5 Sheets—Sheet 1.

O. R. CHAPLIN.

Metal-Planing Machine.

No. 206,424. Patented July 30, 1878.

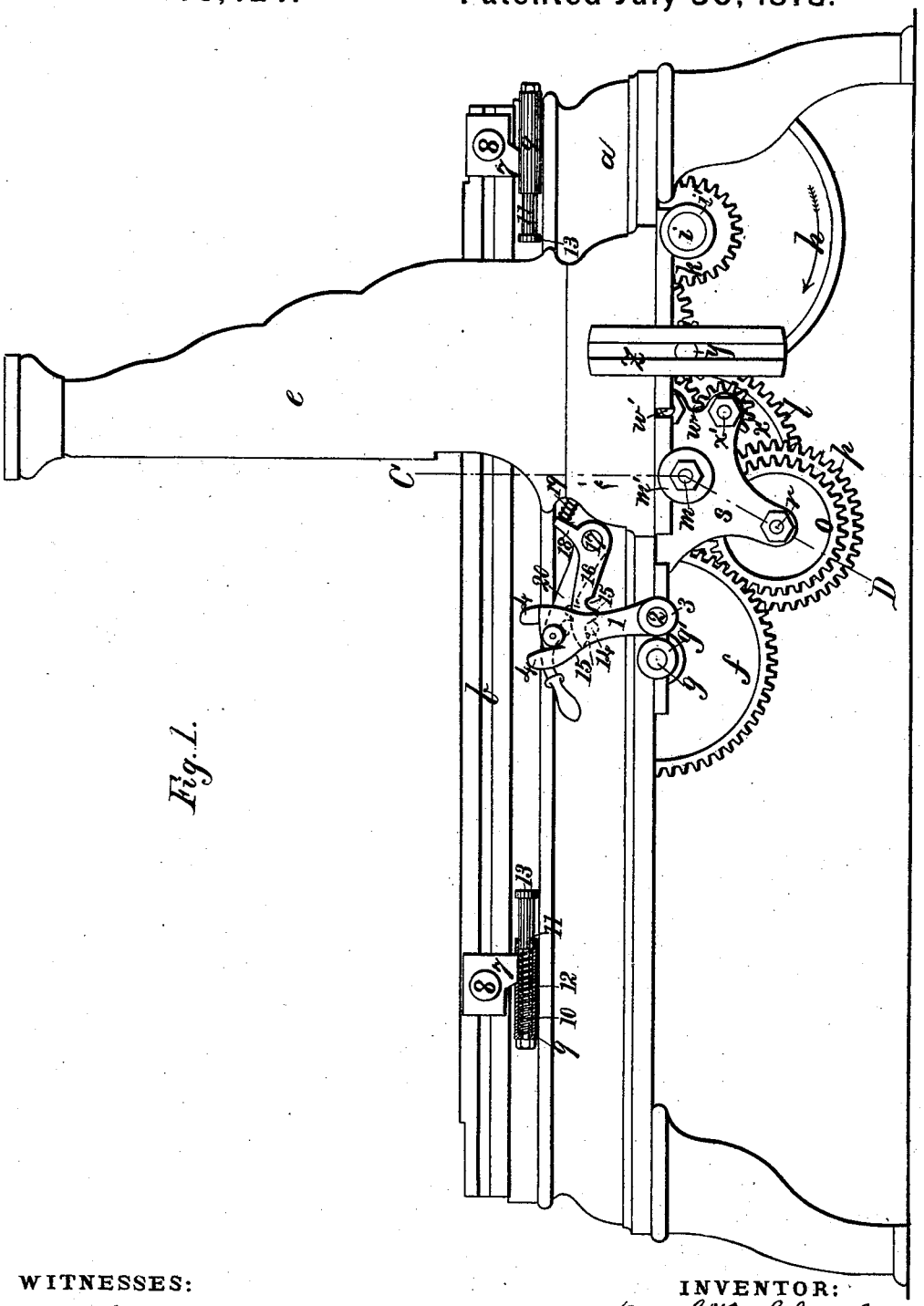

Fig. 1.

