(No Model.) 3 Sheets—Sheet 1.

F. B. MILES.

METAL PLANING MACHINE.

No. 273,873. Patented Mar. 13, 1883.

FIG. 1.

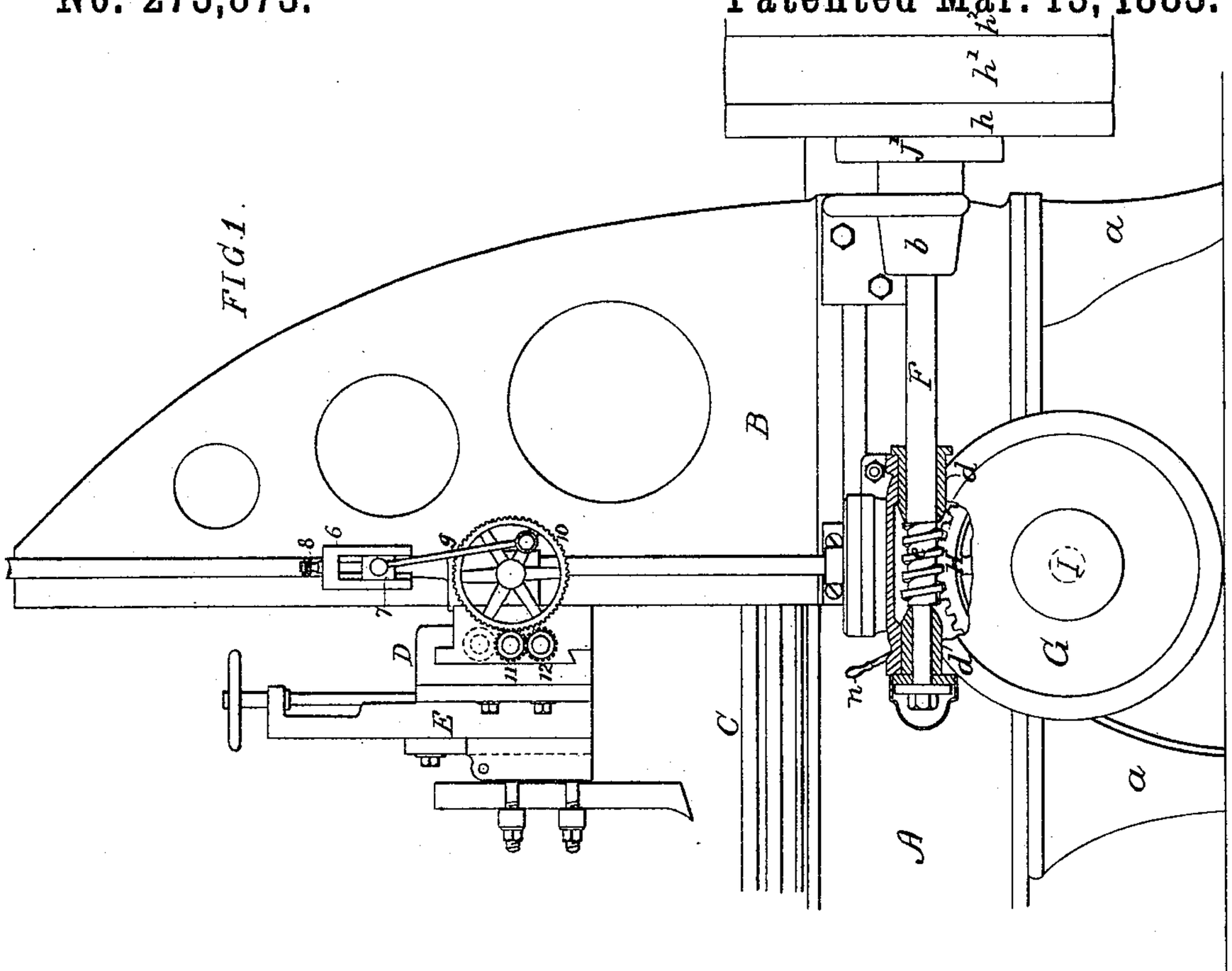
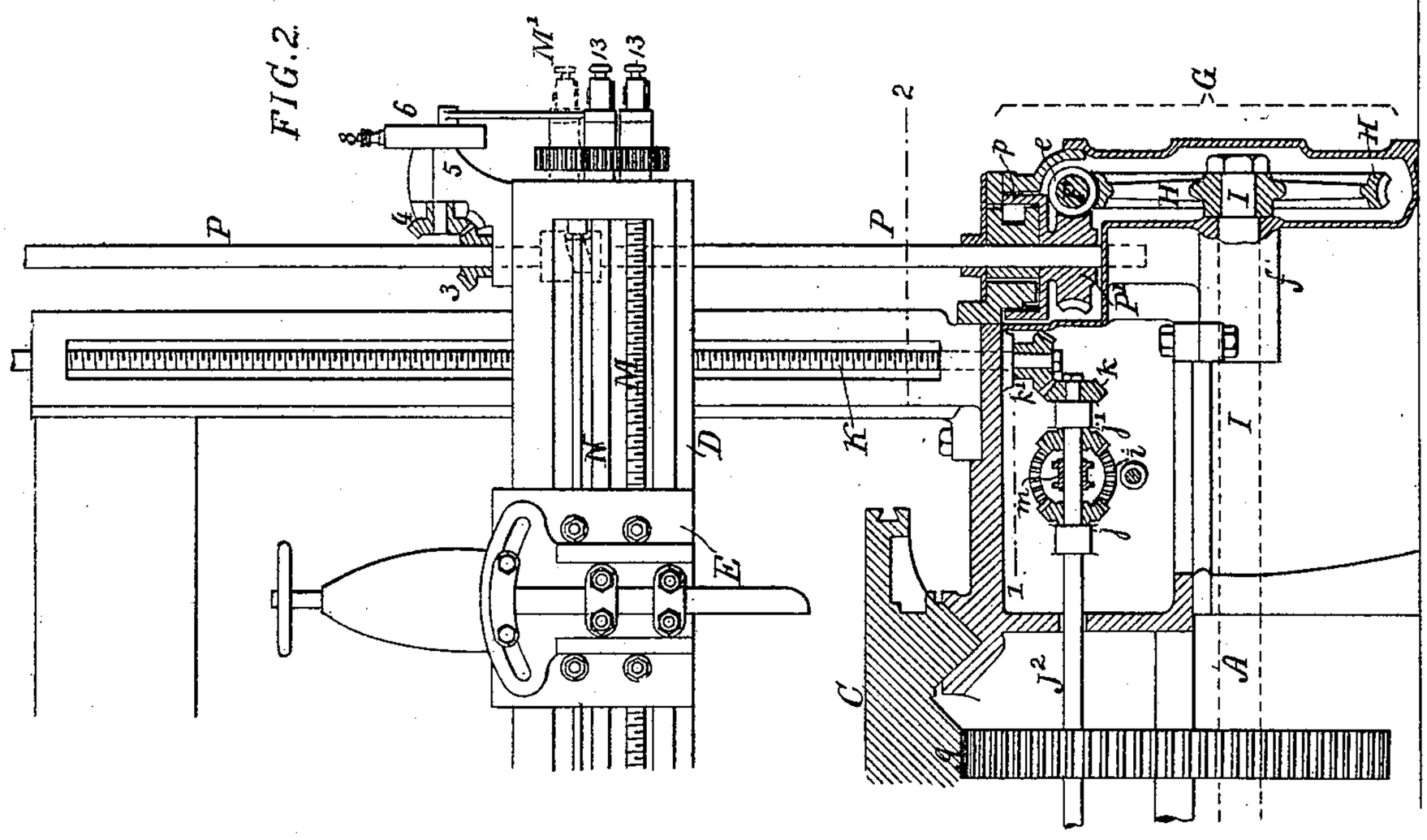


FIG. 2.



