

No. 683,653.

Patented Oct. 1, 1901.

M. M. MAHER.

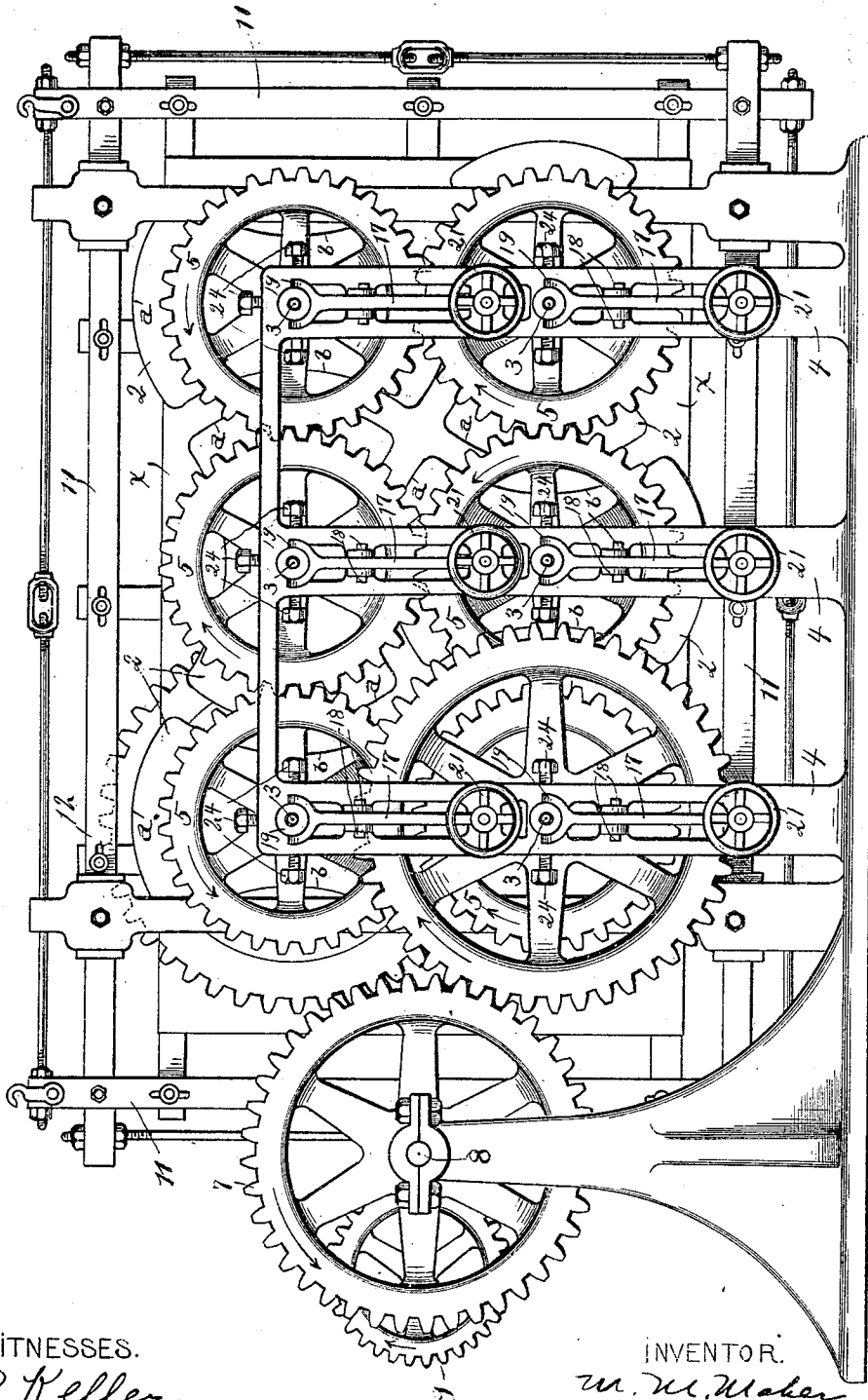
MACHINE FOR GRINDING, SMOOTHING, AND POLISHING PLATE GLASS.

