A. W. HORNIG.

APPARATUS FOR GRINDING AND POLISHING GLASS.

APPLICATION FILED JULY 7, 1910.

969,871.

Patented Sept. 13, 1910.

2 SHEETS—SHEET 1.

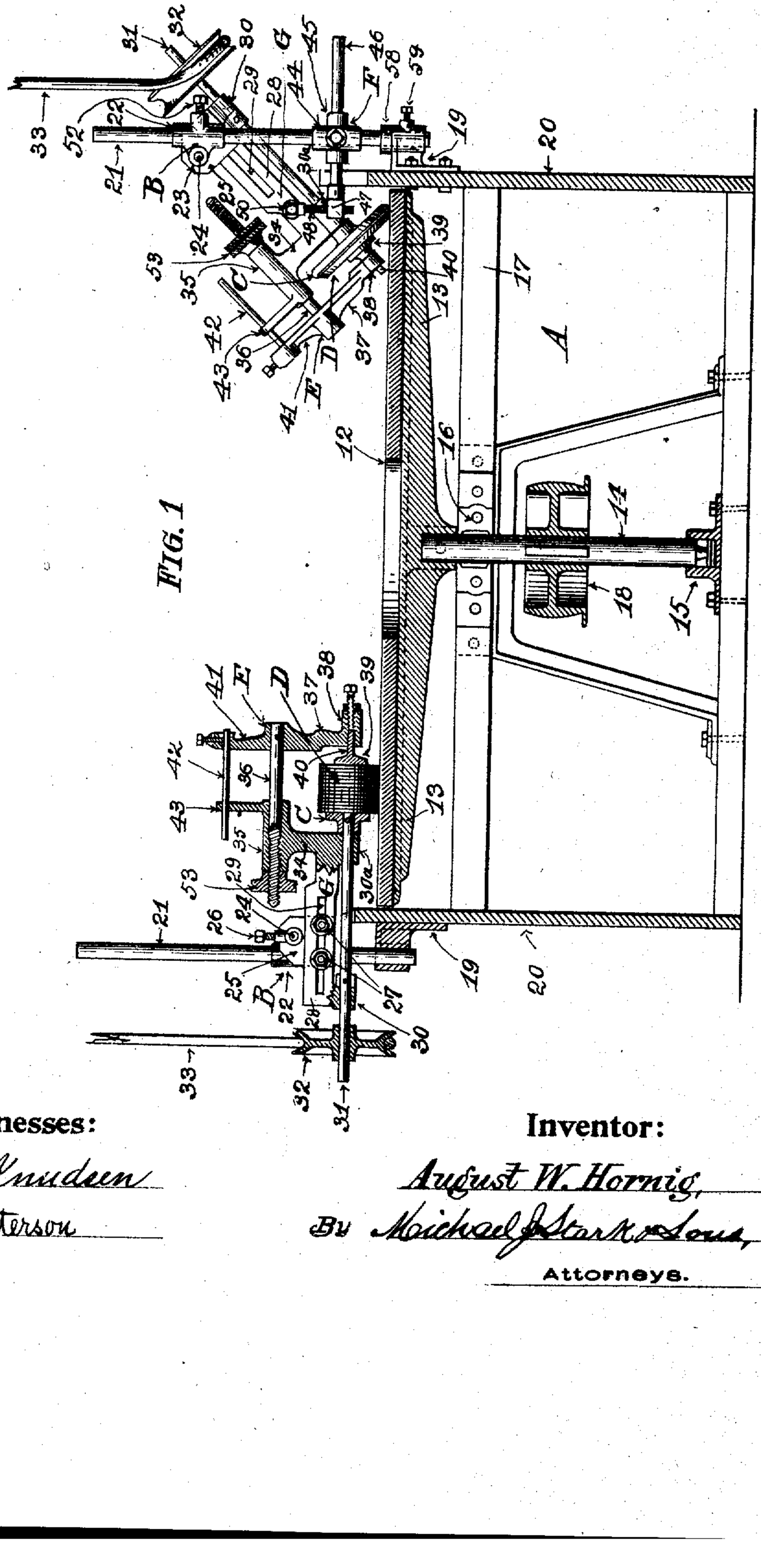

