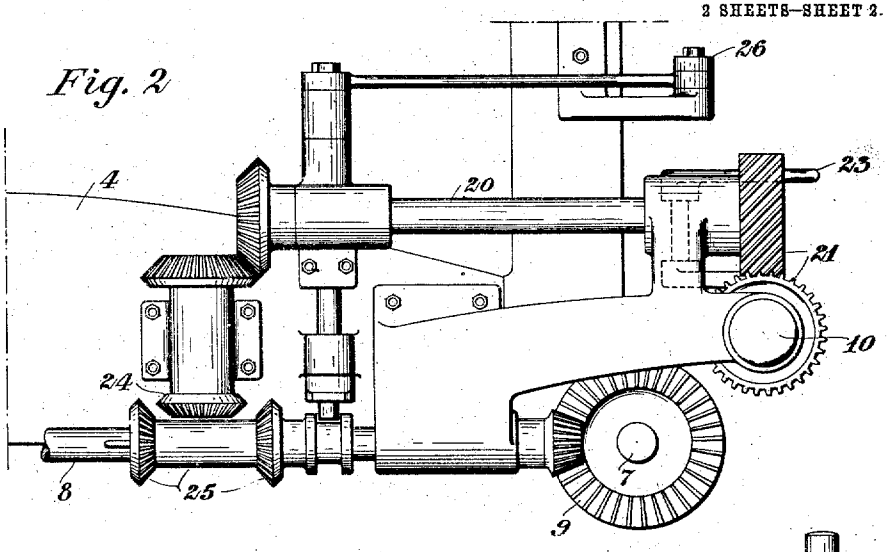
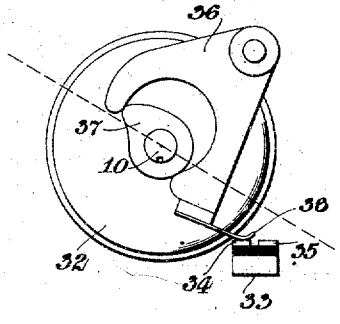


Fig. 4



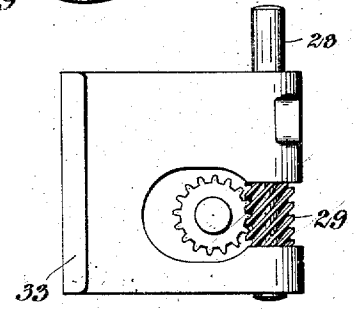


Fig. 3

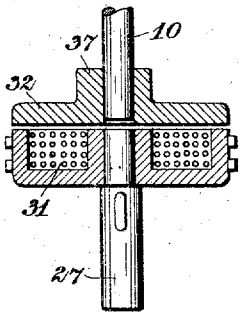


Fig. 5

Witnesses

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UNITED STATES PATENT OFFICE.

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METAL-PLANER.

987,263. Specification of Letters Patent. Patented Mar. 21, 1911.

Application filed September 3, 1910. Serial No. 580,277.

To all whom it may concern:

Be it known that I, WILLARD T. SEARS, a citizen of the United States, residing at Philadelphia, Philadelphia county, Pennsylvania, have invented certain new and useful Improvements in Metal-Planers, of which the following is a specification.

This invention, pertaining principally to metal planers adaptable in part also to other metal working machines, will be readily understood from the following description, taken in connection with the accompanying drawings in which:—

Figure 1 is a side elevation of a portion of a metal planing machine exemplifying my invention: Fig. 2 a plan of one of the housings of the planer: Fig. 3 a plan of the bracket at the foot of the vertical feed shaft: Fig. 4 a plan of the magnetic clutch and automatic switch: and Fig. 5 a vertical diametrical section of the magnetic clutch.

The invention has reference particularly to an improved system for transmitting the feeding motions to tool-carrying parts, and also to the system for giving the fleeter shifting adjustments to those parts.

In the drawings:—1, indicates the planer-bed: 2, the table: 3, the housings: 4, the top brace: 5, the rail: 6, the feed screws and feed-rod mounted in the rail: 7, the rail elevating screws: 8, the top cross-shaft: 9, the gearing connecting the top cross-shaft with the rail elevating screws: 10, the splined vertical feed-shaft: 11, the oscillating segment pivoted at the end of the rail and adapted to mesh with and drive the usual click-boxes removably mounted on the end of the feed-screws and feed-rod of the rail: 12, the crank, of adjustable throw, journaled in a bracket carried by the end of the rail at the oscillating segment: 13, gearing connecting the crank with the splined feed-shaft: 14, the link connecting the crank and segment: 15, one of the shafts through which the driving power is transmitted to the table: 16, the tumbler: 17, the cutting-dog, or the dog which, at the end of the backing stroke, shifts the tumbler to initiate the cutting stroke: 18, the backing-dog to reverse the table-motion at the end of the cutting-stroke: and 19, the shifter-rod by means of which the oscillations of the tumbler under the influence of the dogs, or when moved by hand, effects the reversal of the direction of table motion.