(Application filed Dec. 5, 1900.)

(No Model.)

5 Sheets—Sheet 1.

FIG. 1.



WITNESSES.

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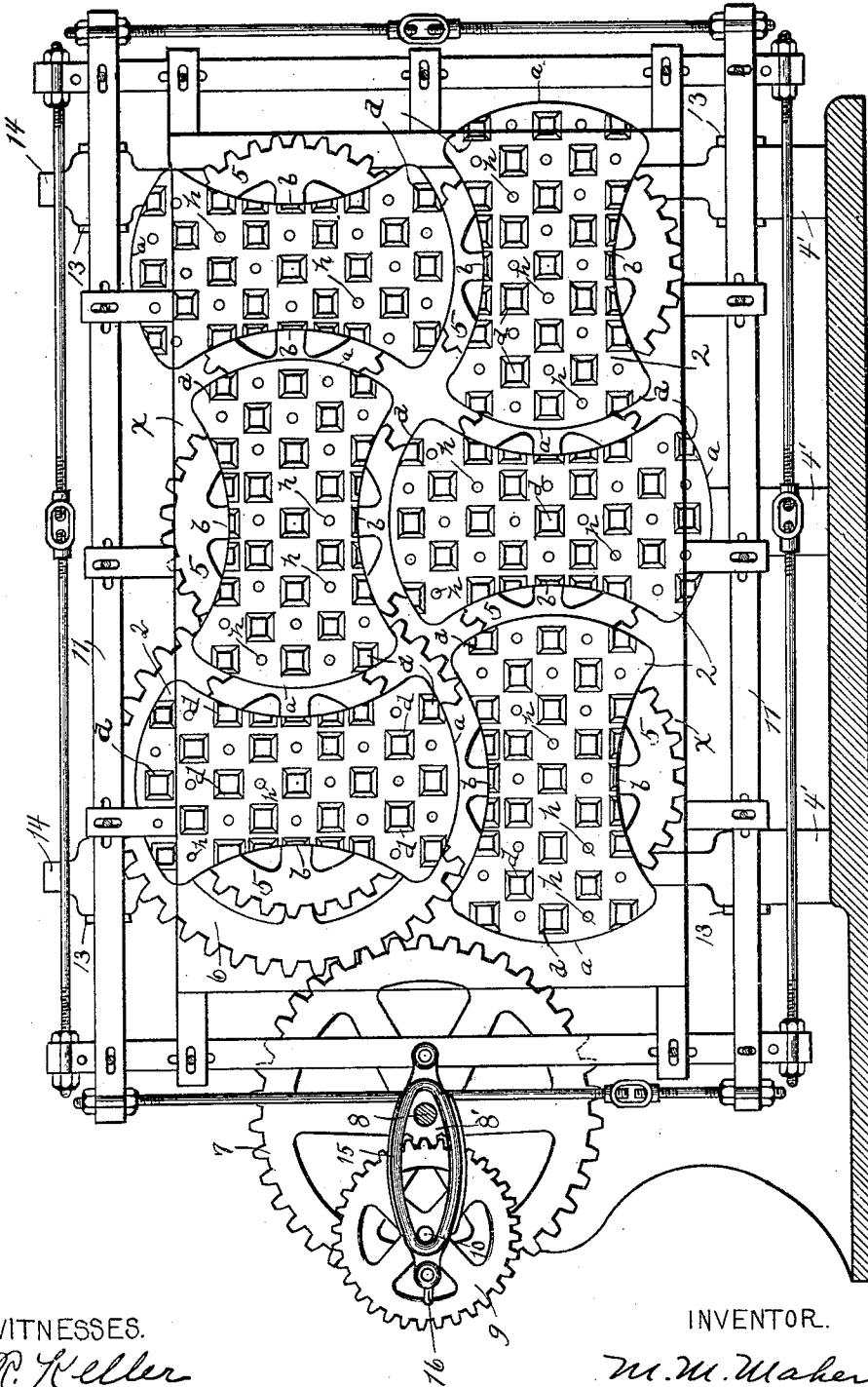
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FIG. 2.