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Hamilton D. Turner.

INVENTOR:

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Howson and Sons

(No Model.) 3 Sheets—Sheet 2.

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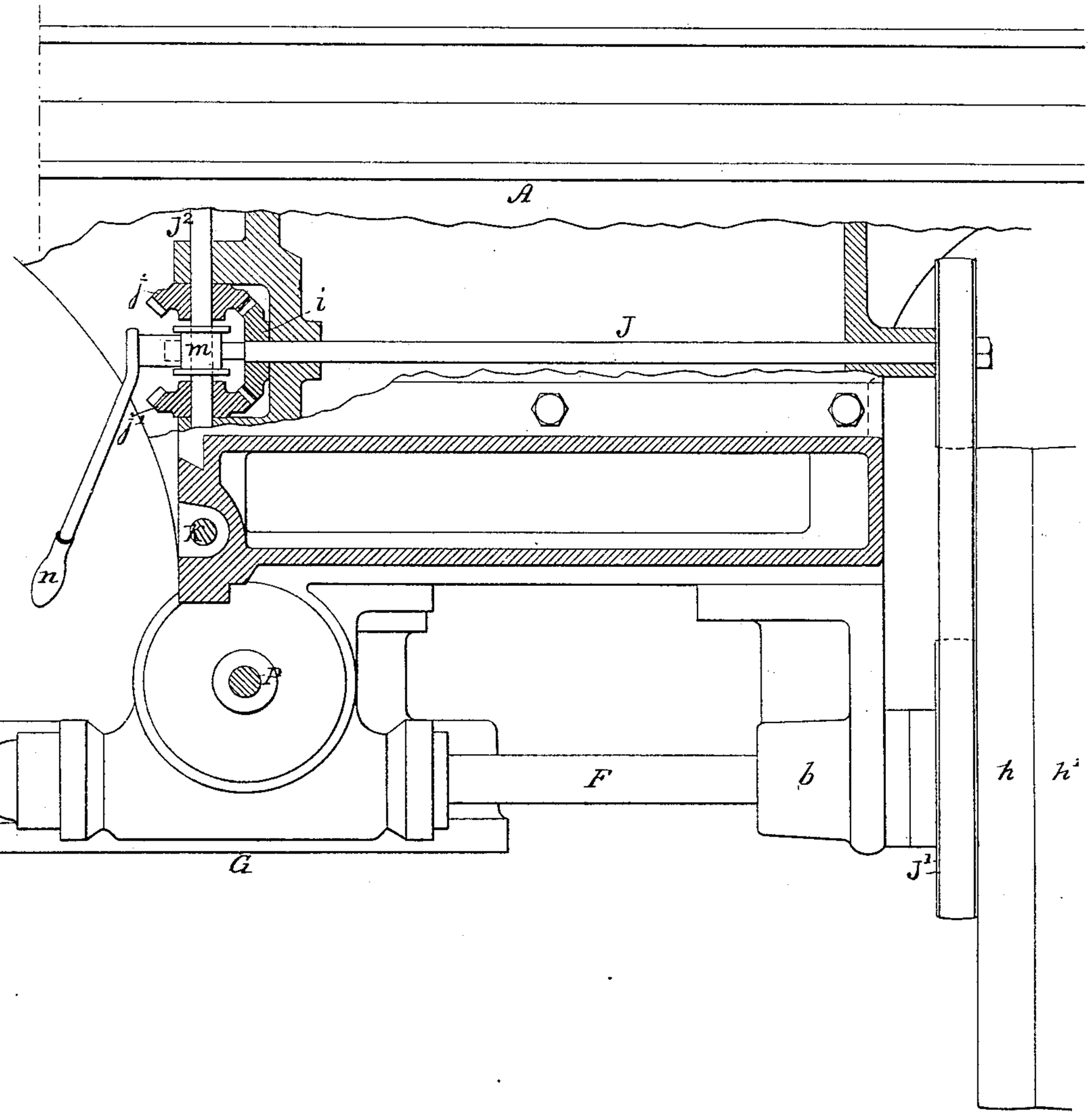
FIG. 3.



