E. FORD.

GLASS POLISHING MACHINE.

No. 181,831. Patented Sept. 5, 1876.

Fig. 1.

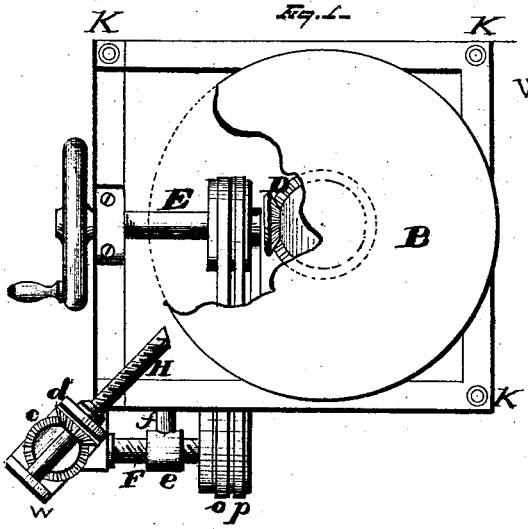


Fig. 2.

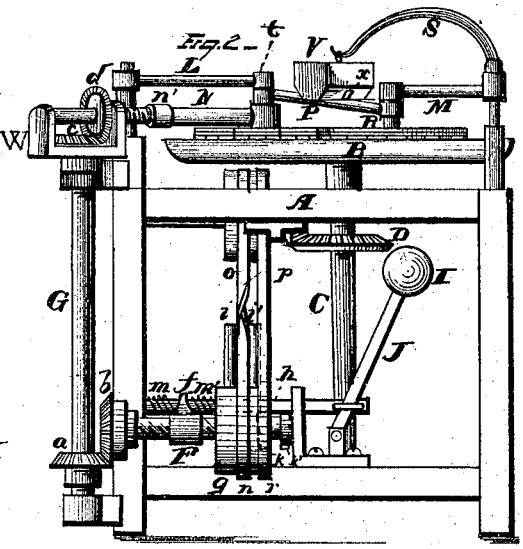
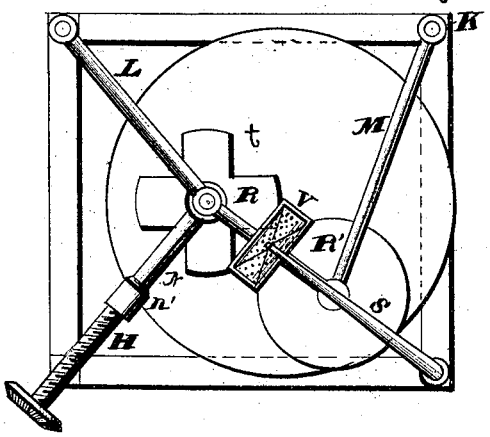


Fig. 3.



WITNESSES

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IMPROVEMENT IN GLASS-POLISHING MACHINES.

Specification forming part of Letters Patent No. **181,831**, dated September 5, 1876; application filed July 11, 1876.

To all whom it may concern:

Be it known that I, EDWARD FORD, of New Albany, in the county of Floyd and State of Indiana, have invented certain new and useful Improvements in Process and Machinery for Grinding, &c., Glass; 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to means for grinding, smoothing, and polishing plate-glass; and it consists in a machine embodying certain details of construction and combinations of parts, as hereinafter specified and claimed.

The following is a description of the mechanism and process which constitute my improvement:

In the drawings, Figure 1 is an isometric view of the machine, with a part of the circular table or disk removed to show main shaft and gearing. Fig. 2 represents a side view at the belt-shifting device. Fig. 3 is a top view.