FIG. 1

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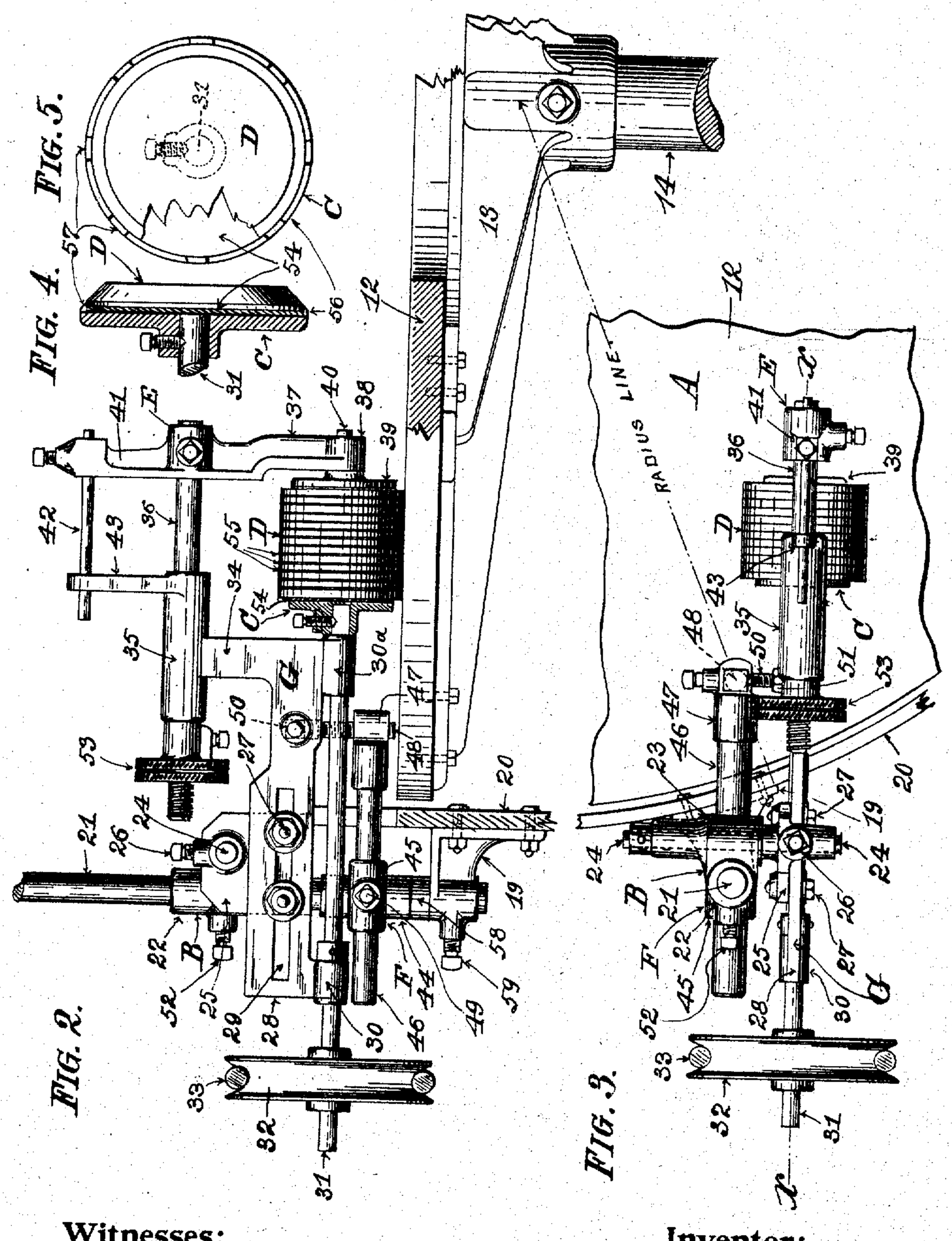

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UNITED STATES PATENT OFFICE.