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3 Sheets—Sheet 3.

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FIG. 4

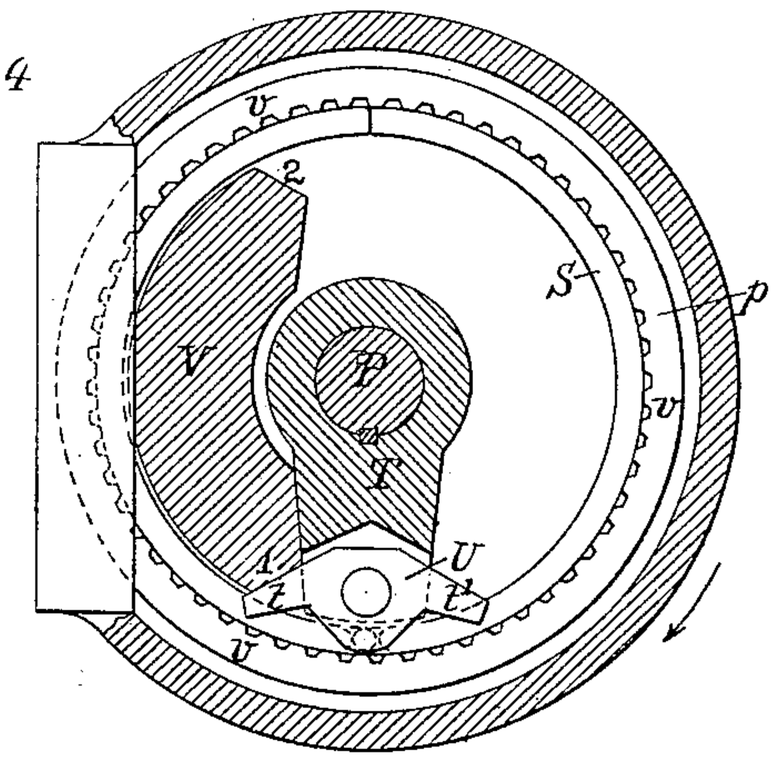


FIG. 5.

