(No Model.) 4 Sheets—Sheet 1.

J. HOLLELY.

MACHINE FOR BEVELING THE EDGES OF GLASS PLATES.

No. 387,233. Patented Aug. 7, 1888.

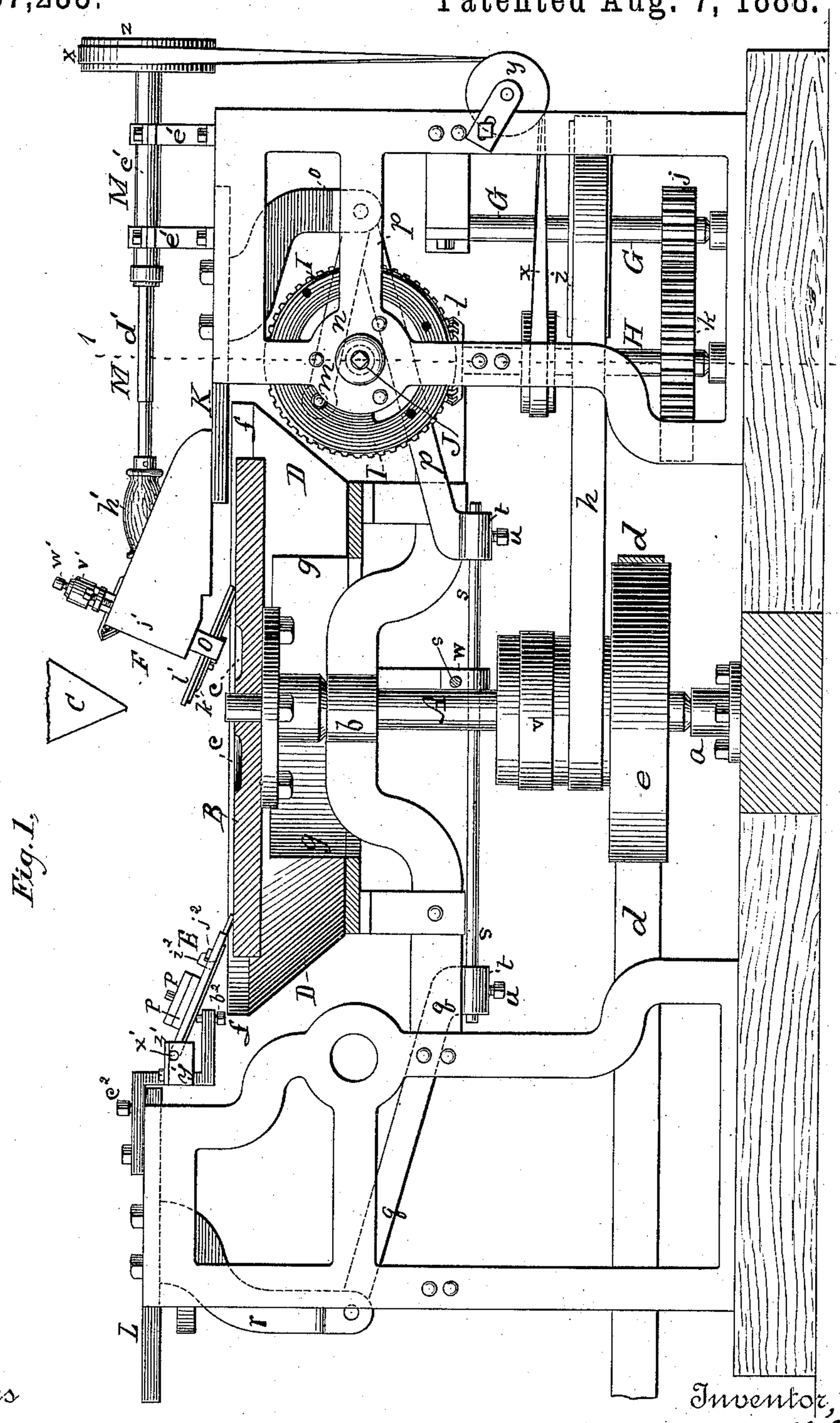

Fig. 1.

