(No Model.) 3 Sheets—Sheet 1.

J. H. HAZEN.

BURNISHING MACHINE.

No. 343,710. Patented June 15, 1886.

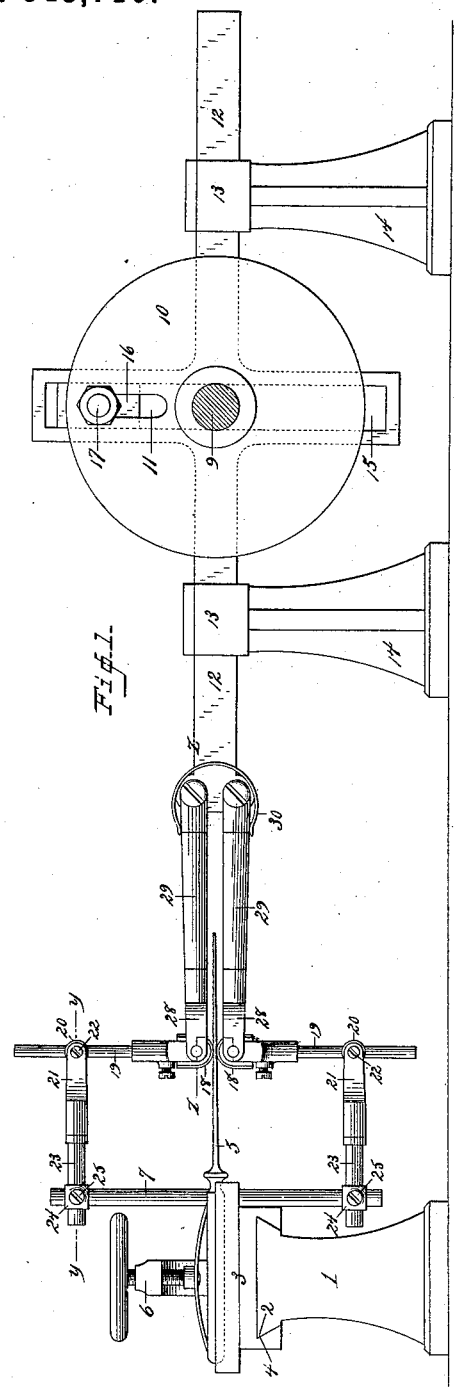

Fig. 1.

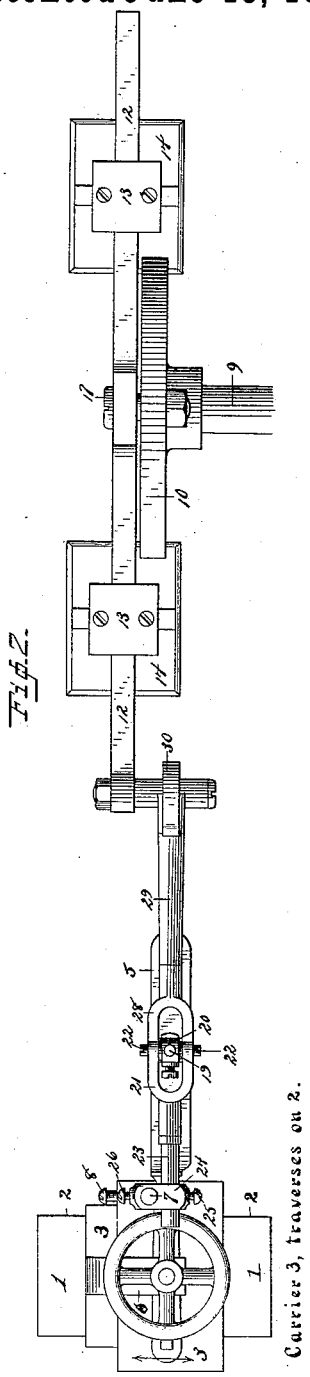

Fig. 2.

Carrier 3, traverses on 2.

Witnesses:
E. C. Perkins.
C. E. Ruggles.

Inventor,
James H. Hazen
By A. M. Worster
Atty

(No Model.) 3 Sheets—Sheet 2.

J. H. HAZEN.

BURNISHING MACHINE.

No. 343,710. Patented June 15, 1886.

