(No Model.) 2 Sheets—Sheet 1.

A. CLARKE.

METAL PLANING MACHINE.

No. 346,090. Patented July 27, 1886.

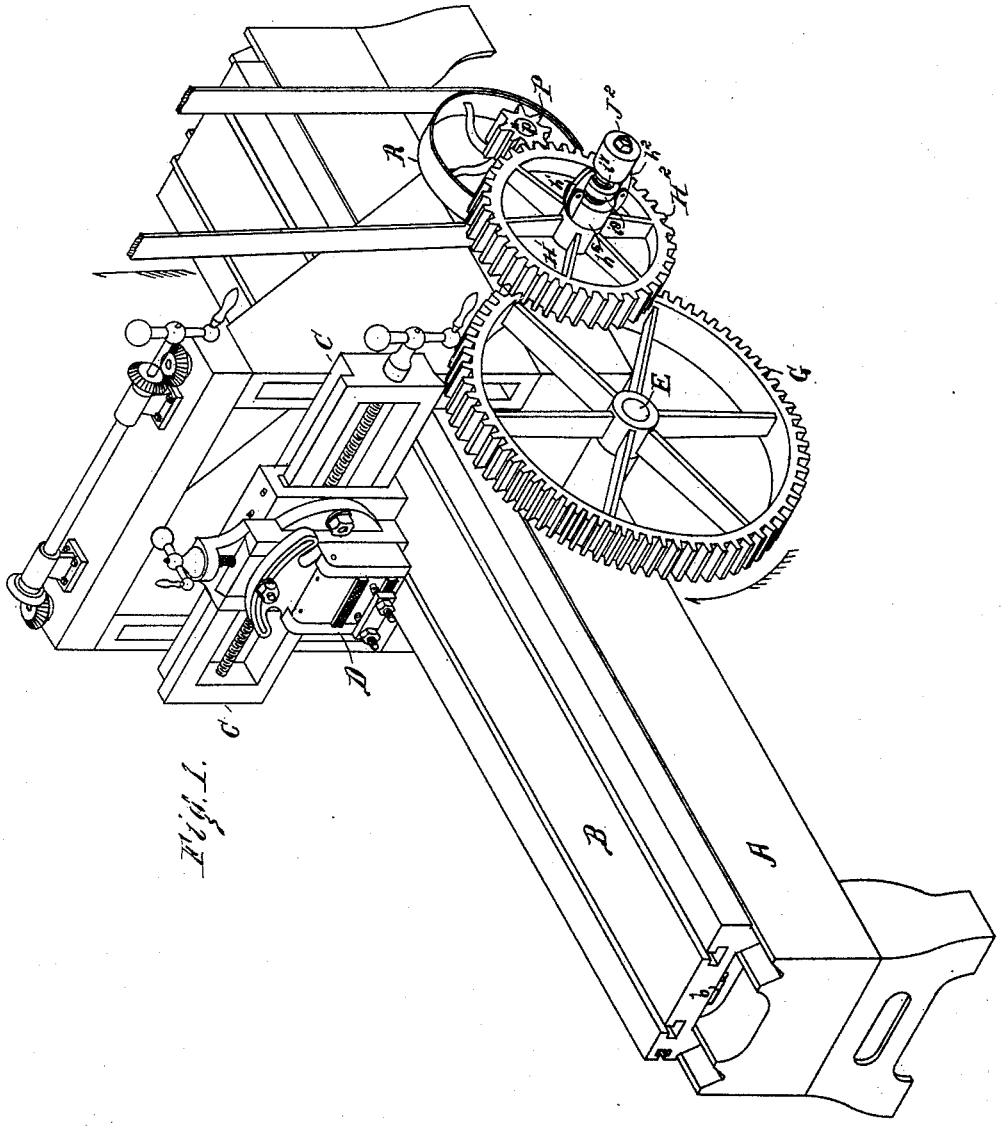


Fig. 1.