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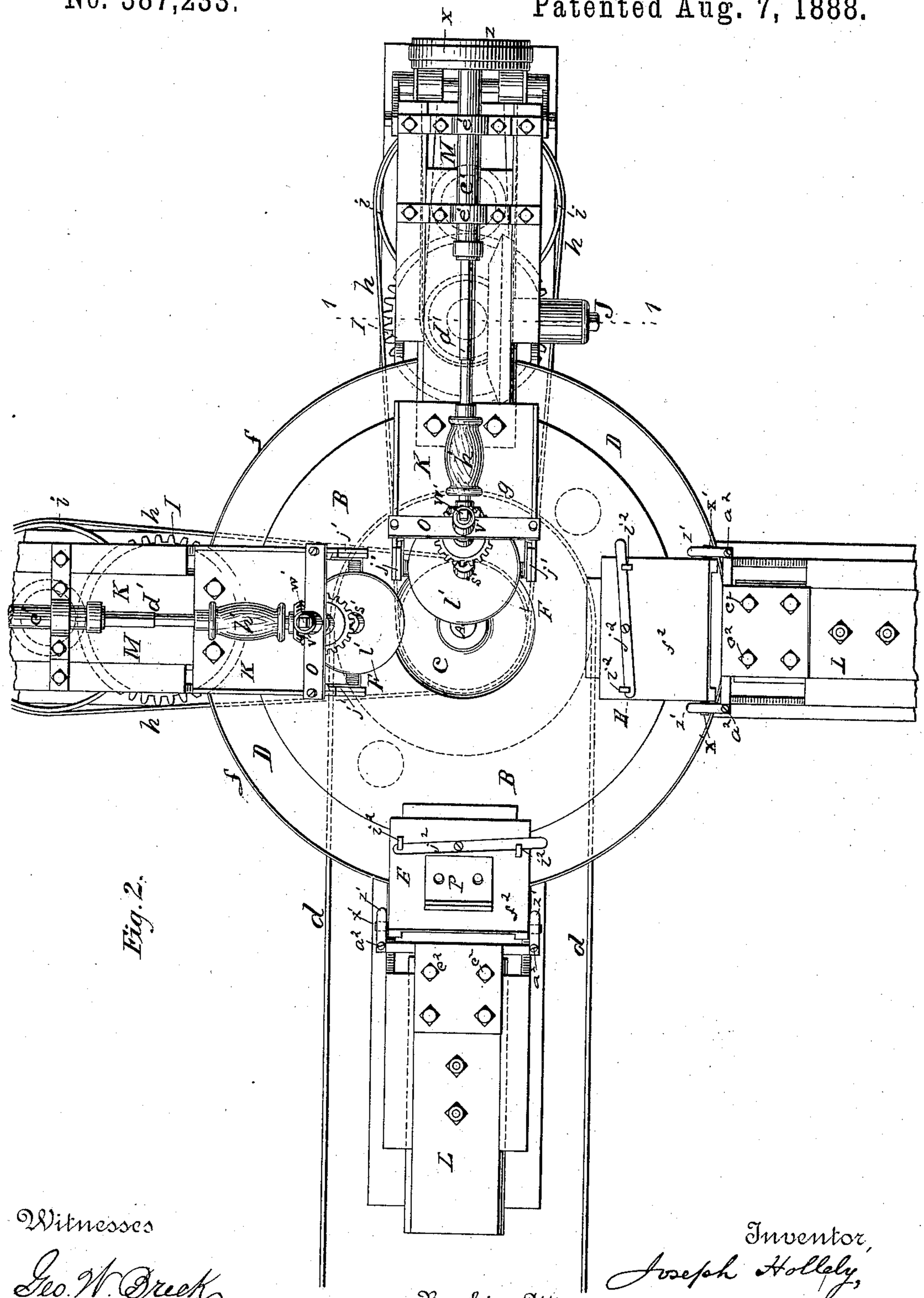

Fig. 2.