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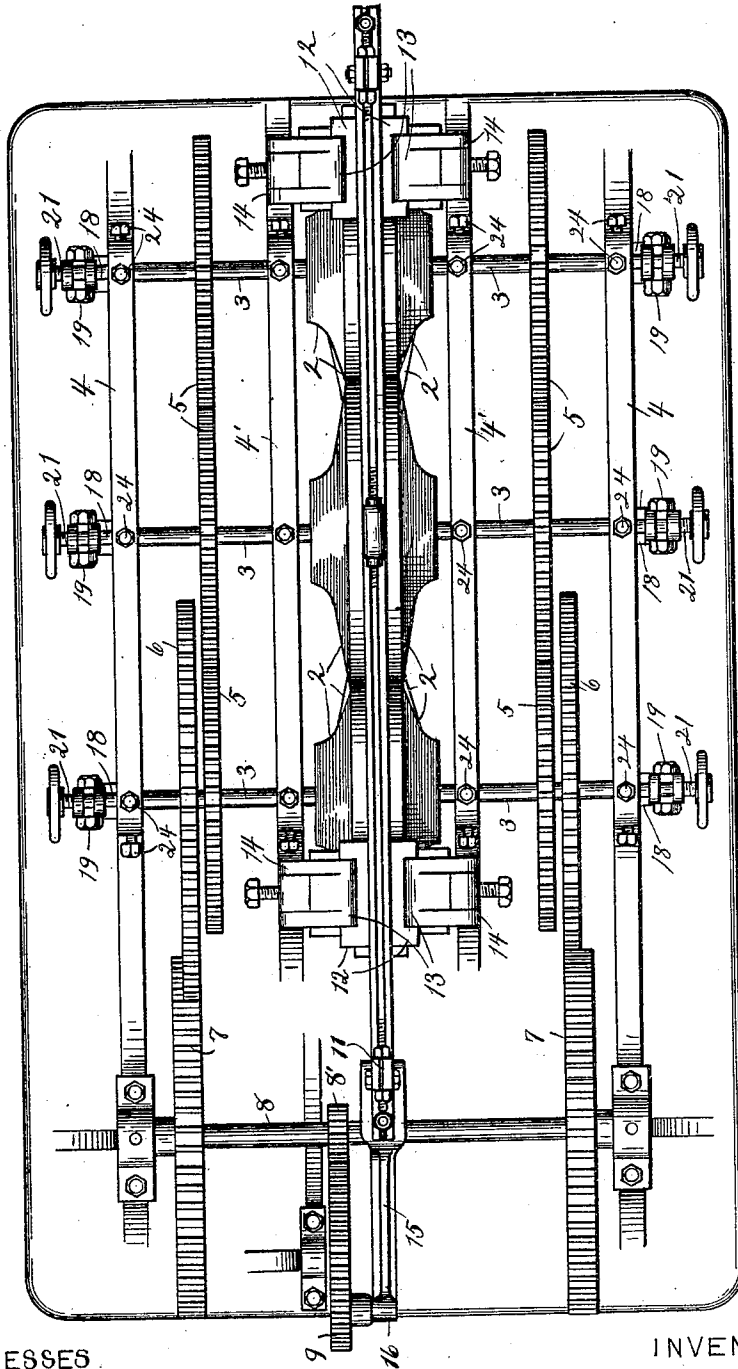
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Fig. 3.