All of the parts thus far referred to are, or may be, of any usual or known construction and subject to usual suitable structural modifications.

Proceeding with the drawings:—20, indicates a countershaft mounted on the top brace parallel with cross-shaft 8: 21, gearing connecting this countershaft with splined shaft 10: 22, a clutch for connecting the splined shaft to and disconnecting it from the gearing: 23, a hand-lever for operating this clutch: 24, a bevel-pinion driven by countershaft 20: 25, a pair of unified bevel-gears splined on cross-shaft 8 and adapted to have either gear of the pair meshed with gear 24: 26, a hand-lever for shifting the pair of gears 5: 27, a short shaft at the foot of and in line with splined shaft 10, this shaft being suitably journaled in a bracket at the foot of the housing: 28, a horizontal shaft across and in front of shaft 27: 29, gearing connecting shafts 28 and 27: 30, a pulley fast on shaft 28 and typifying means for turning shaft 28: 31, the wound member of an electromagnetic clutch fast on shaft 27: 32, the armature member of the magnetic clutch, fast on shaft 10, the same being adapted to be drawn into frictional driving relationship with the wound member of the clutch when the wound member is energized: 33, the bracket supporting shafts 27 and 28: 34, a contact-plate carried by an arm projecting upwardly from bracket 33 to a point above the clutch: 35, a second contact plate near the first one: 36, a bifurcated arm straddling the hub of clutch-member 32 and mounted to oscillate on a vertical axis: 37, a cam turning with splined shaft 10, being preferably formed as the hub of clutch-member 32, this cam engaging the bifurcation of arm 36: 38, a contact spring projecting from arm 36 in position to sweep on and make contact with either of the plates 34—35: 39, a hand-lever pivoted to the planer-bed in position convenient to the workman: 40, a link connecting lever 39 with the reversing tumbler: 41, a contact point adapted to be engaged by lever 39 at one of its extremes of stroke: 42, a second contact point adapted to be engaged by the lever at its other extreme of stroke: 43, a conductor-main adapted to bring current from any suitable source of supply to contact spring 38: 44, the second conductor-main, this main going to one of the terminals of the winding of the clutch:

45, a conductor leading from the other terminal of the winding of the clutch to lever 39: 46, a conductor leading from contact-plate 34 to contact point 42: 47, a conductor leading from contact-plate 35 to contact point 41: and 48, a switch adapted to close the circuit from the mains through the clutch-winding, independent of lever 39 and spring 34.

The construction and manner of working of the electromagnetic clutch may be as usual in such clutches, and pulley 30 is merely typical of means for giving rotations to one member of the clutch at such times and in such directions as may be desired. For the present let it be assumed that member 31 of the clutch is turning constantly in one direction. The circuit being open, at lever 39 and switch 48, no current is going to the clutch and consequently feed-shaft 10 is stationary. If, now, lever 39 be shifted to contact point 42, the tumbler movement will have brought about the movement of the table in cutting direction to the right, as usual. At the same time lever 39, in going to contact point 42, has closed the circuit through the clutch winding, the clutch thus becoming energized and feed-shaft 10 going into rotation. When the shaft has completed a half-turn cam 37 causes contact spring 38 to leave contact plate 34, thus breaking the circuit and deënergizing the clutch and causing the feed-shaft to come to rest. Contact spring 38, immediately after breaking the circuit at contact plate 34, engages contact plate 35 making a new circuit, but open at contact point 41 of lever 39. When the table completes its cutting stroke, and the tumbler is thrown to the right by backing-dog 18, then lever 39 closes the clutch circuit through contact point 41 and the clutch is again energized, and the feed-shaft given another half turn at the end of which half turn the circuit is broken at contact plate 35 and a closure effected at contact plate 34, ready for again energizing the clutch when the planer again reverses and lever 39 goes to contact point 42. Thus at each reversal of the planer motion the clutch is energized and the feed shaft given momentary motion.