Witnesses—
Kirkley Clyde,
Gertrude M. Day.

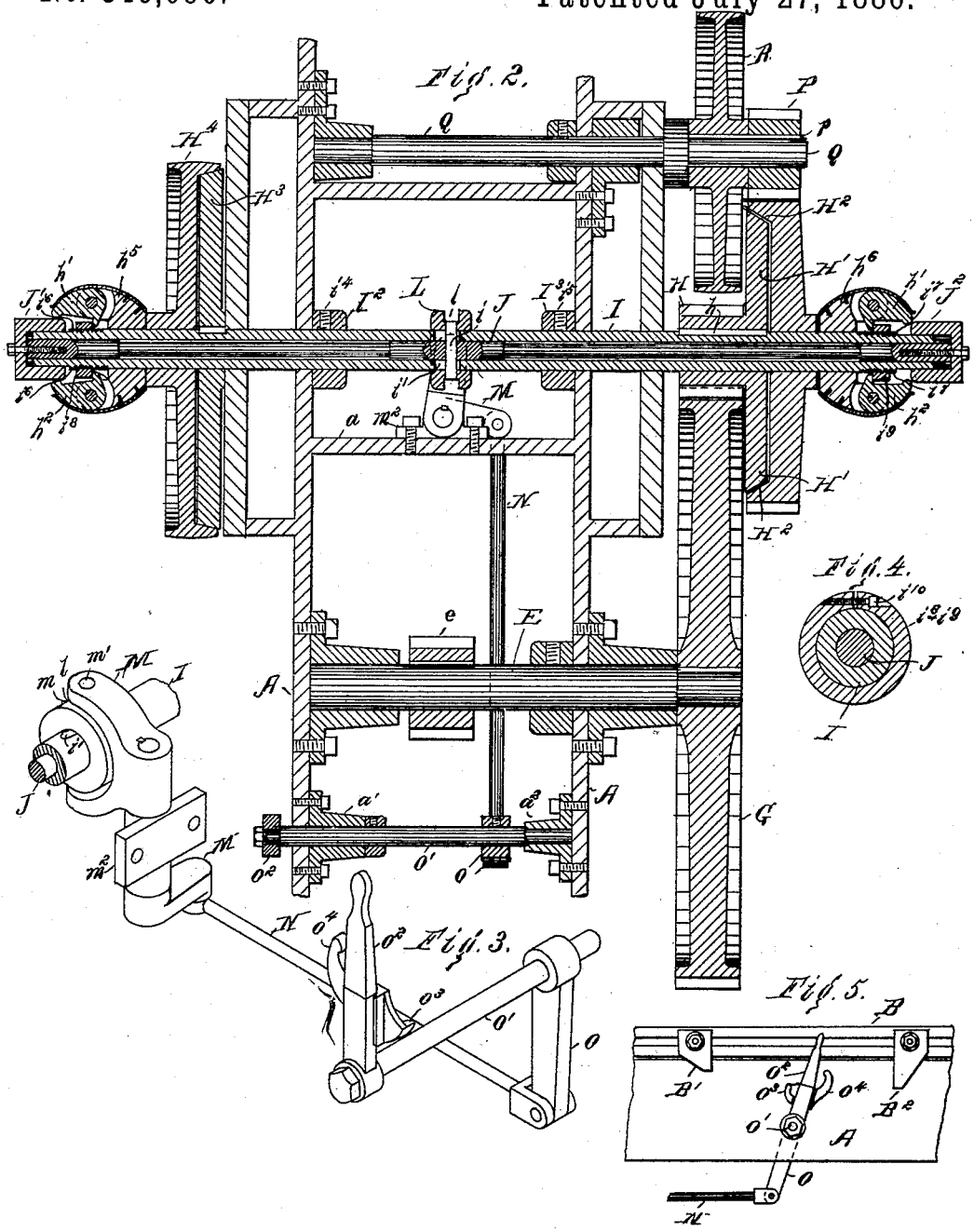
Inventor—
Alfred Clarke,
By Albert M. Moore,
His Attorney.