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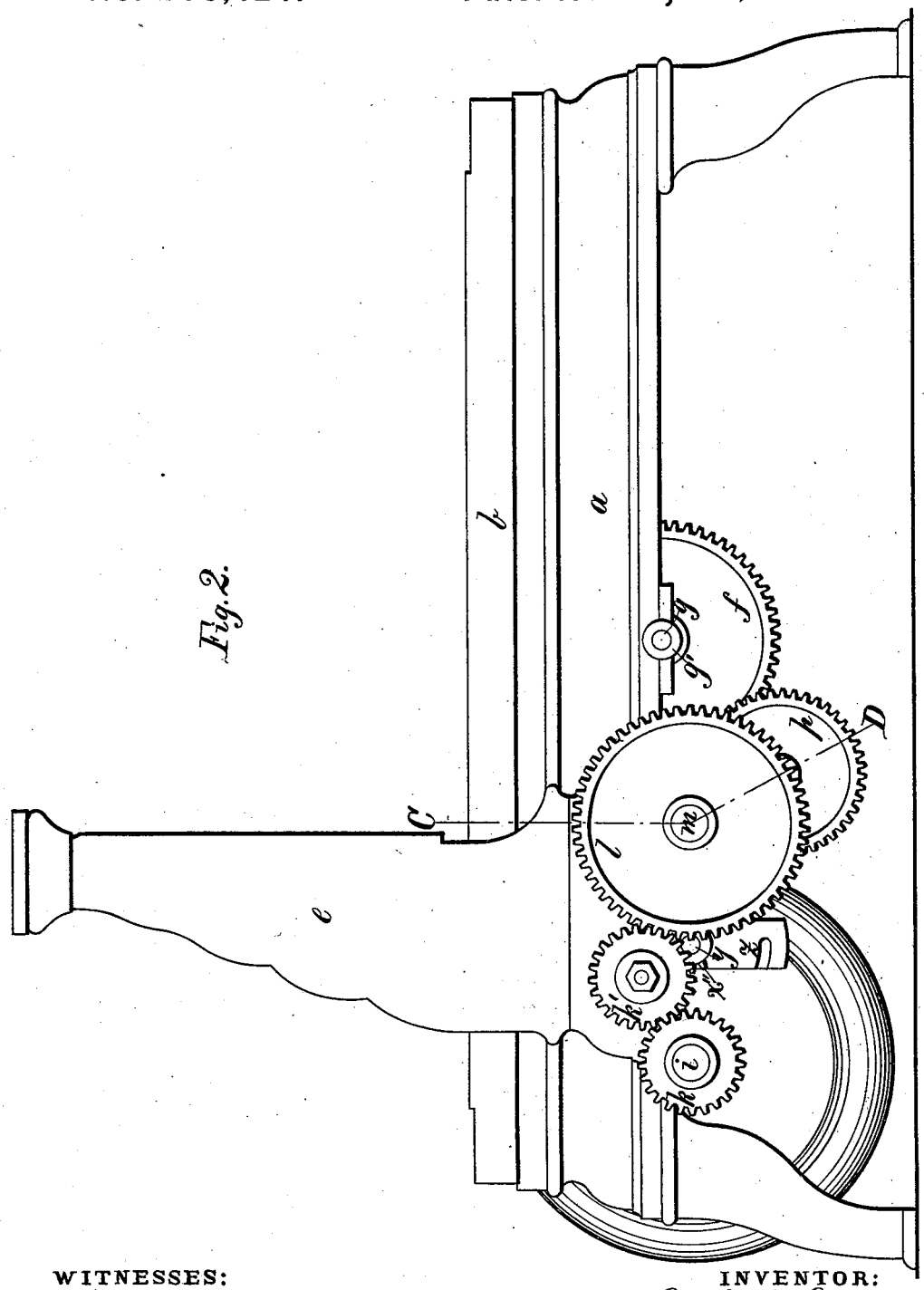

Fig. 2.

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Metal-Planing Machine.