AUGUST W. HORNIG, OF CHICAGO, ILLINOIS.

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969,871. Specification of Letters Patent. Patented Sept. 13, 1910.

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To all whom it may concern:

Be it known that I, AUGUST W. HORNIG, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Grinding and Polishing Circular Glass Plates; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying sheets of drawings, forms a full, clear, and exact specification.

This invention has general reference to improvements in grinding and polishing machines, and it is especially designed for grinding the peripheries of glass plates and for beveling the edges of circular and polygonal glass disks and plates.

It consists, essentially, in the novel and peculiar combination of parts and details of construction, as hereinafter first fully set forth and described, and then pointed out in the claims.

In the drawings already mentioned, which serve to illustrate this invention more fully, Figure 1 is an elevation, partly in section, of my improved glass grinding and beveling machine, the sectional portion of the figure being partly on line *x x* of Fig. 3. Fig. 2 is a front elevation of the device drawn on an increased scale to better to illustrate details of construction. Fig. 3 is a plan. Fig. 4 is a sectional elevation of the chuck or face-plate detached, and Fig. 5 is a face-view of the same.

Like parts are designated by corresponding symbols and characters of reference in all the figures.

A in these drawings designates what is technically known as a "rub-bed". It comprises a circular, preferably cast-iron disk 12, of suitable diameter mounted upon a spider 13, secured to the upper end of a vertically disposed shaft or spindle 14, revolving in a step-bearing 15, at its lower end, and a suitable bearing 16, near its upper end, the latter bearing being secured to a cross-timber or other suitable member 17, said shaft being rotated by a pulley 18 and suitable belting (not shown) or any other of several well-known means for rotating said disk 12. This rub-bed is in general use in establishments engaged in the grinding and polishing of glass, marble, granite, and similar material in slabs or plates, and these articles are placed upon the upper surface of the circular disk 12 and suitably anchored, and when necessary weighted down, the disk being rotated and water and sand or other abrading substances placed upon the disk being employed for grinding and polishing the articles to be so operated upon.

In order to enable a rub-bed, such as described, being successfully employed for grinding the peripheral edges of circular as well as polygonal glass plates, such as are used on automobile lamps, carriage lamps, picture frames, face plates of pressure and vacuum gages, clocks &c., ornamental windows and many other articles of manufacture, and for beveling the edges of these plates, I have invented the apparatus hereinafter described, which apparatus can be readily attached to, and removed from, the rub-bed, and which can be effectively employed for the purpose heretofore mentioned. This apparatus comprises a bracket 19, properly secured to the casing 20 surrounding the rub-bed, said bracket 19 being designed to support a vertically disposed post 21, to which the entire mechanism is movably and adjustably secured. Upon this post there is located a double sleeve B, consisting of a tubular member 22, slidably arranged upon the post 21, and a tubular member 23, located at right angles to the member 22, and preferably formed integral therewith, the latter member being adapted to function as a bearing for a shaft 24, which serves as a pivot for a plate 25, said plate being fastened to the shaft 24 by a set-screw 26, or other suitable means.

To the plate 25 there is movably bolted, by screws 27, a frame G, comprising a plate 28, having a long slot 29, through which the bolts 27 are passed into the plate 25. This plate 28 has at its lower edge, and at both of its ends bearings 30, 30ª, which are adapted to receive a shaft 31, carrying at one end a rope-sheave 32, by means of which and a suitable rope-drive including a rope 33, said shaft 31 is slowly rotated. At the end of the shaft 31 opposite the one carrying the rope-sheave 32 there is removably mounted a chuck or face-plate C, to be hereinafter more particularly described.

The frame G has at the end provided with the bearing 30ª, an upwardly-projecting member 34, formed, preferably integral with a tubular sleeve 35, adapted to receive a rod 36, externally screw-threaded at one end, and carrying at its other end an arm E, one

member 37 of which projects downwardly and has at its lower end a bearing 38, adapted to receive the shank 40 of a clamping disk 39, said shank 40 being in axial line with the shaft 31, said clamping disk 39 being adapted to retain glass plates D, in position for external grinding.