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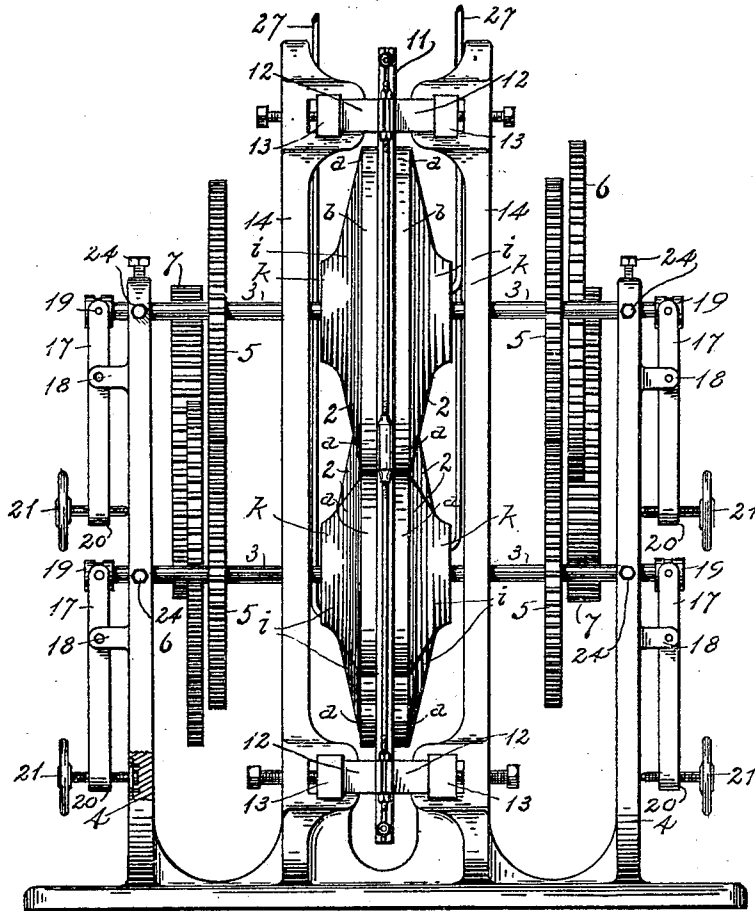
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(No Model.)

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Fig. 4.



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Fig. 7.

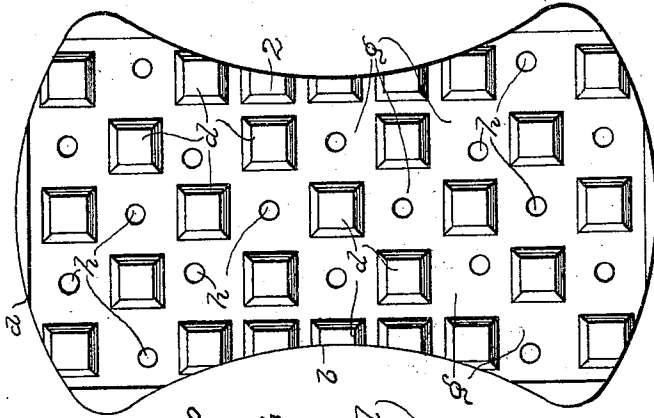


Fig. 8.

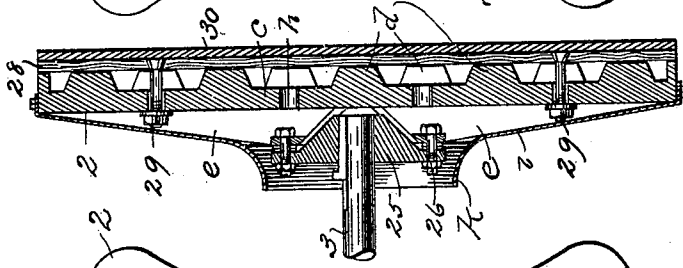


Fig. 6.

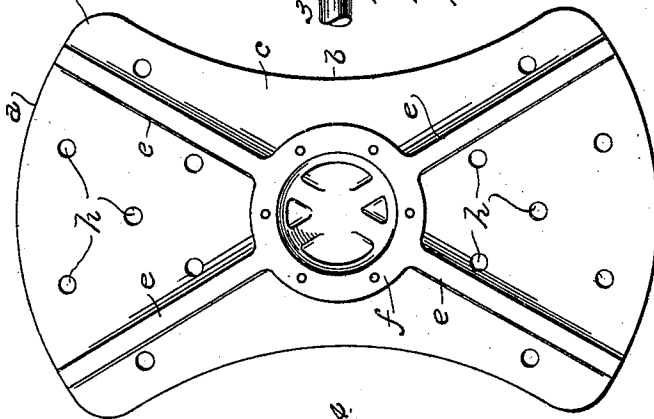
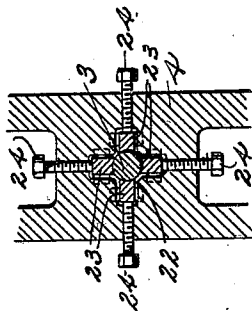


Fig. 5.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR GRINDING, SMOOTHING, AND POLISHING PLATE-GLASS.