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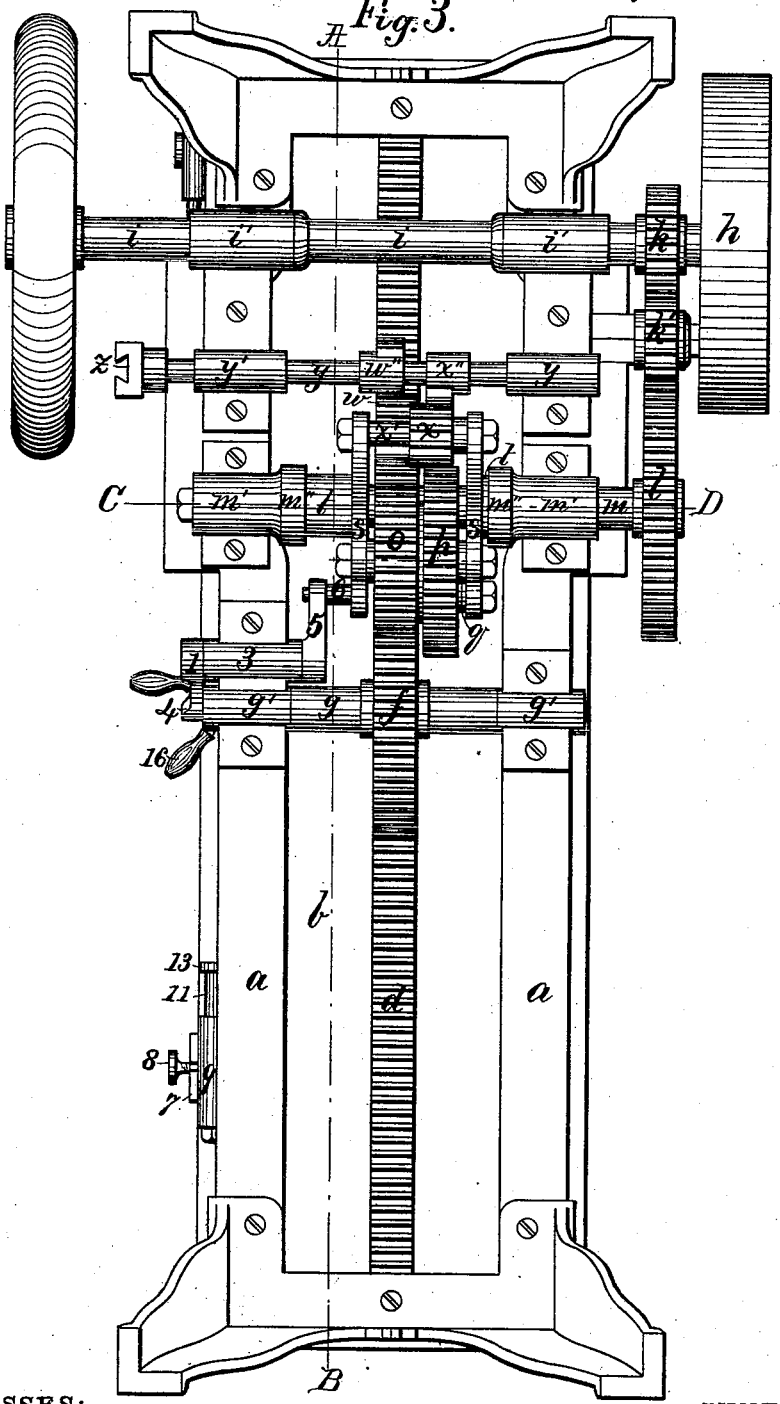
Fig. 3.



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5 Sheets—Sheet 4.

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Metal-Planing Machine.