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Fig. 5,

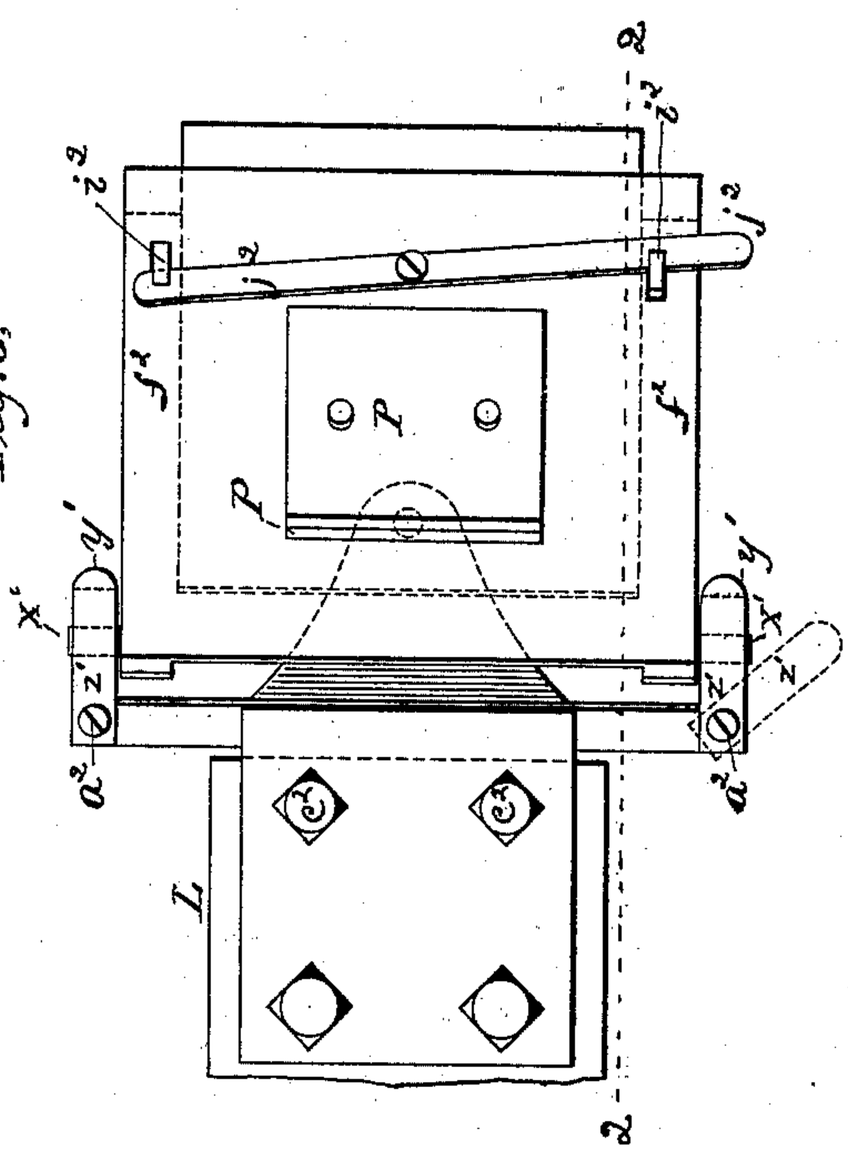


Fig. 6,

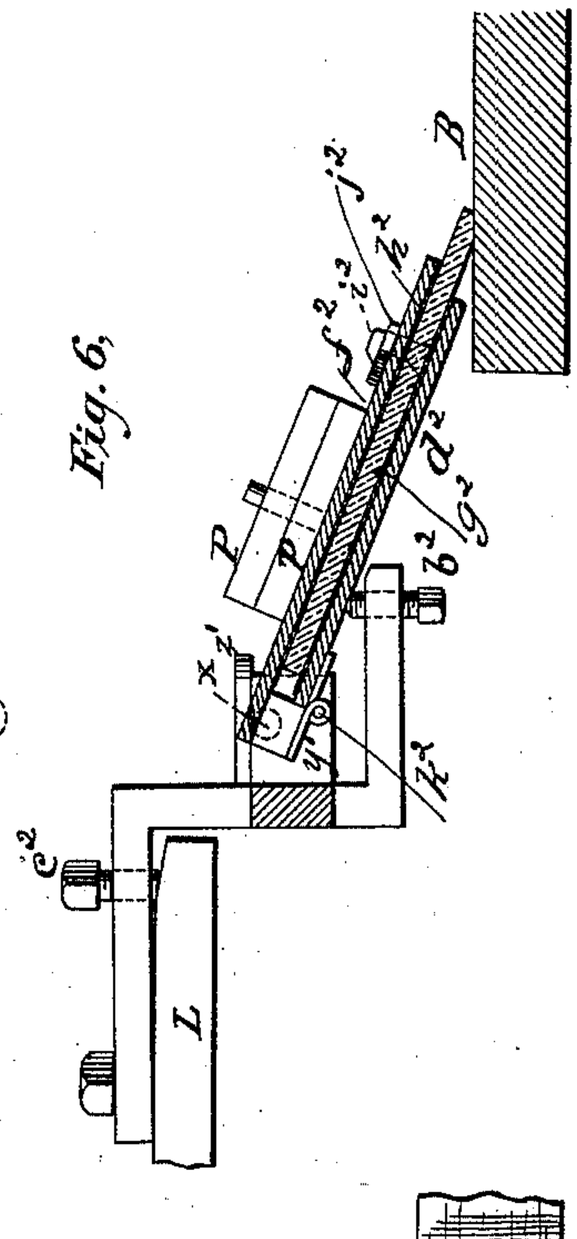
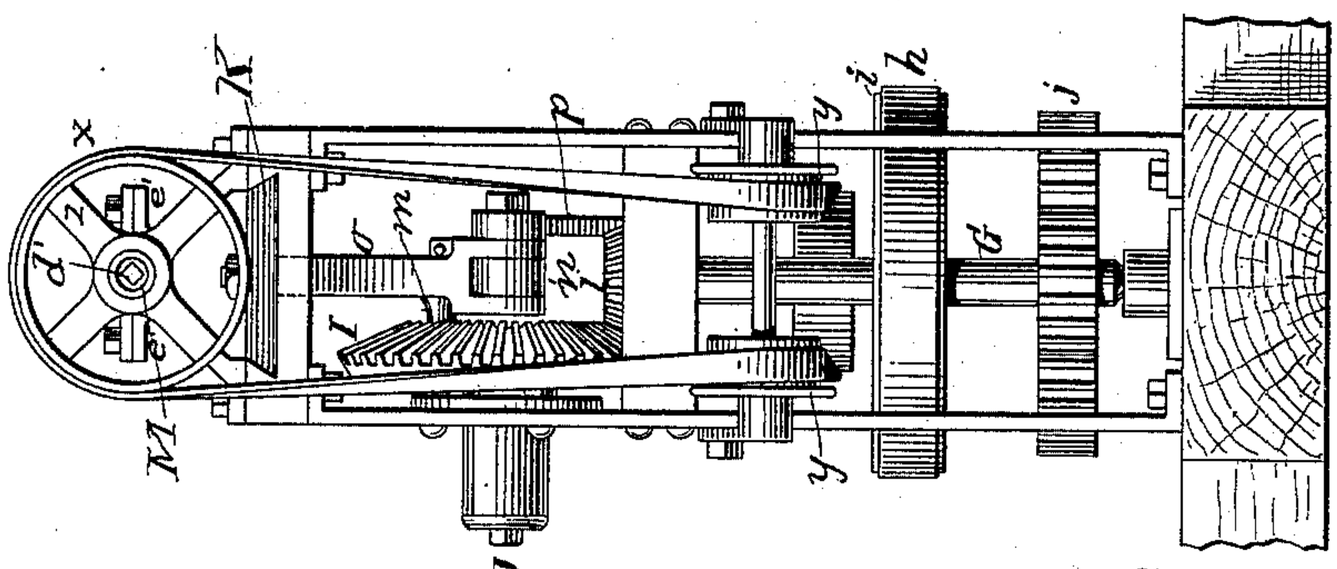