SPECIFICATION forming part of Letters Patent No. 683,653, dated October 1, 1901.

Application filed December 5, 1900. Serial No. 38,832. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL M. MAHER, a citizen of the United States, residing at Ford City, in the county of Armstrong and State of Pennsylvania, have invented new and useful Improvements in Machines for Grinding, Smoothing, and Polishing Plate - Glass, of which the following is a specification.

This invention relates to machines for grinding, smoothing, and polishing plate-glass; and the primary object thereof is to provide a machine having rotary devices for operating simultaneously on both faces of the glass.

A further object is to arrange a plurality of cooperating devices for each face of the glass with means for independently rotating each device.

A further object is to so shape or form said devices and to so assemble them as to cause them to operate in intermeshing relation, thereby subjecting all portions of the plate to the action of said devices in a most effectual manner.

A further object is to provide individual adjustment for the several operating devices, whereby in the preliminary stages of grinding they may be adjusted with reference to pronounced irregularities in the glass and thereby caused to operate with a maximum of efficiency.

The invention consists in the novel structural features and in the combination and arrangement of parts hereinafter fully described and claimed, and illustrated by the accompanying drawings, wherein—

Figure 1 is a view in side elevation of a machine constructed in accordance with my invention. Fig. 2 is a vertical longitudinal sectional view of the same. Fig. 3 is a top plan view. Fig. 4 is an end elevation. Fig. 5 is a detail view of one of the shaft-bearings. Fig. 6 is a rear elevation of one of the operating devices, the container for the abrading material being omitted; and Fig. 7 is a similar view of the same in front elevation. Fig. 8 is a sectional view of one of the devices complete and in operative position on its shaft, also showing same provided with an attached polishing-surface.

In the present adaptation of the invention six abrading heads or runners 2, arranged in

a vertical plane, operate on each face or surface of the plate of glass X, there being twelve runners in all, though it will be understood that this number may be diminished or increased as circumstances may require. The several runners are secured to the inner ends of horizontal shafts 3, journaled in frame-posts 4 and 4'. Mounted on each of shafts 3 is a cogged gear 5, all of said gears being of corresponding diameter. As the distance vertically and horizontally between adjacent shafts 3 is the same, adjacent gears 5 intermesh, thereby actuating the several runners at uniform speed and in desired directions of rotation. On shafts 3 at the forward end of the machine are gears 6, which mesh with the peripherally wide gears 7 on transverse shaft 8. Power is transmitted to this shaft through pinion 8', fixed thereon, meshing with gear 9 on power-shaft 10. It will be noted that on one side of the machine gear 6 is carried by the lower shaft 3, while on the opposite side the corresponding gear is carried by the upper shaft. This arrangement causes opposite or opposing runners, whose centers are normally in line through plate X, to rotate oppositely, thus counteracting any tendency to strain, distort, or displace the glass which might otherwise be present. In shape the runners are somewhat elongated, with their ends *a* rounded concentrically with their own centers and their side edges indented, as at *b*, in lines concentric to the centers of adjacent runners as viewed when the runners are in either upright or horizontal position. As the distance between adjacent runner-centers is less than double the radius of the runners, the rounded runner ends *a* extend into side depressions *b* of adjacent runners, and in this manner they rotate and intermesh in such relation as to completely cover the area of the glass plate, the runners being much more effective in this regard than though the runners were of circular form.

The plate X is secured in and sustained by an adjustable frame 11. The construction of this frame, as well as the manner of securing the plate therein, is described in detail and claimed in a concurrent application, Serial No. 38,831, to which reference may be made. Said frame in this adaptation of the invention is supported at the top and bottom by

horizontal runners 12, slidable in guides 13 on parallel uprights 14, and the frame is reciprocated longitudinally by pitman 15, connected to one end thereof, the pitman having connection 16 with gear 9. In this manner the plate is caused to reciprocate between the opposing runners, so that all portions of both faces thereof are subjected equally to the abrading or polishing process.