No. 206,424. **Patented July 30, 1878.**

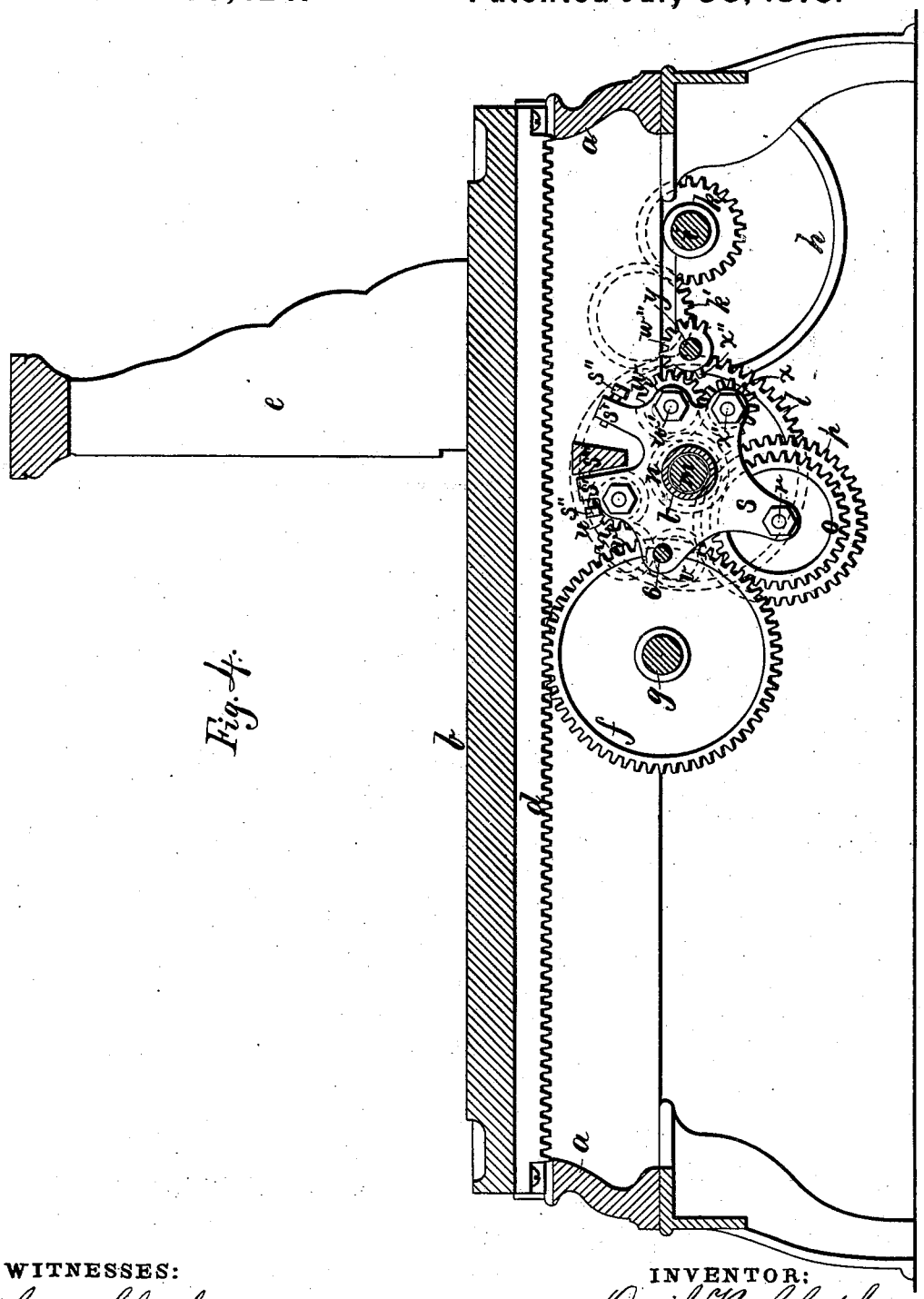

Fig. 4.