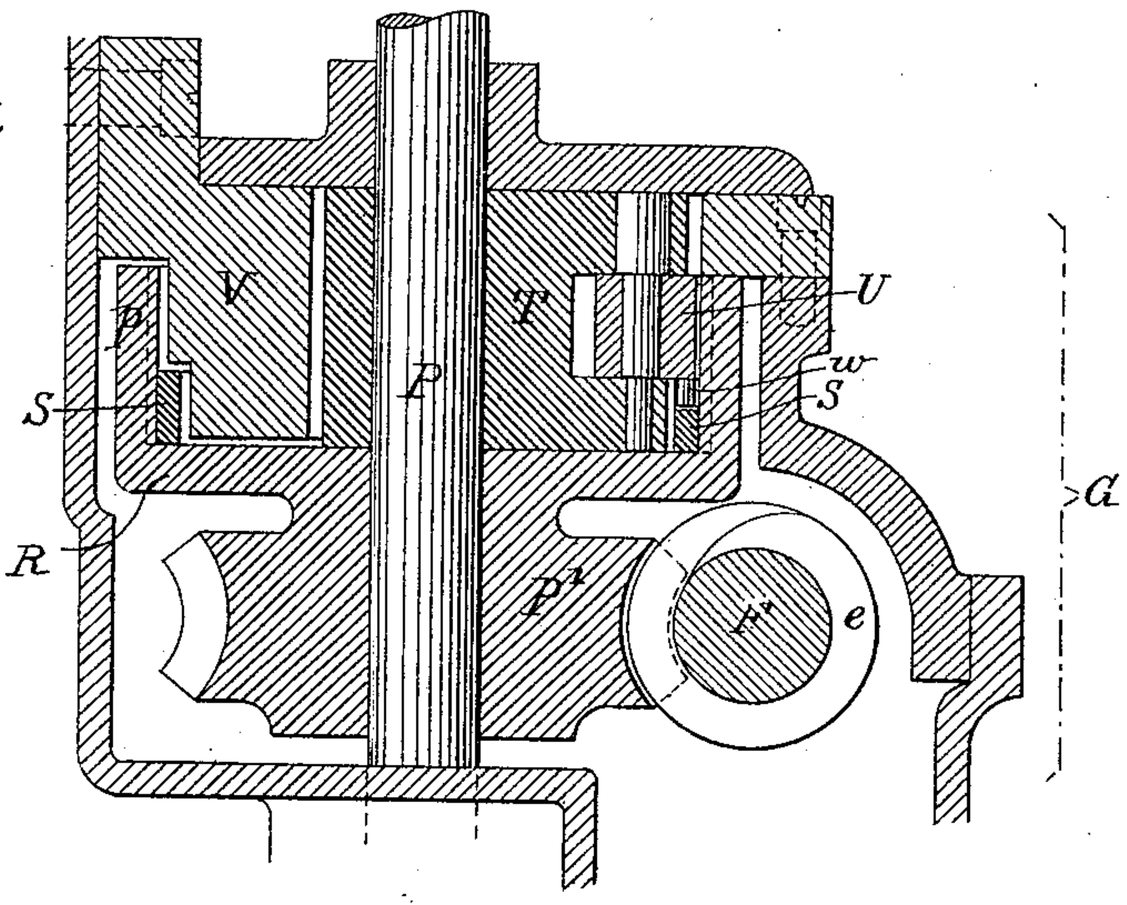
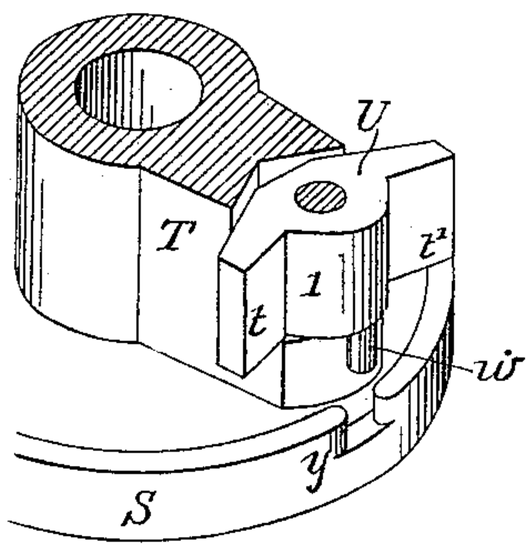


FIG. 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FREDERICK B. MILES, OF PHILADELPHIA, PENNSYLVANIA.

METAL-PLANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 273,873, dated March 13, 1883.

Application filed September 16, 1882. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK B. MILES, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Metal-Planing Machines, of which the following is a specification.

My invention consists in certain improvements, fully described hereinafter, in metal-planing machines, my improvements relating, first, to driving mechanism, and, second, to devices for automatically raising or lowering the cross-head.

In the accompanying drawings, Figure 1, Sheet 1, is a side view of part of a planing-machine, partly in section, and showing my improvements; Fig. 2, a transverse section of Fig. 1; Fig. 3, Sheet 2, a sectional plan on the line 1 2; Figs. 4 and 5, Sheet 3, sections, and Fig. 6 a perspective view drawn to an enlarged scale to illustrate a feature of my invention.

On Sheet 1, A is the bed-plate of the machine, B one of the side frames, D the cross-head, and E the tool-carrying slide, these parts being common to other metal-planing machines.