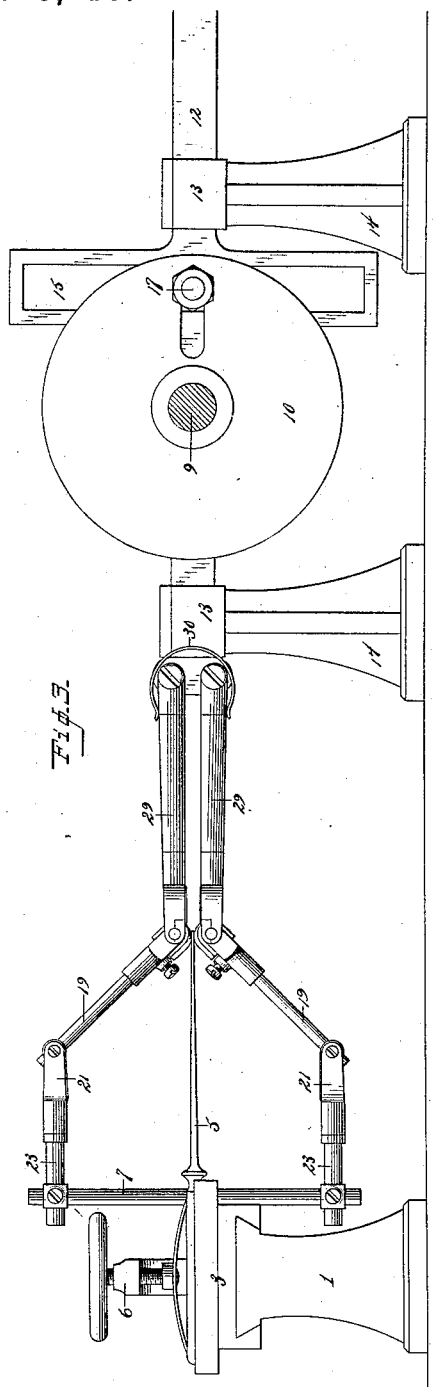

Fig. 3.

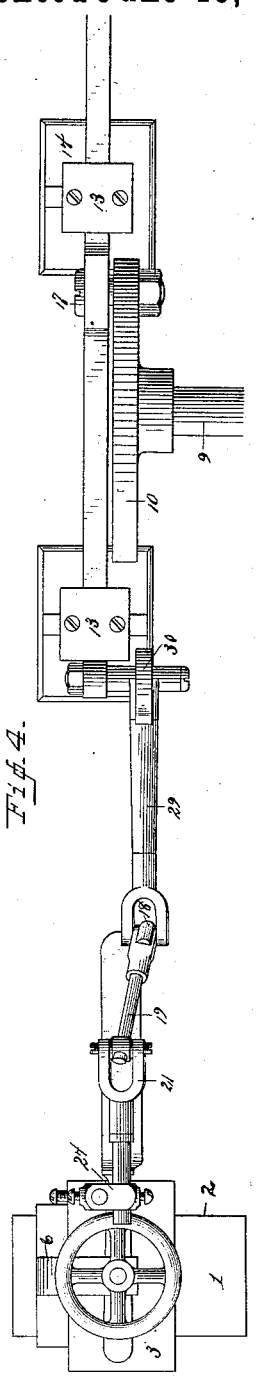

Fig. 4.

Witnesses,
C. C. Perkins.
C. E. Ruggles.

Inventor,
James H. Hazen
By A. M. Wooster
Atty.

(No Model.) 3 Sheets—Sheet 3.

J. H. HAZEN.

BURNISHING MACHINE.

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Fig. 5.

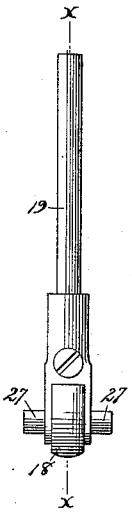


Fig. 6.

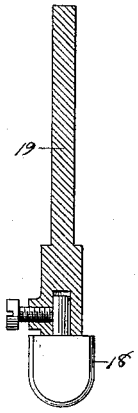


Fig. 7.

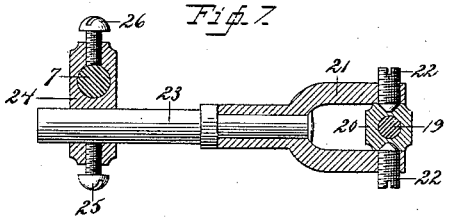
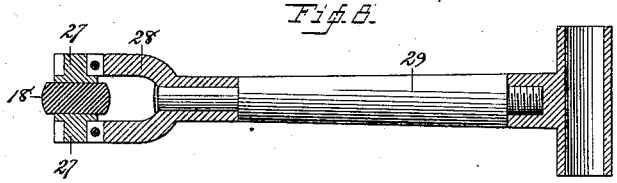


Fig. 8.