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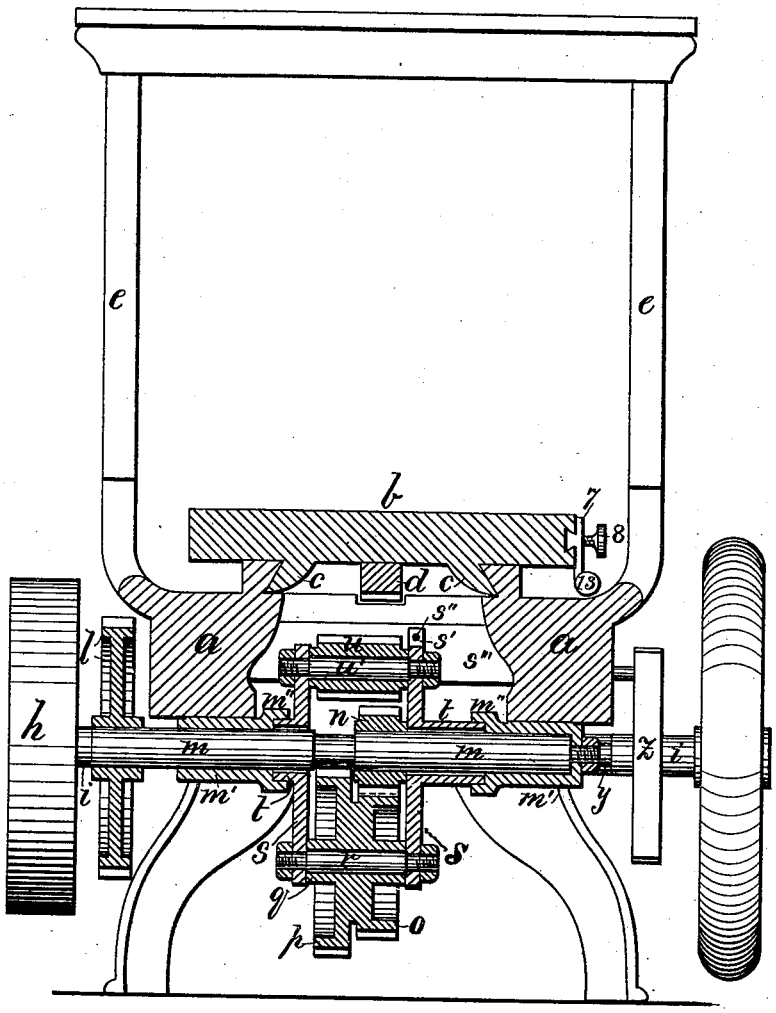
Metal-Planing Machine.

No. 206,424. Patented July 30, 1878.

Fig. 5.



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UNITED STATES PATENT OFFICE.

ORRIL R. CHAPLIN, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN METAL-PLANING MACHINES.

Specification forming part of Letters Patent No. **206,424**, dated July 30, 1878; application filed September 28, 1877.

To all whom it may concern:

Be it known that I, ORRIL R. CHAPLIN, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Metal-Planing Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in metal-planing machines, and it is carried out as follows: I use, in the combination with a rocking frame or plates bolted together by studs, upon which the gears are held in position, and which frame is automatically rocked at the end of each stroke of the bed-plate, intermediate gears, and two additional gears in the rear of said rocking frame, so arranged as to run in opposite directions, and two half-gears secured to an independent shaft, for the purpose of imparting a half-revolution movement to the cross-feed shaft, so as to automatically move the cutting-tool forward at each end of the stroke.

In combination with the aforesaid rocking frame and its gears, I employ a stationary bar or stop, against two opposite sides of which projecting ears on the rocking frame alternately strike when the said rocking frame is shipped, for the purpose of preventing the gears from bottoming into each other, and thereby creating unnecessary friction. The projections on the rocking frame are provided with set-screws, by which the exact rocking motion on said frame can be obtained and regulated.

The rocking frame is so connected with the shipper as to cause the frame to rock, and thus lock the gears together, so as to impart motion to the platen or bed-plate and the cross-feed at the same time.

In combination with the rocking frame and its gears, I use a shipper-lever, connected to the said frame, which, when moved to the right or left, will cause the said frame to rock on its fulcrum, and thereby connect one of the gears in the rocking frame with the driving-gear of the platen or bed-plate at each end of the stroke, so as to automatically cause the said platen or bed-plate to travel forward and back in its bearings. If it is desired to keep the platen and cross-feed stationary, it is only necessary to move the shipper-lever into a perpendicular position, and to hold it in such a position by means of an additional horizontal lever, having a notch on its under side, fitting over a pin projecting on the inside of the shipper-lever. In this position both gears on the rocking frame are disconnected from the driving-gear of the platen, and the driving-pulley may therefore rotate without imparting motion to the platen or cross-feed.

For the purpose of keeping the gears on the rocking frame locked into the driving-gear of the platen during the working of the machine, I employ another horizontal lever, having two inclines on its under side, which inclines or angles meet at the lower part thereof, and which inclines fit over the inward-projecting pin on the shipping-lever. At the rear of this horizontal lever is an elbow-shaped projection, to which is connected a spring of sufficient strength to force the lever with the inclines down over the aforesaid pin on the shipping-lever, so as to keep the gears in contact with each other after the lever is shipped.