F is the driving-shaft, having a bearing in a bracket, *b*, secured to the bed-plate, and two bearings, *d d*, forming part of or attached to a casing, G, which is also secured to the base-plate. On the shaft F is a worm, *e*, gearing into a worm-wheel, H, on a shaft, I, which has a bearing, *f*, forming in the present instance part of the casing G, and another bearing or bearings, which are not shown in the drawings, but which may be attached to the bed-plate in any convenient manner. By a system of wheels which it has not been deemed necessary to illustrate in the drawings the transverse shaft I is geared to a rack, *g*, on the under side of the base-plate C. The driving-shaft F is provided with pulleys *h*, *h'*, and h^2, which are common to other planing-machines, and in connection with which any of the ordinary belt-shifting devices are employed.

K is one of the usual vertical screw-shafts, which is contained within a vertical recess in the frame B, and which, in connection with a like screw-shaft in a recess of the opposite frame, is the medium through which the cross-head D may be raised or lowered, nuts on the said cross-head being adapted to the threaded portions of the shafts. It has been usual to operate these screw-shafts by hand through the medium of suitable gearing on top of the frame whenever it became necessary to raise or lower the cross-head—a tedious operation, the necessity of which I obviate in the following manner:

A horizontal shaft, J, is driven by a belt from a pulley, J', on the driving-shaft F, and on the said shaft J is a bevel-wheel, *i*, gearing into two bevel-wheels, *j j'*, on a transverse shaft, J^2, the latter having at one end a bevel-wheel, *k*, gearing into a similar wheel, *k'*, on the screw-shaft K, the corresponding screw-shaft in the opposite side frame of the machine being similarly geared to the shaft J^2, on which, between the two wheels *j j'*, is a clutch, *m*, which can slide on but must turn with the shaft. This clutch can be moved by a lever, *n*, and connecting mechanism into gear with either of the wheels *j* or *j'*, or out of gear with both, so that the two screw-shafts can be turned in either direction as the cross-head has to be raised or lowered, or may be stationary when the cross-head has reached the desired position.

The cross-head is provided with the usual screw-shaft, M, through the medium of which the cutter-carriage E may be traversed in either direction on the said cross head, which is also provided with the usual shaft, N, through the medium of which and gearing common to other planing-machines the tool-carrying slide can be moved vertically on the carriage E. These shafts M and N are operated from a vertical shaft, P, by mechanism described hereinafter. The shaft P passes through and has its lower bearing in the casing G, above referred to, and on this shaft is a worm-wheel, P', into which gears the worm *e* on the driving-shaft. Forming part of this worm-wheel P', or secured thereto, is a cup, R, formed by a flange, *p*, and in this cup is lodged a ring, S, which, owing to its tendency to expand, is in close frictional contact with the interior of the flange. Within the cup, and secured to the shaft P, is an arm, T, to which is pivoted the duplex pawl or dog U, having two arms, *t t'*, the points of which are adapted to teeth *v* on the inside of the flange *p* of the cup. (See Figs. 4 and 5.) A pin, *w*, extends from the under side of the duplex pawl, at a short distance from the pivot of the same, into a notch,

y, in the friction-ring S. (See Fig. 6.) A fixed block, V, extends into the cup, and this block presents two stops, 1 and 2, one at each end. Referring to Fig. 4, the cup is revolving in the direction of the arrow; but the arm T and shaft P are stationary, for the arm *t* of the pawl U has been brought into contact with the stop 1, and hence both arms of the pawl are out of gear with the teeth *v* of the cup, the arm also being against the stop. The friction-ring is also stationary, and this is the condition of the parts until a reversal of the driving-shaft takes place, when the movement of the cup will also be reversed, and said cup will commence to turn in a direction contrary to that pointed out by the arrow in Fig. 4. The moment this reversal takes place the pawl will be so turned on its pivot that the arm *t* will be moved into gear with the teeth *v* of the cup, for there is such friction of the ring S in the cup that the former will be carried round by the latter far enough to turn the pawl and cause its arm *t* to engage in the teeth, and the consequence of this will be the turning of the arm T and shaft P in the same direction as the cup—that is, in a direction contrary to that pointed out by the arrow in Fig. 4—and this movement of the arm T and shaft P will be continued until the arm *t'* of the pawl comes in contact with the stop 2, when the pawl will be moved out of gear with the teeth of the cup, and will remain out of gear until there is another reversal of the driving-shaft and the cup again turns in the direction of the arrow, when the arm *t'* of the pawl will engage in the teeth and the arm T will be turned back to its first position. (Shown in Fig. 4.)