(No Model.) 2 Sheets—Sheet 2.

A. CLARKE.

METAL PLANING MACHINE.

No. 346,090. Patented July 27, 1886.



Witnesses—
Kirkley H. Clyde.
Gertrude M. Day.

Inventor—
Alfred Clarke,
By Albert M. Moore,
His Attorney.

UNITED STATES PATENT OFFICE.

ALFRED CLARKE, OF LOWELL, MASSACHUSETTS.

METAL-PLANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 346,090, dated July 27, 1886.

Application filed December 4, 1885. Serial No. 184,692. (No model.)

To all whom it may concern:

Be it known that I, ALFRED CLARKE, a citizen of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Metal-Planing Machines, of which the following is a specification.

My invention relates to metal-planing machines, and has for its object to give a quick return motion to the platen; and it consists in the devices and combinations hereinafter described and claimed.

In the accompanying drawings, Figure 1 is an isometric view of a planing-machine provided with my improvement; Fig. 2, a horizontal section in the plane of the axis of the main shaft; Fig. 3, an isometric view of a part of the shipping mechanism, omitting the clutch-pulley and clutch-gear and mechanism for operating the clutch; Fig. 4, a vertical cross-section through the reversing-shaft and the adjusting-collars; Fig. 5, a side elevation of part of the platen with the shipping-dogs and shipping-lever.

The bed A, platen B, cross-slide C, tool-holder D, and the various devices for adjusting the position of the tool or cutter are of the usual construction and operation. The platen B is provided with a rack, *b*, on its under surface, into which takes a pinion, *e*, on the jack-shaft E to reciprocate the platen in the usual manner. A large gear, G, is secured to the end of the jack-shaft, and takes into a pinion, H, secured by a spline, *h*, to the hollow reversing-shaft I, the rotation of which rotates the jack-shaft and gives a reciprocating motion to the platen. Within the hollow shaft I is a central solid rod, J. A collar, L, sliding on the hollow shaft I is provided with an annular groove, *l*, and is secured to the rod J by a pin, *i*, which passes through said hollow shaft in a slot, *i'*, formed in the same and through said rod J. A bell-crank lever, M, is forked at its upper end at *m*, and is provided with pins *m'*, which enter the annular groove *l*. Said bell-crank lever M is pivoted in a bracket, m^2, bolted to a cross-girt, *a*, of the frame A. The lower end of said bell-crank lever M is pivoted to a connecting-rod, N, the other end of said rod being pivoted to an arm, O, pendent from the rock-shaft O'. The end of the rock-shaft is provided with a shipping-lever, O^2, by turning which the shaft O' is rocked in its bearings a' a^2, secured to the frame A. The slot *i'* is long enough to allow the rod J to move endwise within the shaft I when the shipping-lever is moved to rock the shaft O'. The shaft I is prevented from moving endwise by collars I^2 I^3, surrounding the same and secured to said shaft I by set-screws I^4 I^5, which rest against the inner walls of the frame A. The pinion H has secured to it, concentrically therewith, a disk, H', in shape like the frustum of a cone, and forming one of the parts of a friction-clutch. The other part of said clutch H^2 has a hollow cone, adapted to receive and fit the part H'. The part H^2 is also provided with radial teeth, which engage with a pinion, P, secured by a spline, *p*, to the main shaft Q. To the main shaft Q is also secured a driving-pulley, R. When the clutch H' H^2 is coupled, the rotation of the shaft Q causes the gear G to rotate in the direction shown by its arrow in Fig. 1, and gives the feeding or forward motion to the platen. On the other end of the shaft I is another friction-clutch, consisting of a disk, H^3, secured by a spline to the hollow shaft I, and outside of this slides a band-pulley, H^4, provided with a hollow conical opening, adapted to receive and fit said disk H^3. The pulley H^4 is driven in the same direction as the driving-pulley R, both being driven by open belts from an overhead counter shaft (not shown) in the usual manner. The clutches on the shaft I are never both coupled at the same time. The clutches on the shaft I, considered merely as clutches, are substantially alike, and may be of any well-known form of friction-clutch, which depends wholly or partly for its operation on the friction between two surfaces. Outside of each clutch a hub, h^5 h^6, surrounds and slides on the hollow shaft I. Each of these hubs is provided with radial slots, in which are pivoted bell-crank levers h' h^2, the outer ends of said levers being nearly parallel with the axis of the shaft I and resting upon cams J' J^2, secured to the outer end of the rod J by screws passing through said cams into the ends of said shaft, each of these cams being a tapering sleeve having a closed outer end, their outer ends being the larger ends. It is apparent that when the rod J is moved to the