The arm E has an upwardly-projecting member 41, adapted to receive a guide-rod 42, which slides in an upwardly-projecting member 43, formed at the end of the tubular sleeve 35, its object being to keep the arm E in proper position and prevent it from rotating with the rod 36.

Upon the post 21, and below the double sleeve B there is, movably arranged, a further double sleeve F, engaging said post 21 by its tubular member 44, its second tubular member 45, located at right angles to, and formed integral with, the sleeve 44 being adapted to receive a movable rod 46, having at one end a head 47, in which is tapped an upwardly-projecting adjusting screw 48, said rod being held in adjusted position by a set-screw 49, in the sleeve-member 45, shown in Fig. 2.

From the rear face of the frame G projects a stop 50, being by preference a screw held in adjusted position by a lock-nut 51, Fig. 3, said stop being adapted to limit the downward movement of the frame G beyond a predetermined point.

The operation of this apparatus and attachment to a rub-bed is substantially as follows: When circular disks of glass are to be ground on their peripheral edges, the frame G with its appurtenants is so adjusted with reference to the axial line of the shaft 31, that its axial line is above the upper surface of the rubbing disk 12 a distance equal to the radius of the finished disks, and parallel with the surface of said rubbing disk 12. This adjustment is made by slacking a set-screw 52, in the sleeve-member 22 of the part B, and raising or lowering this part B until the proper position of the frame G is attained, when the set-screw 52 is again tightened. Now the double-sleeve F is raised or lowered, as the case may be, after slacking the set-screw 49 in the sleeve-member 44, until the adjusting screw 48 approximately reaches the stop 50 on the frame G, final adjustment being made by the adjusting screw 48 in an obvious manner. Now a number of glass disks D are placed in the space between the face-plate C and the clamping-plate 39 and the clamping-plate 39 caused to impinge upon the glass-plates D by rotating a knurled hand-nut 53 located upon the screw-threaded portion of the rod 36 in the proper direction to draw the arm E toward the frame G and the face-plate C. And in order that these glass plates may readily adhere to the face-plate C and one to the other, I place in the face-plate a rubber disk 54, and between each glass plate a moistened sheet of paper or other suitable material 55, as indicated in Fig. 2. The rubbing disk is then rotated as well as the shaft 31, and water and sand being supplied to the rotating disk 12, the edges of the glass plates are readily and rapidly ground until the stop 50 reaches the adjusting screw 48 which prevents further downward movement of the frame G, the pivotal point of which is in the shaft 24. When circular plates are to be beveled, one plate only can be handled at a time. In this case I prefer to employ a face-plate C, such as is shown in detail in Figs. 4 and 5, said face-plate having a slightly projecting peripheral rim 56 to engage said glass disk D by its peripheral edge and thereby to properly center the same. The frame G is also placed at an angle of approximately 45 degrees to the plane of the rubbing disk, as illustrated at the right-hand illustration of Fig. 1, by making the proper changes in the various adjustments heretofore described with reference to the peripheral grinding of the glass disks. And, finally, when it is desired to bevel the edges of polygonal plates, a proper chuck or face-plate C is provided to hold the polygonal plates by their peripheral edges in the clamping device, but in this case the shaft 31 is not rotated and the edges of the plate successively subjected to the abrading action of the device. Inasmuch as sand and grit is likely to lodge in the recess in the face-plate C, I notch the peripheral rim of the same with a series of notches 57, Figs. 4 and 5, through which the sand can escape and be washed away.

While I have heretofore described this device with reference to its use for grinding the edges of glass plates, it is obvious that the same mechanism may be successfully employed for polishing the same, a suitable bed 12, and proper polishing material being all that is necessary to enable this device being used for the purpose indicated.

