2 Sheets--Sheet 1.

W. HENDERSON.

Metal Planing-Machines.

No. 147,497. Patented Feb. 17, 1874.

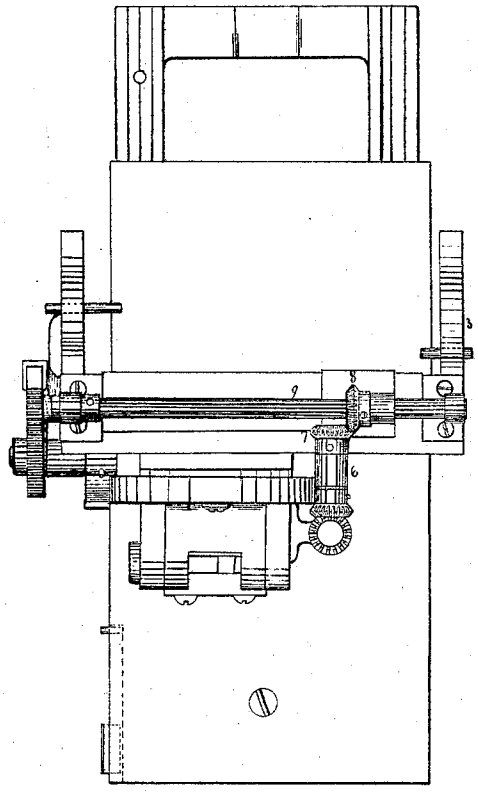

Fig. 1.

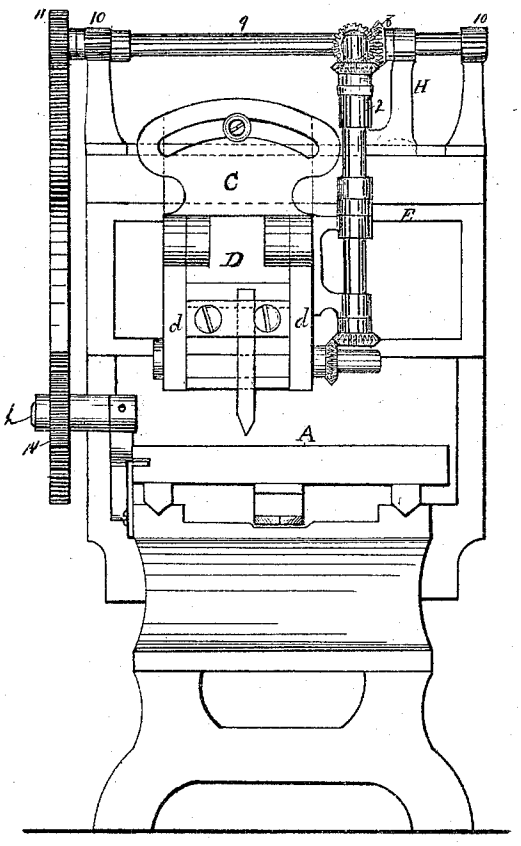

Fig. 2.

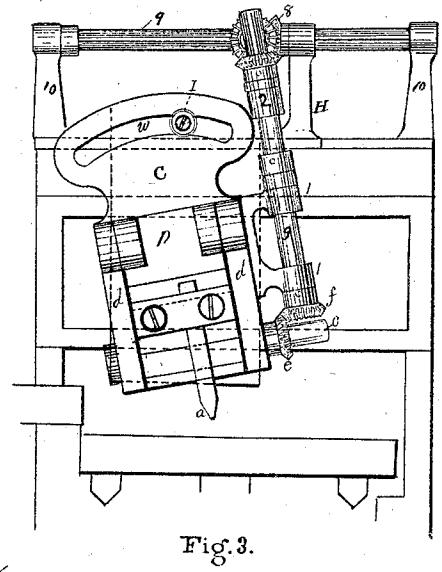

Fig. 3.

WITNESSES.

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2 Sheets--Sheet 2.