The invention consists in the parts and combinations, hereinafter specified and claimed, wherein A represents the frame of the machine, which may be of any suitable construction or material. B is a circular disk or table of suitable dimensions, supported by a shaft, C, which extends down into a pit, so that the top of the table is only about twenty inches, or a convenient distance, above the floor of the building. Preferably this disk is circular, because such a one is more easily balanced and runs truer than the octagon disk, and does not cause the runners to jump or bounce when working upon the outer surface of the table. Keyed to the main upright shaft C, near its upper end, is a large bevel-gear wheel D. E is the power-shaft, placed at right angles to the main shaft, and having on its inner end a bevel-gear, which works in connection with the wheel D. F is a screw-shaft, which transmits motion to screw-shaft H through the intervention of shaft G and bevel-gears *a b c d*. This shaft H extends over part of the disk B, and to within about ten inches of its surface. These three shafts are connected with the engine-shaft by pulleys and belting. Screws or threads are turned or cut upon shafts F and H, and upon the lower one is placed a nut, *e*, having a short arm, *f*, which extends out to operate the belt or gear shifting apparatus. Instead of the belt-and-pulley connection just described, or its equivalent, the three shafts may be connected with the power-shaft by another shaft having gears, in which case the gear-shifting device may be the usual one employed, or its equivalent, consisting of a double clutch sliding upon a key or feather fixed on the shaft between two loosely-mounted gears.

The shifting device shown in the drawings consists of a rod, *h*, sliding in standards, and provided with two upwardly-projecting guide-pins, *i i'*, downwardly-projecting guide-pins, *k k'*, and two springs, *m m'*, between which the arm *f* slides, and against which it operates to move alternately the belts *o p* from and to the central and fixed pulley *n*, and from and to the loose pulleys *q* or *r*. I is a weight on the upper end of rod J, which rod is pivoted to the frame A, and is attached to sliding rod *h* for the purpose of assisting the shifting of the belts.

Attached to the end of hollow bar N, which connects with the runner R, is a nut, *n'*, which works upon the screw-shaft H, and occupies such a position on the screw-shaft that the runners, during the operation of the machine, are moved a certain predetermined distance back and forth and to and from the center of the disk. At the four corners of the frame of the machine, or in any other desired position, are upright iron or wooden posts K, provided with pins *s*. Connecting-rods L M, having a sleeve at each end, connect said pins with similar pins *t* in the center of the runners, for the purpose of guiding them. R R′ are the runners, constructed of wood or iron, and may be either round, square, oblong, or in the shape of a cross. Each has an upright pin, *t*, in the center, identical with those of the posts. These runners, for grinding or smoothing, must be faced with bars of iron, or any other metal or hard substance. Those used for polishing are faced with felt or any other soft material. They are all connected by bars, as shown, and three or more may be so connected that the whole will be made to operate by the screw.

shaft and hollow bar, so as to work at any particular point or spot on the surface of the table. The screw-shaft and hollow bar, during the operation of the machine, have a certain amount of lateral movement which is permitted by the two-armed sleeve W, which fits over shaft G, and in which shaft H is journaled. The runners, in whatever shape, will usually be ten feet in longest dimensions. S is a crane, which is attached to one of the standards by pin and socket. V is the sand-box, having perforated bottom, suspended on the arm of the crane between lugs x x' of the runner connecting-rod P.

Any ordinary crane fastened to side of building may be used for suspending sand-box, and for handling the runners in removing them to and from the machine.

The process of grinding, smoothing, and polishing the glass is as follows: The rough plate-glass is bedded in plaster-of-paris, upon the disk or circular table B. Two or more runners of any shape or size required, each faced with iron bars, are placed thereon. These runners are then connected by the rods L and M with the posts, the principal runner to which all the others are connected being attached to the bar N, operated by the screw-shaft H. The sand-box V, filled with sand or emery, is then suspended over the table, and a stream of water directed into it, which forms a sludge of the sand, carrying it through the holes in the bottom, and dropping it upon the surface of the glass between the runners, where it is carried by motion of the runners under the same and to the edge of the disk. The machinery is now set in operation, revolving the circular disk, on which the plate is bedded, the screw-shaft H, which moves the entire set of runners, together with the sand-box and the screw-shaft F, which operates the belt or gear shifting device, reversing at intervals the direction in which screw-shaft H turns and the runners move.