To effect an instantaneous shipping of the lever and gears during the forward and back motion of the platen, I employ adjustable spring-dogs on the platen, one attached to each end, which spring-dogs are each made with a tubular receptacle secured to the platen or bed-plate, in which is movable an adjustable dog resting against a yielding coiled spring within the aforesaid tubular receptacle. The said dog is provided with a collar or annular projection in its outer forward end. The object of these spring-dogs is to allow the platen or bed-plate to move horizontally forward until the collar on the dog is forced against the tubular receptacle aforesaid by coming in contact with the shipping-lever, when the latter is disconnected from the notched-knee rocking lever, and the moment it is so liberated the compressed spring within the dog-receptacle acts upon the movable dog and causes it to instantly throw the shipping-lever over to its opposite farthest position, where it is held in

place by the notched spring knee lever aforesaid till the opposite spring-dog comes in contact with the shipping-lever and reverses the operation in a similar manner.

As soon as the shipping-lever is reversed the rocking frame, containing the gears, is turned so far around its axis as to disconnect one gear and connect the reverse gear, or vice versa, from the driving-gear of the platen, and at the same time to impart a half-revolution to the shaft operating the cross-feed for the cutting-tool. If not for these spring-dogs aforesaid, the platen or bed-plate would come to a standstill as soon as the dog reached the shipping-lever, as it would unship one gear without connecting the opposite one with the driving-gear of the platen.

In the accompanying drawings, Figure 1 represents a side elevation. Fig. 2 represents a side elevation, seen from the opposite side of Fig. 1. Fig. 3 represents a bottom view of the machine. Fig. 4 represents a longitudinal section on the line A B shown in Fig. 3; and Fig. 5 represents a cross-section on the line C D, shown in Figs. 1, 2, and 3.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

a represents the frame of an ordinary metal-planing machine, on which *b* is the traveling platen or bed-plate, with its guides *c c* and cog-rack *d*, in the usual manner. *e e* represent the upright frame for the cross-feed of the cutting-tool, as usual. *f* represents the main driving-gear, that is geared to the rack *d* and secured to the shaft *g*, that revolves in the stationary bearings *g' g'*, as shown in Fig. 3. *h* represents the driving-pulley, that is set in rotary motion by means of belt-power from a counter-shaft, or otherwise, as may be desirable. The pulley *h* is secured to the shaft *i*, that is made to rotate in the stationary bearings *i' i'*, as shown. To the shaft *i* is furthermore secured the pinion *k*, by which the rotary motion of the shaft *i* is conveyed to the intermediate pinion *k'* and cog-wheel *l*. The latter is secured to the shaft *m*, that is made to rotate in the stationary bearings *m' m'*. About midway on the shaft *m* is furthermore secured the pinion *n*, that is in gear with the cog-wheel *o*, concentrically with which is secured the cog-wheel *p*. The cog-wheels *o* and *p* are secured to the shaft *q*, that is made to rotate upon a stud, *r*, secured to the rocking plates *s s*, each of which is provided with a hub, *t t*, concentric with and surrounding the shaft *m*. The hubs *t t* project into and are supported within the annular sockets *m'' m''*, that form each a part of the bearings *m' m'*.

When the rocking plates *s s* are in the position as shown in Fig. 1, and the pulley *h* set in a rotary motion, as indicated by the arrow, the platen or bed-plate *b* is carried forward toward the cutting-tool by means of pinions *k k'*, cog-wheel *l*, shaft *m*, pinion *n*, cog-wheels *o* and *f*, and the cog-rack *d*.

To reverse the motion of the platen or bed-plate *b* without reversing the motion of the driving-pulley, it is only necessary to rock the plates *s s* around their axis far enough to disconnect the gear *o* from the driving-gear *f;* and by rocking said plates or frames *s s* a little farther, the pinion *u*, movable around the stud *w'* in the plates *s s*, is interlocked with the driving-gear *f*. The latter is, in this case, set in an opposite rotary motion by means of the pinion *n*, cog-wheels *o* and *p*, and intermediate pinions *v* and *v'*, the latter geared into the pinion *u*, that is now interlocked with the driving-gear *f*.