Fig. 4,

Fig. 3,



Witnesses

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Fig. 7.

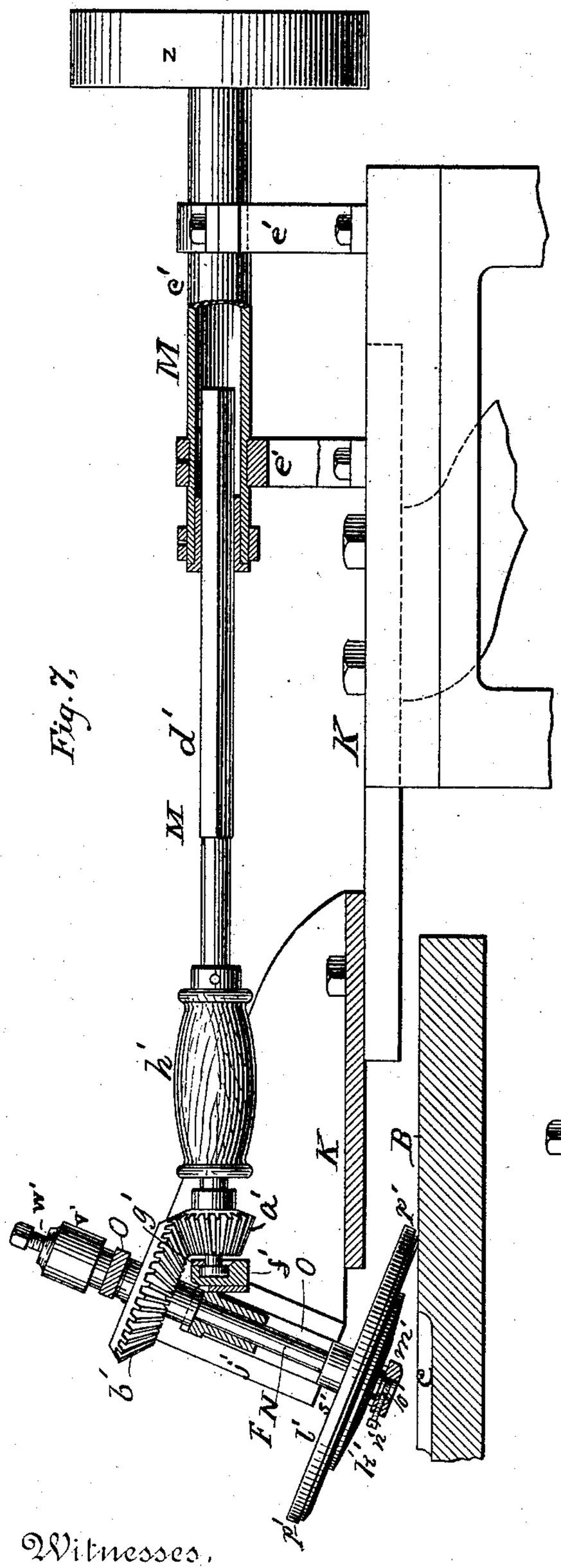


Fig. 9.