It will thus be seen that whenever there is a reversal of the driving-shaft, and a consequent reversal of the table of the machine, there will be a partial rotation of the vertical shaft P in one direction when the table of the machine reaches the limit of one of its movements and in the contrary direction when the table reaches the limit of its other movement, and it is from this intermittently-vibrating vertical shaft that the screw-shaft M may be caused to feed the carriage E on the cross-head, or the shaft N caused to feed the tool-carrying slide of the carriage, in the manner which I will now proceed to describe. The vertical shaft P passes through the hub of a bevel-wheel, 3, Fig. 2, the shaft being grooved to receive a feather in the said wheel, which gears into a similar wheel, 4, on a shaft having its bearing in a bracket, 5, secured to the cross-head D, and to this shaft is secured an arm, 6, in a slot in which a block, 7, can be adjusted by a screw, 8, Fig. 1. The block 7 is connected by a rod, 9, to an arm of the cog-wheel 10, which is hung to a pin on the cross-head, and which gears into two pinions, 11 and 12, the former on the shaft N and the latter on the shaft M. As the shaft P is intermittently turned first in one direction and then in the other, an intermittent oscillating motion must be imparted to the cog-wheel 10, the extent of the movement of the latter being determined by the adjustment of the block 7 in the slotted arm 6. Hence the pinions 11 and 12 must be rapidly rotated first in one direction and then in the other at intervals determined by the reversal of the driving-shaft.

In connection with each pinion and its shaft there is a pawl-and-ratchet device, for which Letters Patent No. 266,865 were granted to me October 31, 1882, the pawl being under the control of a small knob or handle, 13, by manipulating which the pawl may be adjusted to a position which will cause the pinion to intermittently turn its shaft in either direction, or to such a position that the pawl will be out of gear with the ratchet-wheel, when the pinion will turn without moving the shaft.

In many planing-machines there are two carriages for two cutting-tools on the cross-head. When this is the case, an additional screw-shaft, M', will be required for the additional carriage, and an additional pinion, the position of shaft and pinion being indicated by dotted lines in Fig. 1.

The location of the mechanism for operating the feed-screw M on the cross-head D, and the actuating of said mechanism by the shaft P, is an important feature of my invention, as the mechanism, when thus located, is within convenient reach of the attendant, who can readily alter the feed without changing the position in which he stands while watching the work, thus overcoming an objection to that class of planing-machines in which the feed-changing devices are adjacent to the bed of the machine.

A shaft P, operating in the manner set forth, is not absolutely essential to my invention, as a shaft rotating in one direction either continuously or intermittently may be used, the mechanism between the said shaft P and the screw-shaft being preferably so constructed in all cases as to permit the turning of the screw-shaft in either direction, or the stoppage of said shaft at pleasure.

I claim as my invention—

1. The combination, in a metal-planing machine, of the driving shaft F, the shaft J, driven therefrom, the shaft J^2, geared to the two screw-shafts K for raising and lowering the cross-head, and clutch-gear, whereby the said shaft J^2 may be arrested or caused to turn in either direction, substantially as set forth.

2. The combination of the internally-toothed cup R, driven from the driving-shaft, and the friction-ring in the said cup, with the shaft P, an arm, T, secured thereto, the duplex pawl having arms *t t'*, adapted to engage in the teeth of the cup, and pivoted to the said arm T and connected to the friction-ring, and with stops 1 and 2, all substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDK. B. MILES.

Witnesses:
HARRY DRURY,
HARRY SMITH.