With the process of grinding with the octagon disk and stationary runners, as now used, it is almost impossible for skilled workmen to get a true and even surface upon the glass, while with my invention the machine can be put in operation and left in charge of a boy or ordinary laboring man. The surfaces of the glass, owing to the runners being at all times in motion, will be ground perfectly true. Also, by the means described of operating the runners and keeping them in motion, a perfectly even temperature is obtained, which, in polishing, is necessary, and thereby, also, loss from breakage is reduced.

After one side has been ground, the sand-box and runners are removed, and the surface of the glass is thoroughly washed and cleaned without being taken up or moved in any way. Clean runners, iron-faced like the first, are placed upon the glass, connected as before, and the machinery again put into operation. In this process of smoothing, which occupies about four hours, emery is used with water in five different grades. After the smoothing is accomplished, the runners are detached and the glass thoroughly cleaned, by washing, but without removing it. Another set of runners, of circular shape or in the shape of a cross, lined or faced with English felt or any other soft substance, is then placed upon the machine and connected as before. Rouge is now applied to the surface of the glass, by means of a brush, the machine is put in motion, and the polishing begins. This operation will require from eight to ten hours. After this the glass, which is now finished on one side, is removed from the machine for the first time. The glass is then again embedded, with the polished surface downward, upon the same machine, and the other side is finished in the same manner as before described, after which it is removed from the machine in a finished condition. It is then washed and transported to the wareroom, having been handled only four times during the entire operation.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The circular disk B, screw-shaft H, and hollow nut-carrying bar N, in combination with runner R, substantially as and for the purpose described.

2. Disk B, screw-shaft H, and female screw or hollow nut-carrying bar N, in combination with two or more runners, of which one only is directly connected with bar N, the other being indirectly and movably connected thereto, substantially as and for the purpose described.

3. The combination, with rotary disk B, of one or more runners and suitable actuating mechanism, for automatically reciprocating the runners on the rotary disk, substantially as and for the purpose described.

4. The combination of two or more runners and hollow nut-carrying bar N with screw-shaft H and the several connecting-rods which connect the runners with each other and with the standards, substantially as and for the purpose described.

5. Disk B, two or more runners, and hollow nut-carrying bar N, in combination with screw-shaft H, and the several connecting-rods which connect the runners with each other and with the standards, substantially as and for the purpose described.

6. The combination, with rotary disk B, of the perforated sand-box V, removably secured to the swinging crane S, whereby the sand-box may be located over any portion of the rotary disk, substantially as and for the purpose set forth.

7. The combination of disk B, crane or arm S, perforated sand-box V, and lug-provided connecting-rod P, whereby the sand-box is moved with the runners, substantially as and for the purpose described.

8. The pulleys n q r, connected with the driving-pulley by a crossed and straight belt, in combination with the screw-shaft F, traveling arm f, belt-shifting arms i i', and suitable intermediate gearing, connecting with

the runners by means of screw-shaft H and hollow nut-carrying rod N, substantially as and for the purpose set forth.

9. The belt-shifting device, consisting of sliding rod *h*, provided with guide-pins *i i' k k'*, springs *m m'*, and weighted lever J, substantially as and for the purpose described.

10. The combination, with the rotary disk B and two or more runners, connected to move in unison, of suitable actuating mechanism, substantially as set forth, whereby the runners will have a combined rotary and reciprocating movement on the surface of the glass, substantially as and for the purpose set forth.

11. The combination, with a rotary disk, B, of two or more runners and a sand-box, located to deliver sand on the disk between the runners, substantially as and for the purpose specified.

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

EDWARD FORD.

Witnesses:
JAMES G. SHIELDS,
GEO. R. BEACH.