Witnesses.

E. G. Perkins.
C. E. Ruggles.

Inventor,

James H. Hazen
By A. Wilkinson
Atty.

UNITED STATES PATENT OFFICE.

JAMES H. HAZEN, OF WATERBURY, CONNECTICUT.

BURNISHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 343,710, dated June 15, 1886.

Application filed May 1, 1886. Serial No. 200,787. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. HAZEN, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Burnishing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates more especially to that class of burnishing-machines adapted to finish the blades of silver-plated knives, and has for its object to simplify and improve their construction, the essential requirements being that the machine shall be durable and not likely to get out of repair, and shall do its work quickly and so perfectly as to leave an absolutely-smooth surface, free from lines or marks of any kind.

It has been a serious objection to burnishing-machines as heretofore constructed that it was impossible to continuously produce first-class work—that is, surfaces free from lines and marks—and, moreover, that in the event of an uneven place occurring in the plating the latter was liable to be partially or entirely removed by the burnisher, leaving an ugly mark or channel upon the surface of the blade. These objections I wholly overcome by so constructing the machine that the blade is continuously acted on by rolling surfaces, the face of each burnisher being rounded from side to side and from end to end. I thus insure that the entire surface of each burnisher shall be brought in contact with the blade during the operation of burnishing, so that the blades are finished evenly and smoothly, and the wear upon the burnishers shall be the same upon all portions of their surface, it being impossible for any portion to become worn flat, as the contact-point is continually changing. With these ends in view I have devised the simple and novel construction of which the following description, in connection with the accompanying drawings, is a specification, numbers being used to indicate the several parts of the machine.

Figure 1 is a side elevation of the machine complete, all of the parts being shown as in their intermediate position; Fig. 2, a plan view corresponding with Fig. 1; Fig. 3, a side elevation, in which the burnishers are shown as at their extreme forward position; Fig. 4, a plan view corresponding with Fig. 3, showing the burnisher at its extreme forward position, and also showing it at one extreme of its lateral movement; Fig. 5, an elevation, on an enlarged scale, of one of the burnishers detached; Fig. 6, a section on the line $x\,x$ in Fig. 5; Fig. 7, a section, on an enlarged scale, on the line $y\,y$ in Fig. 1, and Fig. 8 is a section, on an enlarged scale, on the line $z\,z$ in Fig. 1.

Similar numbers denote the same parts in all the figures.

1 denotes a standard having bearings 2, and 3 denotes a carriage having ways 4, adapted to engage the bearings. The carriage is adapted to have lateral reciprocating motion across the top of the standard. This motion may be produced automatically in any suitable manner. As the manner in which this motion is produced forms no portion of my invention, I have not deemed it necessary to illustrate it in the drawings.

5 denotes a knife, which is secured upon the carriage by a clamp, 6, of any suitable construction.

7 denotes a rod, which is secured in the carriage by a set-screw, 8.

9 denotes a shaft carrying a disk, 10, having a radial slot, 11.

12 denotes a slide of any suitable construction supported in guides 13 upon standards 14. This slide is provided with a cross-slot, 15.

16 is a block adapted to slide in this slot, and provided with a stud, 17, which engages slot 11 in the disk. It will thus be seen that the rotation of the disk will impart longitudinal reciprocating motion to the slide. This motion may, however, be produced in various other ways, that shown, however, being one of the simplest. 18 denotes the burnishers, the bearing surfaces of which are rounded in both directions, as is clearly indicated in Figs. 5 and 6. The burnishers are secured by set-screws to arms 19, said arms being adapted to slide freely in blocks 20, which are held in yokes 21 by set-screws 22. The yokes 21 are swiveled to arms 23, which are adjustably secured in blocks 24 upon rod 7 by means of set-screws 25.

26 denotes set-screws, by which blocks 24 are secured to rod 7.

I preferably construct the burnishers as shown in Fig. 5—that is, with trunnions 27, journaled in yokes 28. These yokes are

swiveled to arms 29, which are pivoted to the inner end of slide 12, as is clearly shown in the drawings.