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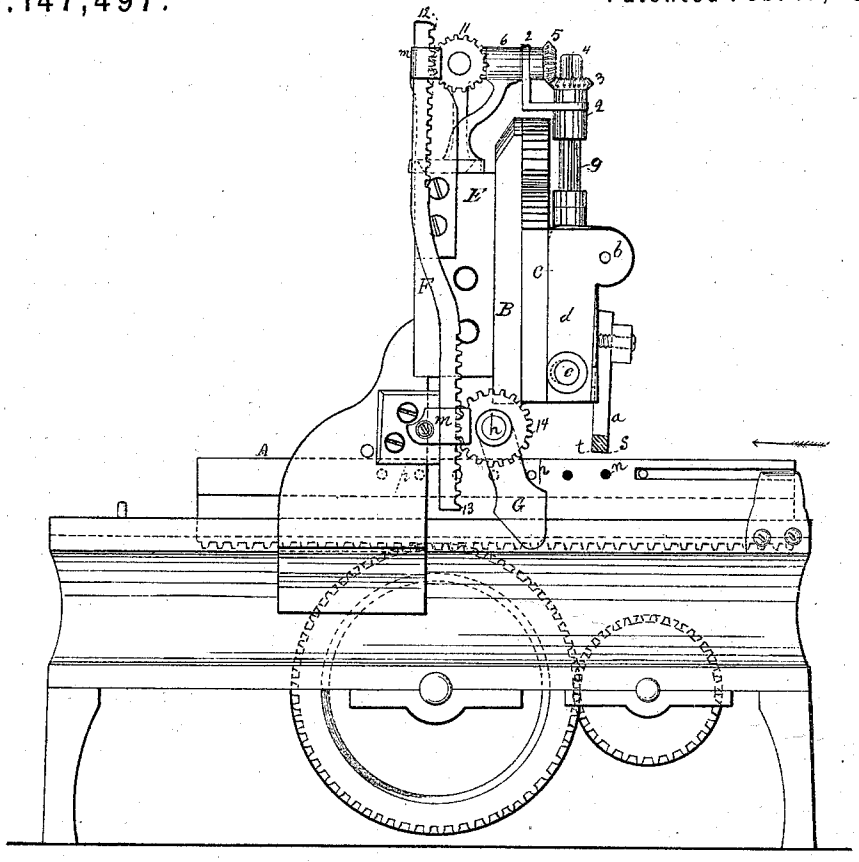

Fig. 4.

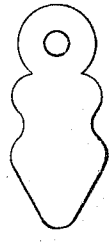

Fig. 5.

WITNESSES.

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UNITED STATES PATENT OFFICE.

WILLIAM HENDERSON, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO HIMSELF AND LUCIUS W. POND, OF SAME PLACE.

IMPROVEMENT IN METAL-PLANING MACHINES.

Specification forming part of Letters Patent No. **147,497**, dated February 17, 1874; application filed July 26, 1873.

To all whom it may concern:

Be it known that I, WILLIAM HENDERSON, of the city and county of Worcester and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Machines for Planing Metal; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form a part of the specification, and in which—

Figure 1 represents a top or plan view of so much of a planing-machine as is necessary to illustrate my present improvements. Fig. 2 represents a front view. Fig. 3 represents a front view of a portion of the machine shown in Fig. 2, the cutter and frame which supports it being shown in inclined positions. Fig. 4 represents a side view; and Fig. 5 represents a modification of a part of the machine—the finger acted upon by the movable table to change the position of the cutter.

To enable those skilled in the art to which my invention belongs to make and use the same, I will proceed to describe it in detail.

The nature of my invention consists in the combination, in metal-planing machines, of mechanism, substantially as hereafter described, whereby the tool is automatically raised from its work while the material is moving in one direction, and before the cut is completed, and after the material has passed the point of the tool, the tool will be automatically set to act upon the material to finish the cut on the same line as it is moved back in the opposite direction; and the nature of my invention consists, further, in certain details of construction or combination of devices, whereby the tool and the frame which supports it can be adjusted in inclined positions at the will of the operator without interfering with the automatic adjustment of the cutting-tool.