right in Fig. 2, the cam J^2 will be drawn out from under the outer ends of the levers $h' h^2$, and the cam J' will at the same time be drawn under the outer ends of the levers $h' h^2$ at the other end of said rod J. The inner ends of said levers $h' h^2$ are each nearly in contact with the surface of the shaft I, the inner arms of said levers being about radial to said shaft I. The shaft I is provided near each end with an external screw-thread, i^6 i^7. Internally-threaded collars i^8 i^9 surround said shaft I, and engage with the external screw-threads thereof. The collars i^8 i^9 are split radially at one side, and a screw, i^{10}, (see Fig. 4,) in each collar draws the sides of the slit thus formed together, to make said collars immovable upon the shaft I. When the screws i^{10} are loosened, the collars may be readily adjusted toward or from the ends of the shaft I, to vary the closeness of contact between the parts of the friction-clutches, said collars being adapted to be struck by the inner ends of the levers $h' h^2$ when the outer ends of said levers are thrown outward by the sliding of said rod J and cams $J' J^2$. It follows that sliding the rod J to the right in Fig. 2, and lifting the outer ends of the levers $h' h^2$ at the left away from the shaft I, will cause the inner ends of said levers to strike said collar i^8, and will force the hollow outer part of the clutch at the left of the machine to the right and cause it to engage with its counterpart by crowding the hub h^5 against said outer part of said clutch. It is also evident that sliding the rod J to the left will couple the clutch at the right of the machine and uncouple the clutch at the left thereof; also that throwing the upper end of the shipping-lever O^2 forward will cause the machine to have its operative or planing motion, and that throwing the upper end of said shipping-lever backward will cause the platen to have a return motion. The shipping-lever O^2 is provided with dogs O^3 O^4, lying out of the same vertical plane. The platen is provided with two dogs, $B' B^2$, arranged and adjusted in the usual manner, so that when the platen has reached the end of its advance or planing motion the platen-dog nearest the front end of the platen will strike the rear lever-dog and throw the upper end of the shipping-lever backward and reverse the motion of the platen. When the platen has reached the end of its return or reverse motion, the rear platen-dog will strike the front lever-dog and throw the upper end of the shipping-lever forward and cause the platen to advance.

I claim as my invention—

1. The combination, in a planing-machine, of a platen provided with a rack, a shaft provided with a pinion engaging said rack and with a gear, another shaft having a pinion secured thereto and engaging with said gear, said last-named pinion forming part of a friction-clutch, the other part of said clutch sliding and turning freely on said last-named shaft, and automatic mechanism, substantially as described, for engaging and disengaging the parts of said clutch, as and for the purpose specified.