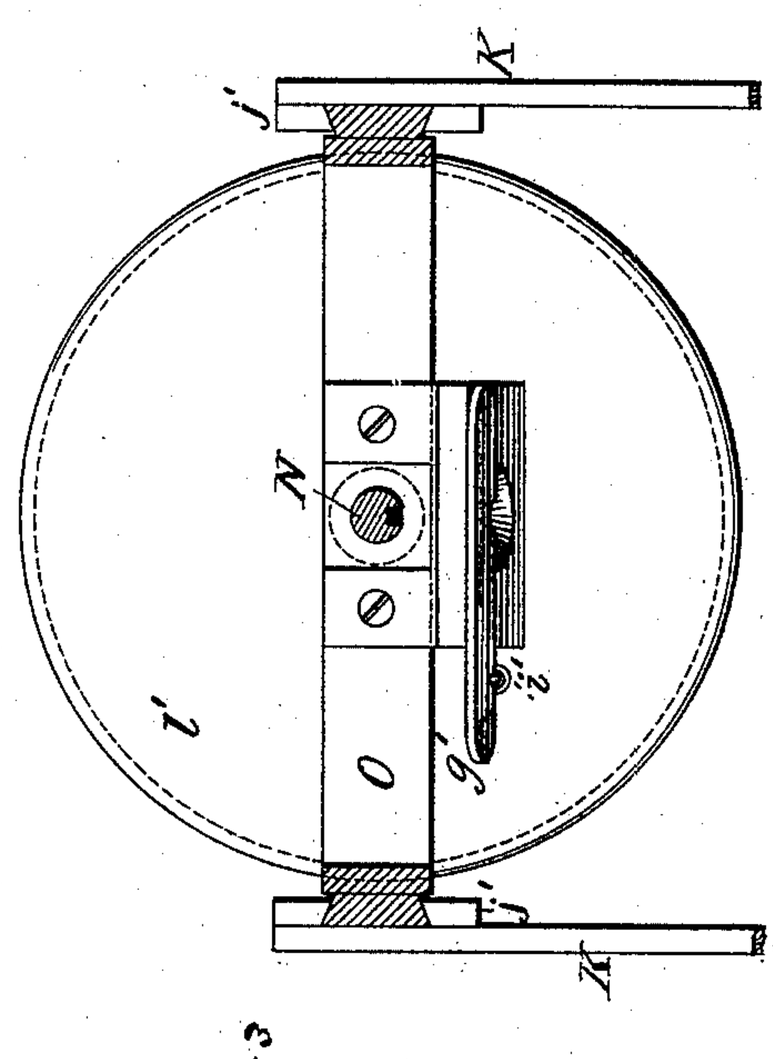
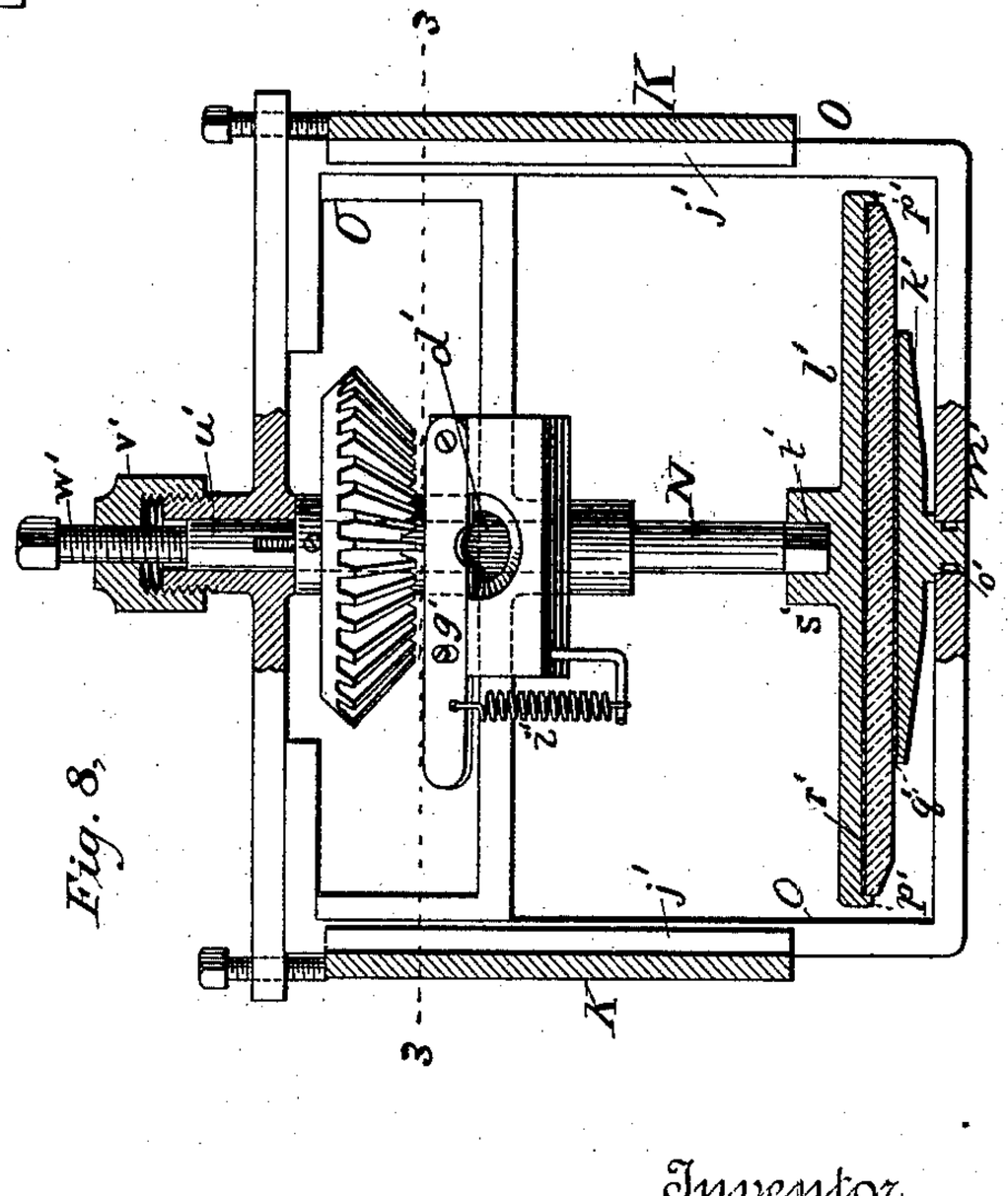