In the drawings, the part marked A represents the movable bed or table, upon which the work to be planed is secured, and said table may be moved back and forth by the ordinary mechanism in common use for operating the tables of planing and gear-cutting machines. The part marked B supports the compound tool-frame C D, and may be in turn combined with the frame E, so that it can be moved to the right or left or up and down the same as the corresponding part is operated in common planing-machines. The cutting-tool *a* is attached to a frame, D, pivoted at *b* to the frame C, while through its lower end is passed an eccentric shaft, *c*, which turns in bearings in the side pieces or flanges *d d*, which project from the frame part C, while it has upon one end a beveled gear, *e*, which takes into beveled gear *f* upon the lower end of shaft *g*, which is in turn supported in bearings 1 1, secured to the side of frame C, and is also supported at the top by a bearing-piece, 2, through which said shaft *g* can slide freely. Above the bearing-piece 2 is arranged, upon shaft *g*, a beveled gear, 3, having a spline to fit the slot 4 in shaft *g*, said gear meshing into gear 5 on the front end of a short shaft supported in bearing-piece 6, while a gear, 7, is attached to its rear end, to mesh into gear 8 on shaft 9, the latter shaft being supported to turn in proper bearings 10 10, and having a gear, 11, on one end, into which the teeth 12 of the rack-piece F mesh, while teeth 13 on the lower end of said rack-piece mesh into gear 14 on the end of shaft *h*, to which the finger G is secured. Rack-piece F is held in place by collar-pieces *m m*, through which it can work freely up and down. A series of holes, *n*, are made in the sides of table A for the reception of pins *p*, one of which is inserted on each side of the finger G.

The operation is as follows: Assuming that the table is being moved in the direction indicated by the arrow, Fig. 4, the work on the table will be cut or acted upon by the cutting-edge *s* of the tool *a*, until pin *p* is forced against finger G, thereby turning gear 14, which raises rack-bar F, and, by its action on gear 11, turn shaft *g*, gears 8, 7, 5, 3, *f*, and *e*, and, consequently, shaft *c*. As the eccentric shaft *c* turns, it turns frame D out, thereby raising the cutting-edge *s* until the face of the tool assumes a horizontal position; and as the table advances the cutting-edge *s* is elevated and the cutting-edge *t* depressed into the proper position to act upon the material being planed, when the motion of the table is reversed.

It will be seen that, by changing the pins *p*

into different holes, the table A will move to a greater or less distance before the tool is changed, thus enabling the operator to adjust the machine to plane or cut different lengths and widths of material.

The edges of finger G, which are acted upon by pins *p*, can be made of such inclination or form as to permit the tool to remain with its edge in a horizontal position for such a length of time as may be required, which will depend upon the nature and character of the work.

By my improvements it will be seen that the machine not only planes when the table is running in both directions, but the cutting-edge of the tool will be raised automatically before the entire cut is completed at each end or side of the work, consequently there will be no chipping out at the edges. In gear-cutting this is a very important feature, since there is very great danger, in cutting gears with a planing-tool, of chipping out the sides of the blank, when such operation is performed in the ordinary manner.

By reference to Fig. 3 it will be seen that the frames C D can be set so as to hold the tool in an inclined position, and that, too, without disconnecting the mechanism which operates the eccentric shaft *c*. This is owing to the fact that gear 8 is connected to a sliding stand, H, and is also provided with a spline-pin, which works in a slot cut in shaft 9, while shaft *g* is free to slide through bearing 2 and gear 3.

The compound frame C D, when once adjusted, is securely held in place by means of a set-screw or bolt, I, which passes through the curved slots *w* and clamps frame C to the part B.

It will be observed that my improved planer differs substantially from those planing-machines in which the cutting-tool is so constructed as to cut in both directions. This feature, broadly considered, I do not claim; but in my improved planing-machine the cutting-tool is raised before the entire cut is completed, and then, after the work has passed, is automatically reset to complete the cut on the same line, when the work is moved back. By this improvement a deep cut or chip can be taken without danger of breaking off the edge of the work at the completion of the cut.

Having described my improvements in machines for planing metal, what I claim therein as new and of my invention, and desire to secure by Letters Patent, is—

1. The combination, with table A and part B of a metal-planing machine, of an automatic device or mechanism for raising the cutting-tool from its work before the cut is completed, and then, after the work has passed, resetting it to complete the cut upon the same line, as the work is moved back by the reverse motion of the table, thereby preventing breaking or chipping out of the edges, substantially as described.

2. The combination, with the table A, of finger G, gear 14, rack-bar F, and gears 11, 8, 7, 5, 3, *f*, and *e*, and their respective shafts, substantially as and for the purposes set forth.

3. The combination, with the hinged or pivoted frame D, of the shafts *c* and *g*, with their respective gears, substantially as and for the purposes set forth.

4. The combination, with shafts *g* and 9, of the bearing 2 and sliding bearing-piece H, substantially as and for the purposes set forth.

WILLIAM HENDERSON.

Witnesses:

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E. E. MOORE.