It is necessary that provision be made for moving the runners on both sides of the plate laterally in order that the glass may be inserted and removed and also that the runners may be advanced as the process of abrading proceeds. This I accomplish by permitting shafts 3 to move longitudinally in their bearings, and such adjustment may be effected and maintained by means of levers 17, fulcrumed between their ends to brackets 18, projecting from posts 4. Each lever at one end loosely clutches its shaft at 19 and at its opposite end is provided with a nut 20, adapted to travel on screw-shaft 21, swiveled to post 4. By this means the shafts are always positively held, yet capable of the gradual adjustment necessary to keep the runners to the work. The range of necessary adjustment does not exceed the peripheral width of gears 7. Hence the machine is always in gear.

Many plates are rough and irregular, owing to the presence of knots and depressions; also, many are warped, and in the preliminary stages of grinding away such irregularities it is frequently desirable to have the runners operate in planes oblique to their normal positions, so that such irregularities may be eliminated with the greatest possible saving of time and without endangering adjacent portions of the plate. To provide for such adjustment, the bearings of shafts 3 in posts 4 and 4' are adjustable vertically and laterally, the posts being so formed as to provide passage-ways 22 for the shafts and to receive the four quarter bearing-blocks 23, each block being independently adjustable by a set-screw 24, movable through an integral portion of the post. Thus the desired angle at which each runner shall work may be accurately secured by slackening certain of the screws and tightening up others, and as the roughness or unevenness in the plate is reduced a gradual readjustment of the screws restores the shafts and runners to normal position. By this universal adjustment it will be apparent that the runners may be caused to assume any desired angle for working, yet the most extreme adjustment of this character necessitates so slight a deflection of shafts 3 that actuating-gears 5 are not affected thereby.

The runners 2 may be constructed in a variety of ways; but in the preferred construction they are formed each with a cast-iron head portion *c*, having on its face the integral checkered abrading projections *d* and on its back the radial ribs *e*. The inner ends of these ribs are inwardly beveled or

tapered to form a seat for cone-hub 25 on shaft 3, ribs *e* being cast with ring *f*, which is secured by bolts 26 to the peripheral rim of hub 25. The runner is thus secured to the shaft in a most substantial manner and may be readily trued thereon in case the parts do not of themselves fit true by inserting thin washers on one or more of bolts 26, as will be understood.

Abrading projections *d* are arranged, preferably, alternately with spaces *g* of equal area, and in these spaces the runner-head is formed with apertures *h*, through which sand and water are constantly supplied during the abrading process, the same being uniformly distributed over the surface traversed by the runner. The sand and water are confined in a sheet-metal receiver *i*, secured to the back of the runner-head and formed with an annular outwardly-flaring mouth *k*, surrounding shaft 3 and into which the abrading material is discharged through trough or spout 27, leading from an elevated source of supply. (Not shown).

The general operation of the machine is the same for polishing as for grinding, and it may be used therefor interchangeably. Runners (not shown) constructed especially for polishing may be substituted on shafts 3 for the abrading-runners herein described, or temporary polishing-faces may be applied to the latter. An example of this is shown in Fig. 7, wherein a board 28 is secured to the runner-face by bolts 29, the board being faced at 30 with felt or other suitable polishing fabric.

With apparatus constructed as herein shown and described all portions of the plate are subjected alike to the action of the runners, the edges and corners thereof being operated upon, owing to the particular formation or shape of the runners, without excessive longitudinal movement of the plate and without causing the runners to project far from the plate edges when operating thereon.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the character described, opposing and oppositely-rotating abrading or polishing devices for operating simultaneously on opposite faces of an interposed plate, a support for the plate, and means for moving the support while the plate is being operated upon, substantially as shown and described.