Fig. 8.



Witnesses,
Geo. W. Breck.
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UNITED STATES PATENT OFFICE.

JOSEPH HOLLELY, OF BROOKLYN, NEW YORK.

MACHINE FOR BEVELING THE EDGES OF GLASS PLATES.

SPECIFICATION forming part of Letters Patent No. 387,233, dated August 7, 1888.

Application filed May 19, 1886. Serial No. 202,669. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH HOLLELY, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented an Improved Machine for Beveling the Edges of Glass Plates; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

My invention consists in various improvements in machines for grinding and polishing the bevel-edges of glass plates for mirrors and other uses, substantially as herein specified, and pointed out in the claims.

In the accompanying drawings, Figure 1 represents a side view of the machine, the revolving grinding-disk and sand-receiving basin surrounding the same being in central vertical section and some other parts being removed; Fig. 2, a top view of the machine; Fig. 3, an end view of one wing of the machine, as looking from the right toward the left in Fig. 1; Fig. 4, a vertical section of the part shown in Fig. 3, taken in a plane indicated by the line 1 1, Figs. 1 and 2; Fig. 5, a top view, on an enlarged scale, of the clutch for holding glass plates with straight edges; Fig. 6, a vertical section of the same in a plane indicated by the line 2 2, Fig. 5, showing also a section of the adjacent edge of the grinding-disk; Fig. 7, a side view and partial central vertical section, on an enlarged scale, of the clutch for holding circular plates of glass and the means employed for rotating the same during the grinding of the plates held thereby, showing also a vertical section of the adjacent edge of the grinding-disk; Fig. 8, a central axial section of the clutch, some of the parts being only in elevation; Fig. 9, a horizontal section of the same in a plane indicated by the line 3 3, Fig. 8.

Like letters designate corresponding parts in all of the figures.

The operative parts of the machine are mounted in any suitably-constructed frame, as shown in the drawings, or otherwise.

Centrally located in the frame, and running in step and cross bearings *a b*, is the main shaft A, which carries and rotates the horizontal grinding-disk B, suitably made of cast-iron turned smooth and plane on its upper grinding-surface, but having a shallow recess, *c*, near the center around its shaft, for first receiving the sand and water used in grinding and to form a terminal inner, as well as outer, edge for the disk, over which the articles to be ground are reciprocated radially, thereby insuring a uniform wear of the surface. This grinding-disk is rotated at a speed of about two hundred and seventy revolutions per minute (more or less) by a belt, *d*, passing from the power-shaft around a pulley, *e*, on the main shaft A.