The motions of the feed shaft are to be transmitted to the screws and feed-rod of the rail in the usual manner, as by the oscillation of segment 11. In this way the intermittent motion involved in the feeding operation is provided for. The device may also be used in giving the fleeter shifting motions to the feed screws and rod of the rail by closing switch 48, whereby the clutch is constantly energized and segment 11 in constant oscillation. This provides for turning the feed-screws and rod of the rail intermittently but with such frequent impulses as to provide for a satisfactory fleeting motion. If it be desired to raise or lower the rail, then switch 48 is to be closed and clutch 22 engaged, and double gears 25 properly adjusted, whereupon the continuously turning feed-shaft gives continuous rotation to the rail elevating screws to raise or lower the rail, the raising and lowering motion being under control by either clutch-lever 23 or switch 48. The present description started on the assumption that pulley 30 would be turning continuously in one direction, and it is this assumption that necessitates the presence, somewhere between the pulley and the rail-elevating screws, of a reversing device as typified by double gear 25. It is manifest that if pulley 30 be turned in selective direction then the intermediate reversing device would not be necessary.

For raising and lowering the rail it is necessary, as has been explained, either to turn clutch-member 31 in selective direction or to provide reversing mechanism between that clutch-member and the rail-elevating screw. But for feeding operations neither of these conditions are necessary for clutch-member 31 may turn continuously in one direction, as has been explained, or it may reverse its direction of motion at each reversal of the planer, the result in either case being that the feed-shaft comes to rest soon after starting into rotation, and it is immaterial in which direction that shaft turns, nor is it requisite that it shall turn in the same direction after each reversal of the planer motion.

While I have illustrated my invention in connection with a metal planer, it is to be understood that this is merely a single exemplifying embodiment of the invention, which may well find embodiment in other reciprocating machines calling for feeding action at one or both ends of the stroke of the reciprocating part.

I claim:—

1. A machine of the class described comprising, a reciprocating part, a feed-part to be given motion at one or both ends of the stroke of the reciprocating part, a power-driven device to give motion to the feed-part, electrically controlled means for connecting the power-driven device with the feed-part and for disconnecting it therefrom, a normally open electric circuit for such control, circuit-closing mechanism actuated by a moving part of the machine upon reversal of motion of the reciprocating part to connect the power-driven device and feed-part, and a circuit-breaker actuated by the motion of the feed-part to disconnect the power-driven device from the feed-part, combined substantially as set forth.

2. A machine of the class described comprising, a reciprocating part, a feed-part to be given motion at one or both ends of the

stroke of the reciprocating part, a power-driven device to give motion to the feed-part, electrically controlled means for connecting the power-driven device with the feed-part and for disconnecting it therefrom, circuit connections to said electrically controlled means and containing two movable contact members, a pair of contact points for each of said contact-members, connections between a moving part of the machine and one of said contact-members to cause said contact member to open the circuit at one of its contact points and close it at the other, and connections between the feed-part and the other contact-member to cause the movement of the feed-part to close the circuit at one contact point and open it at the other contact point pertaining to the second contact member, whereby the circuit is normally open except when temporarily closed by the movement of said moving part of the machine, combined substantially as set forth.

3. A machine of the class described comprising, a reciprocating part, a feed-part to be given motion at one or both ends of the stroke of the reciprocating part, a power-driven device to give motion to the feed-part, electrically controlled means for connecting the power-driven device with the feed-part and for disconnecting it therefrom, a normally open electric circuit for such control, circuit-closing mechanism actuated by a moving part of the machine upon reversal of motion of the reciprocating part to connect the power-driven device and feed-part, a circuit-breaker actuated by the motion of the feed-part to disconnect the power-driven device from the feed-part, and a hand-operable circuit closer to render the circuit independent of said circuit breaker, combined substantially as set forth.

4. A machine of the class described comprising, a reciprocating part, a feed-part to be given motion at one or both ends of the stroke of the reciprocating part, a power-driven device to give motion to the feed-part, an electro-magnetic clutch to connect the power device with the feed-part, a normally open circuit for energizing the clutch, a circuit-closing mechanism actuated by a moving part of the machine to energize the clutch upon the reversal of motion of the reciprocating part, and a circuit breaking mechanism actuated by the motion of the feed-part to deënergize the clutch after the feed-part has started into motion, combined substantially as set forth.

5. A machine of the class described comprising, a reciprocating part, a feed-part to be given motion at one or both ends of the stroke of the reciprocating part, a power-driven device to give motion to the feed-part, an electro-magnetic clutch to connect the power device with the feed-part, a normally open circuit for energizing the clutch, a circuit-closing mechanism actuated by a moving part of the machine to energize the clutch upon the reversal of motion of the reciprocating part, a circuit breaking mechanism actuated by the motion of the feed-part to deënergize the clutch after the feed-part has moved a predetermined distance, and a hand-operable switch to maintain the circuit closed through the clutch while the circuit is open at the circuit breaker, combined substantially as set forth.

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Witnesses:
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