It will thus be seen that the gears that are thrown in and out of gear with the driving-gear *f* for the purpose of producing a forward and back motion of the platen or bed-plate are the gears *o* and *u*. On account of the proportionate sizes of the different gears, as shown, a quicker backward motion of the platen is obtained as compared with its forward motion toward the cutting-tool.

s' s' represent the stops or projections on the rocking frames *s s*, which stops are provided with the regulating-screws *s'' s''*, by means of which and the stationary bar or projection *s'''* the proper throw of the rocking frames *s s* is obtained and regulated, so as to prevent the gears *o* and *u* from bottoming with the driving-gear *f*.

The pinion *n* is furthermore geared into the pinion *w*, that is movable around its axis upon the stud *w'* in the frames *s s*. The pinion *w* is geared into the pinion *x*, that is movable around its axis upon the stud *x'* in the said rocking frames *s s*, and as the latter are rocked around their fulcrum the pinions *w* and *x* alternately engage into the half-gears *w''* and *x''*, secured to the rock-shaft *y*, located in the stationary bearings *y' y'*, by which a half-revolution movement is imparted to the head or block *z*, secured to the end of the rock-shaft *y*, from which head or block a rod or link is to be connected to the cross-feed above the platen or bed-plate in the usual manner, and in this way a half-revolution movement is imparted to the head or block *z* for the operation of the cross-feed at the end of each stroke of the platen or bed-plate.

1 represents the upright shipping-lever, secured in its lower end to the rock-shaft 2, that is journaled in the stationary bearing 3, and provided in its upper end with the projecting lips 4 4, as shown. To the inner end of the rock-shaft 2 is secured the forked arm or lever 5, that embraces a stud or pin, 6, secured to one of the rocking frames *s;* and it will thus be seen that the desired rocking motion of the frames *s s* is obtained by moving the shipping-lever 1 a little to the right or left, as may be desired.

7 7 represent the adjustable spring-dogs, secured by means of the screws 8 8 to the platen or bed-plate, as shown. Each of these spring-dogs is provided with a hollow tubular receptacle, 9, in which is movable the bolt 10, provided with an annular enlargement, 11,

against which the spring 12 is pressing, as shown in the left-hand side of Fig. 1. The outer free end of the bolt 10 is provided with a head or collar, 13, as shown, and for the purpose set forth.

On the inside of the shipping-lever 1 is located a pin, 14, over which is resting either of the notches 15 15 made on the under side of the lever 16, that is hung at 17, and provided with a knee or bend, 18, to which is connected the spring 19, the other end of which is secured to the frame of the machine or other stationary part.

20 represents a lever provided with a notch on its under side, fitting over the projecting pin 14 in case it is desired to keep the shipping-lever 1 in a vertical position, so that neither of the gears *o* or *u* are in a working position, in which case the driving-pulley *h* can rotate freely without conveying any motion to the platen or bed-plate.

Having thus fully described the nature. construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. The combination of the rocking plates *s s*, the pinions *n u w x*, the half-gears *w'' x''*, the wheels *o p*, and intermediate gears *v v'*, rock-shaft *y*, and the head or block *z*, as and for the purpose set forth.

2. The herein-described spring-dogs 7 7, consisting of the tubular receptacles 9 9, bolt or pins 10 10, springs 12 12, and heads or collars 13 13, as herein set forth and shown.

3. The combination of the rocking frames *s s* and their gears and pinions, as set forth, with the shipping-lever 1, knee-lever 16 18, having notches 15 15 and spring 19, and the spring-dogs 7 7, as and for the purpose set forth.

4. The combination of the single pulley *h*, intermediate gears *k k' l n x u*, the wheels *o p*, and intermediate gears *v v'*, with driving-gear *f*, rack *d*, and reciprocating bed-plate *b*, as herein set forth and described.

5. In combination with the gear-carrying rocking frames *s s*, the projections *s' s'*, regulating-screws *s'' s''*, and bar or stationary stop *s'''*, as and for the purpose set forth and described.

In testimony that I claim the foregoing as my own invention I have affixed my signature in presence of two witnesses.

ORRIL R. CHAPLIN.

Witnesses:
ALBAN ANDRÉN,
HENRY CHADBOURN.