The sand, of proper fineness, mixed with water to about the consistency of cream, is first placed in a suitable hopper, C, (partly shown in Fig. 1,) suspended nearly in a central position over the grinding-disk, and is allowed to flow therefrom in requisite quantity and to fall into the central cavity or recess, *c*, of the grinding-disk, and from there it is driven radially outward in all directions over the surface of the disk by centrifugal action produced by the revolving motion of the said disk. Around and under the grinding-disk is situated a stationary receiving-basin, D, for the discharged sand and water, substantially as shown in Figs. 1 and 2. The upper edge or rim, *f*, of this basin is somewhat higher than the upper surface of the grinding-disk, as shown in Fig. 1, sufficiently so to catch the sand and water thrown from the disk to protect the machine, and especially the operative parts thereof, from the destructive effects of the swiftly-propelled sand. Under the middle of the grinding-disk, around its shaft, is an inner upwardly-projecting wall or periphery, *g*, to prevent the escape of the sand and water inwardly, to the injury of the said shaft and its bearings. This sand-receiving basin, constructed and arranged as above set forth, constitutes an improvement of value in such a machine. The sand caught in the basin is drawn off through one or more holes in the bottom of the basin, as indicated by dotted lines in Fig. 2. Now, with such a grinding-disk of proper diameter four or more plates of glass may be ground at the same time, and I have represented in Fig. 2 four clutches for holding four plates of glass, and these clutches are constructed and organized in their movements so that plates of glass may be readily

inserted therein and taken therefrom while the grinding-disk continues its uninterrupted revolutions, and the plates inserted in and taken from each separate clutch while all the others continue in action. Thus the attendant can remove the ground-glass plate from each clutch in succession and replace it by a plate not ground, so that no loss of time is suffered in the operations of the machine, and the attendant is kept constantly employed in supplying it with unground plates and removing from it the finished plates. The four plate-holding clutches shown in Fig. 2 are arranged in equidistant positions around the circumference of the grinding-disk, and their reciprocating movements over the grinding-disk are in radial directions, so that the motions of each are respectively at right angles to those of adjacent clutches; and, while other organizations might be employed, I find it to be very advantageous to have two clutches, E E, for plane-edged plates and two clutches, F F, for circular plates, a clutch E revolving opposite to and alternating in action with a clutch F; and, also, as another improvement, each clutch E is reciprocated directly by a clutch F or its slide, the latter receiving its reciprocating motion from the main shaft A. These movements and the means of imparting them are now to be described.

The means of driving one pair of clutches E F is shown in Figs. 1, 3, and 4. From a pulley on the main shaft A a belt, *h*, passes to a pulley, *i*, on a transmitting-shaft, G, which drives a third shaft, H, by gear-wheels *j k* on the respective shafts. The shaft H has a bevel gear-wheel, *l*, on its upper end, gearing into a larger bevel-wheel, I, on a horizontal shaft, J. The bevel-wheel I serves as a crank-wheel, a crank-pin, *m*, being on its face, for operating a connecting rod or pitman, *n*, pivoted thereon, the other end of the pitman being pivoted to a bracket, *o*, bolted or otherwise secured to a slide, K, which carries the clutch F, for holding and rotating circular glass plates. The diameter of the circle in which the crank-pin *m* revolves determines the extent of the reciprocation of the clutch over the grinding disk B; and in order to vary the extent of this reciprocating movement as may be required the crank-pin is or may be adjusted to different distances from the center of the gear-wheel I by being inserted in different holes therein, as indicated in Fig. 1.

By the means thus far described one of the clutches is given the requisite reciprocating movement. For communicating a corresponding reciprocating movement to the opposite clutch E a very simple means is effective. This consists in an arm, *p*, secured at one end to the bracket of the clutch-slide K, a similar arm, *q*, secured at one end to a corresponding bracket, *r*, on the slide L of the opposite clutch, and a connecting-rod, *s*, attached at its two ends to the other free ends of the two arms, so that the two clutch-slides are caused to reciprocate together as one. The connecting-rod is adjustably secured to the two arms by socket-sleeves *t t* on the two arms and holding-screws *u u*, as shown, or by equivalent means, whereby the position of the clutch E may be adjusted to correspond with that of the clutch F and its traverse over the grinding-disk may be changed at will. There is a special advantage gained by this simple means of reciprocating one clutch by the reciprocating slide of the other clutch, in that one clutch is made always to travel outward over the grinding-disk while the other is traveling inward, alternating in their inward and outward movements, so that the action of the grinding-disk on the plates carried by the clutches is made uniform throughout their reciprocating movements. A precisely similar means of reciprocating the other two clutches at right angles to the two above referred to is employed, as indicated in Fig. 2, the belt *v* therefor running from the pulley on the main driving-shaft being shown just above the first described. The connecting-rod *s* is preferably made to run in a guide-bearing, *w*, and the same guide-bearing may serve for the other connecting-rod running in a direction at right angles to the first named, as shown in Fig. 1.