30 is a U-shaped spring whose ends bear upon rods 29, whereby said rods are held in operative position.

It will be seen that I have so constructed the machine that each part is detachable and adjustable.

The operation is as follows: Rotary motion being imparted to shaft 9, the slide is caused to reciprocate. During each reciprocation of the slide the burnishers bearing upon opposite sides of the blade must pass from end to end of the knife-blade and back again. As the burnisher-rods are supported in yokes suspended a short distance from the blade on opposite sides thereof and at a point about midway between its opposite ends, it follows that during each passage of the burnishers over the surface of the blade the position of the burnishers relatively to the blade will be continually changing, each portion of the bearing-surface in its longest direction coming in contact with the blade during this movement. When it is desired to burnish a piece of work longitudinally at a single place, it is done in this manner, the edge of the burnisher being made as wide as may be necessary. In the burnishing of knife-blades, however, it is not desirable that the burnishers should have more than an instant's contact with any portion of the blade. I therefore provide a carriage for the knife, which is caused to reciprocate in any suitable manner in a direction at right angles to the movement of the slide. The effect of this movement of the carriage is to give the burnishers an additional movement—that is, to cause them to roll from side to side—during the time that they are acting upon each knife. The intermediate position of the burnishers is shown in Figs. 1 and 2. At this moment the position of the burnisher-arms is vertical and the burnishers are acting upon the center of the blade.

In Fig. 4 one extreme of the longitudinal movement of the slide is shown and one extreme of the lateral movement of the carriage.

It will be readily understood that when the burnishers are acting at the back of the knife the carriage will have moved to a position that will bring the blade and the burnisher to its opposite position relatively to arms 29.

In Fig. 4 the knife is shown as slightly to the left of a line drawn through the center of arms 29, the burnisher-arms being inclined toward the right and one side of the burnisher acting at the edge of the blade. At its other extreme position the carriage will have moved to the right sufficiently to bring the knife-blade to a position slightly at the right of a line drawn through the center of arms 29. The burnisher-arms will then incline toward the left and the opposite side of the burnisher will be acting at the back of the blade.

It will be apparent that the details of construction may be reasonably varied without departing from the spirit of my invention.

I claim—

1. In a burnishing-machine, burnishers rounded from side to side and from end to end, and arms whereby they are carried, in combination with a laterally-reciprocating carriage, a longitudinally-reciprocating slide, and swiveled connections between the carriage and slide and the burnishers, whereby the latter are caused to act with a rolling movement, the contact-points of the burnishers and the article changing continually.

2. A burnishing-machine consisting, essentially, of burnishers rounded from side to side and from end to end, arms by which said burnishers are carried, and yokes therefor which permit universal motion of the arms, in combination with swiveled connections from the burnishers to a longitudinally-reciprocating slide, and connections to a laterally-reciprocating carriage for the article to be burnished, whereby the burnishers are caused to act with a rolling movement longitudinally and laterally.

3. The burnishers rounded from side to side and from end to end, arms 19, by which they are carried, and swiveled yokes 21, in which said arms are supported, in combination with a laterally-reciprocating carriage, by which said yokes are carried, a longitudinally-reciprocating slide, and yokes 28, in which the arms 19 are pivoted, and which are swiveled to said slide, whereby a rolling movement from side to side and from end to end is imparted to the burnishers.

4. A laterally-reciprocating carriage having a clamp, 6, to receive a knife, and swiveled yokes 21, secured to said carriage, in combination with burnishers carried by arms 19, adapted to slide in said yokes, swiveled yokes 28, in which arms 19 are pivoted, and a longitudinally-reciprocating slide by which yokes 28 are carried.

5. The yokes 21, the burnishers and burnisher-arms 19, retained in said yokes, in combination with longitudinally-reciprocating slide 12, and arms 29, pivoted thereto, and having yokes 28, in which arms 19 are pivoted.

6. In a burnishing-machine, a laterally-reciprocating knife-carriage having a rod, 7, and swiveled yokes 21, attached to said rod, in combination with burnishers carried by arms 19, adapted to slide in said yokes, and arms 29, having swiveled yokes 28, in which arms 19 are pivoted, and a longitudinally-reciprocating slide to which arms 29 are pivoted.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES H. HAZEN.

Witnesses:

A. M. WOOSTER,

CORA E. RUGGLES.