It will now be observed that by making the frame G laterally adjustable to the extent of the slotted aperture 29 in the plate 28, I am enabled to change the position of the glass plates upon the rubbing disk 12 by moving these plates nearer to, and farther away from the outer edge of the rubbing disk. This I find very desirable because it prevents the rubbing surface from being grooved and unevenly worn, which it invariably would, were the grinding always done at the same spot. To change this position at any time without disturbing the adjustment of the parts while the device is in operation, I provide the post 21 with a collar 58, which rests upon the upper surface of the bracket 19, and provide the latter bracket with a set-screw 59, to hold the post 21 in adjusted position, whereby, by

slacking this set screw 59, the post, and with it the frame G and its appurtenants may be swung through an arc of a circle having its center in the said post, such an angular position with reference to the radius line of the rubbing disk 12 being shown in Fig. 3. It will be further noted that while I have shown in Fig. 1 a rub-bed supplied with two of my attachments for grinding glass plates, any reasonable number of these attachments may be located around the rub-bed, the number thereof depending upon the diameter of the rubbing disk 12, so that by employing a number of these attachments, which can all be attended to by a single person, I am enabled to grind, bevel and polish glass plates at an exceedingly low cost.

I have heretofore described the preferred embodiment of my invention, but I desire it understood that many changes in the details of construction may be made by a mechanic skilled in the art to which this invention appertains without departing from the scope of my invention.

Having thus fully described this invention, I claim as new and desire to secure to me by Letters Patent of the United States—

1. In a machine for grinding the peripheries and beveling the edges of glass plates, an attachment to the rub-bed, comprising an upright post, a frame pivotally secured to said post, a shaft in said frame, said shaft carrying at one end a face-plate adapted to hold said glass plates, clamping-mechanism adapted to removably hold said glass plates to said face plate, means, independent of the means which rotate the rub-bed and directly connected to the shaft in said frame, adapted to slowly rotate said shaft, said means including a belt-driven pulley, and adjustable means adapted to limit the oscillatory movement of said pivoted frame to produce glass plates of uniform diameter, as described.

2. A machine for grinding the peripheries and beveling the edges of glass plates, adapted for use in connection with a rotating rub-bed, comprising a vertically disposed post, a double sleeve movably disposed upon said post, a plate pivoted in one member of said double sleeve, a frame secured to said plate, bearings on said frame, a rotatable shaft mounted in said bearings, a face-plate at the end of said shaft, a tubular socket on said frame, a screw-threaded rod movable in said socket, an arm at the outer end of said rod, an adjusting nut upon the screw-threaded portion of said rod, and a clamping disk mounted in the lower end of said arm and in axial line with said shaft.

3. A machine for grinding the peripheries and beveling the edges of glass plates, adapted for use in connection with a rotating rub-bed, comprising a vertically-disposed post, a double sleeve movably disposed upon said post, a plate pivoted in one member of said double sleeve, a frame adjustably secured to said plate, bearings on the lower edge of said frame, a rotating shaft mounted in said bearings, a pulley at one end of said shaft, a face-plate at the other end of said shaft, a tubular socket on said frame, a screw-threaded rod in said socket, an arm at the outer end of said rod, an adjusting nut upon the screw-threaded portion of said rod, a clamping disk mounted in the lower end of said arm and in axial line with said shaft, and means upon said post and adapted to coöperate with said frame to limit the downward movement of said frame.

4. The combination, with a vertically disposed post, of a double right-angled sleeve adjustably mounted upon said post, a plate, a shaft projecting from said plate and engaging one of the members of said double right-angled sleeves, a frame adjustably secured to said plate, bearings at the lower edge of said frame, an upwardly-projecting member on said frame, a tubular sleeve at the upper end of said upwardly-projecting member, a shaft in said bearings, a face-plate at the outer end of said shaft, a rod in said tubular sleeve, a downwardly projecting arm at the end of said rod, means adapted to draw said arm toward said frame, a clamping disk journaled in said arm and in axial line with said shaft, a stop on said frame, and means secured to said post and coöperating with said frame to limit the downward movement of said frame.

In testimony that I claim the foregoing as my invention, I have hereunto set my hand in the presence of two subscribing witnesses.

AUGUST W. HORNIG.

Witnesses:
MICHAEL J. STARK,
A. S. PETERSON.