2. In a machine of the character described, rotatable abrading or polishing devices arranged with their edges in a common plane and adjacent each other, the edges of said devices being formed with projections and depressions, whereby the said devices are adapted to intermesh when rotating without interfering, substantially as shown and described.

3. In a machine of the character described, runners arranged adjacent each other and

formed with corresponding depressions and projections whereby they may intermesh without interference, and means for rotating the runners, substantially as shown and described.

4. In a machine of the character described, runners arranged adjacent each other, each runner being formed with diametrically oppositely extended portions and diametrically oppositely arranged depressions whereby the runners may intermesh without interference, and means for rotating the runners, substantially as shown and described.

5. In a machine of the character described, a plurality of runners arranged adjacent each other, each runner being axially mounted and having its opposite ends curved concentrically to its axis and its opposite sides formed with curved depressions, whereby adjacent runners may rotate in intermeshing relation without interference, and means for rotating the runners, substantially as shown and described.

6. In a machine of the character described, two series of runners arranged in parallel planes and facing each other, opposing runners of each series having horizontally-aligning axes with means for rotating them in opposite directions, the runners being formed with corresponding projections and depressions, whereby the runners of each series may rotate in intermeshing relation without interference, substantially as shown and described.

7. In a machine of the character described, two series of runners arranged in vertical and parallel planes and facing each other, the distance horizontally and vertically between adjacent runner-centers being the same, a horizontal shaft for each runner and to which it is centrally secured, intermeshing gear-wheels on the shafts of each runner series, and means for actuating said gears, substantially as shown and described.

8. In a machine of the character described, a plurality of runners arranged normally in a common plane, means for rotating the runners, and means for varying the position of any one or more of said runners, whereby it or they may be caused to rotate obliquely to such normal plane, substantially as shown and described.

9. In a machine of the character described, a plurality of horizontal shafts normally in parallel relation, adjustable bearings for said shafts, means for rotating the shafts, and a runner carried by each shaft and disposed normally at right angles thereto, substantially as shown and described.

10. In a machine of the character described, two series of horizontal shafts with corresponding shafts in the series aligning, a runner carried by each shaft, a gear carried by each shaft and meshing with the corresponding gears of adjacent shafts, thereby forming a train of gears for each shaft series, means for moving the shafts longitudinally,

a transverse actuating-shaft, and two relatively wide gears on said shaft for actuating the said trains of gearing, substantially as shown and described.

11. In a machine of the character described, two series of runners arranged facing each other, means for rotating each runner of each series, means for sustaining a plate of glass between the runners, and mechanism for reciprocating the glass, substantially as shown and described.

12. In a machine of the character described, the combination of a post, a runner-carrying shaft journaled therein and adjustable longitudinally therethrough, a lever fulcrumed between its ends to the post and at one end having loose connection with the shaft, and a screw-shaft swiveled to the post and adjustable through the opposite end of the lever, substantially as shown and described.

13. In a machine of the character described, the combination of posts or supports, a runner-carrying shaft, and vertically and horizontally adjustable bearings in the posts or supports for said shafts, substantially as shown and described.

14. In a machine of the character described, a grinding head or runner provided with projections on its face arranged in checker form, apertures in the spaces between the checkered projections, and means at the rear of the head or runner for supplying abrading material through said apertures, substantially as shown and described.

15. In a machine of the character described, the combination of a grinding head or runner formed with apertures through its face, a shaft to which the head is secured, and a receiver secured to the rear side of the head, the receiver having a relatively large opening through which the shaft extends, and means for supplying abrading material to the receiver through said opening, substantially as shown and described.

16. In a machine of the character described, the combination of a grinding head or runner formed on its rear face with a conical seat, an actuating-shaft, and a conical hub secured to the shaft and adapted to fit said seat, substantially as shown and described.

17. In a machine of the character described, the combination of a head or runner formed on its rear face with strengthening-ribs, the inner ends of said ribs terminating in a conical seat, a band or collar carried by the ribs and surrounding said seat, a conical hub secured to an actuating-shaft and adapted to unite with said band or collar, substantially as shown and described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

MICHAEL M. MAHER.

Witnesses:

HERMAN SPENCER,
EMMA BURGE.