2. The combination, in a planing-machine, of a platen provided with a rack, a shaft provided with a pinion engaging said rack, and with a gear, another shaft having a pinion secured thereto and engaging with said gear, said last-named pinion forming a part of a friction-clutch, the other part of said friction-clutch sliding and turning freely on said last-named shaft, another friction-clutch one part of which is secured to and turns with said last-named shaft, and the other part of which clutch slides and turns freely on said last-named shaft, the movable parts of said clutches being adapted to rotate constantly in opposite directions, and automatic mechanism, substantially as described, for simultaneously coupling one and uncoupling the other of said clutches, to reverse the motion of said platen, as and for the purpose specified.

3. The combination, in a planing-machine, of a platen having a rack, a shaft provided with a pinion engaging said rack, said shaft being also provided with a gear, a driving-shaft provided with a pinion, and a train of gears connecting said last-named pinion and said first-named gear, a reversing-shaft rotating with one of the intermediate gears of said train in the same direction with that of said driving-shaft, and automatic mechanism, substantially as described, for connecting and disconnecting said driving-shaft pinion and the intermediate gear of said reversing-shaft, as and for the purpose specified.

4. The combination, in a planing-machine, of a platen-actuating shaft provided with a gear, a driving-shaft provided with a pinion, a train of gears connecting said first-named gear and said pinion, a reversing-shaft carrying an intermediate gear of said train, and automatic mechanism, substantially as described, for simultaneously reversing the motion of said reversing-shaft and for disconnecting the pinion of said driving-shaft and said intermediate gear, as and for the purpose specified.

5. The combination of the platen resting upon a suitable bed and capable of sliding thereon and provided with a rack, a platen-actuating shaft provided with a pinion engaging said rack and with a gear, a reversing-shaft provided with friction-clutches, one part of each of said clutches being secured to said reversing-shaft and rotating therewith, the other part of said friction-clutch being free to turn and slide on said reversing-shaft to engage with or be disengaged from the fixed part of said clutch, the fixed part of one of said clutches engaging with said gear, the movable parts of said clutches being adapted to be rotated constantly in opposite directions, said reversing-shaft being hollow and provided with longitudinal slots, a rod sliding in said hollow shaft and projecting from the ends thereof, cams secured to the outer ends of said rod and adapted to close said clutches, a bell-crank lever having a forked arm, a rock-shaft,

said shaft provided with a down-hanging arm with a shipping-lever, a rod connecting said down-hanging arm and said forked bell-crank lever, the forked arm of which extends on opposite sides of said hollow shaft and engages with a collar, and a pin driven through said collar and through the longitudinal slots in said hollow shaft and into said sliding rod, as and for the purpose specified.

6. The combination of the platen resting upon a suitable bed and capable of sliding thereon and provided with a rack, a platen-actuating shaft provided with a pinion engaging said rack and with a gear, a reversing-shaft provided with friction-clutches, one part of each of said clutches being secured to said reversing-shaft and rotating therewith, the other part of said friction-clutch being free to turn and slide on said reversing-shaft to engage with or be disengaged from the fixed part of said clutch, the fixed part of one of said clutches engaging with said gear, the movable parts of said clutches being adapted to be rotated constantly in opposite directions, said reversing-shaft being hollow and provided with longitudinal slots, a rod sliding in said hollow shaft and projecting from the ends thereof, cams secured to said outer ends of said rod and adapted to close said clutches, a bell-crank lever having a forked arm, a rock-shaft provided with a down-hanging arm and with a shipping-lever, a rod connecting said down-hanging arm and said forked bell-crank lever, the forked arm of which extends on opposite sides of said hollow shaft and engages with a collar sliding thereon, a pin driven through said collar and through the longitudinal slots in said hollow shaft into said sliding rod, said shipping-lever being provided with dogs lying in different vertical planes, and said platen being provided with dogs, one of which is adapted at each end of the traverse of said platen to strike one of the dogs on said shipping-lever, and thereby to change the direction of the motion of said platen, as and for the purpose specified.

ALFRED CLARKE.

Witnesses:
ALBERT M. MOORE,
GERTRUDE M. DAY.