For rotating the clutch F for holding circular plates of glass so as to bring all parts of the edge equally in contact with the grinding-disk, the following means is shown: A belt, *x*, passes from a pulley on the vertical shaft H first around the idler-pulleys *y y* to change the direction of the belt from horizontal to vertical, and thence upward and around a pulley, *z*, on a horizontal shaft, M, which turns the spindle N of the clutch, being geared thereto at its inner end by two bevel gear-wheels, *a' b'*, as shown in Fig. 7. Since the inner end of this shaft must reciprocate endwise with the clutch, and the outer end of the shaft carries a pulley stationary in position, the shaft is made in two parts, the outer part, *c'*, being hollow or tubular and running in two supporting-bearings, *e' e'*, and the inner part, *d'*, being angular and sliding in an angular socket in the inner end of the tubular shaft, but turned therewith. The inner end of the inner part of the shaft has a bearing, *f'*, in the frame of the clutch F; and in order that the clutch may be readily ungeared from the shaft the inner end of the said shaft, forming the journal which turns in the said bearing, has a flange on the end or groove therein, behind or in which a latch, *g'*, fits to hold the shaft-journal in the bearing, so that on lifting the latch the shaft may at once be withdrawn therefrom far enough to ungear it from the spindle or mandrel of the clutch, the inner part of the shaft M sliding freely in the outer tubular part thereof. For manipulating this inner part of the shaft for gearing it with or ungearing it from the spindle or mandrel, there is a handle, *h'*, on the shaft, which is rounded in that part, so that the shaft may continue to revolve freely in the handle while it is held by the hand of the operator. The

holding-latch g' is pivoted at one end and held down on the shaft by a spring, i', as shown in Figs. 8 and 9.

The clutch itself is constructed with a rectangular frame, O, sliding in ways j' j' of the slide K at the required proper inclination to give the bevel to the plates, as shown in Figs. 7, 8, and 9. The clutch proper is composed of two clamp-plates, k' and l', between which the plates of glass are centered and held. The lower plate, k', which is smaller in diameter than the glass plates held in the clutch, so as not to come in contact with the grinding-disk, has a step-bearing, m', in the lower bar of the frame, and is held therein by a screw, n', projecting into a groove, o', of the journal of the disk, as shown in Figs. 7 and 8. The upper plate, l', of the clutch is larger than the plates of glass to be held thereby, and has a flange, p', around its lower side or face to surround the glass plates and retain them in a central position. The faces of both chuck-plates have sheets or linings q' r' of india-rubber or equivalent packing material, to press in immediate contact with the glass plates for holding the same tightly and preventing injury thereto.

In a hub or boss, s', on the upper side of the upper clutch-plate is a square or angular socket, t', in which fits the lower end of the spindle or mandrel N by which the clutch is rotated. The upper end of the clutch spindle or mandrel has an extended bearing, u', in the upper bar of the frame, over the upper end of which a cap, v', screws, like a stuffing-box. In the center of this cap a set-screw, w', screws and bears on the upper end of the clutch spindle or mandrel for tightening the upper clutch-plate down upon the plate of glass to be beveled. When a plate of glass is to be removed from the clutch, the screw w' is to be unscrewed two or three turns. Then to remove a plate the clutch-frame is drawn up from its slideways, the driving-shaft having first been ungeared from its spindle or mandrel, as above set forth. The clutch-frame, after removal from its ways, is then reversed in position, or placed upside down, in which position the mandrel will drop in the frame as far as the partially-withdrawn screw will permit, and the upper clutch-plate, l', then underneath, will drop with the mandrel, leaving the glass plate free to be withdrawn and another plate put in its place. Then the clutch-frame is again put into its ways, the screw w' is again tightened down upon the spindle or mandrel, and the driving-shaft is geared to the spindle or mandrel. During this unclutching and clutching manipulation the machine is kept in constant motion. The pressure of the glass plate upon the grinding-disk is produced by the weight of the clutch and frame. It may be regulated, if desired, by any suitable or known means. Any equivalent of the adjusting-screw w' for clamping the glass between the clutch-plates may be used instead of the same.

The clutch E for holding straight-edged glass plates not requiring to be rotated, the construction is simpler than that for holding circular plates. Besides the views shown in Figs. 1 and 2, I have shown the construction on a larger scale in Figs. 5 and 6. The clutch is pivoted at the rear edge by journals x' x' in bearings y' y' of the carrying-slide L, so that it can be adjusted to any desired angle of inclination for making the desired bevel and for convenience in shifting the plates to different positions, in order that each edge may be successively presented to the action of the grinding-disk. Caps z' z' cover the bearings and journals of the clutch, and they are pivoted at one end on holding and set screws a^2 a^2, so that the other end may be free to be swung off and on the bearings to enable the journals of the clutch to be lifted therefrom and the whole chuck removed thereby for convenience in cleaning away the sand which accumulates in different parts of the clutch and would damage it if allowed to remain an indefinite length of time. I have shown in Figs. 1 and 6 the carrying-slide raised considerably above the grinding-disk, with the forward part, on which the clutch is immediately supported, bent downward, so that the slideways may be elevated above the throw of the sand from the grinding-disk, whereby friction and damage to the slide are avoided. It is preferable, also, to have the slide and ways of the circular-plate clutches elevated in a similar way for a similar purpose, although not so represented in the drawings.

A set-screw, (or screws,) b^2, is placed in the front end of the slide for the chuck to rest on and to adjust its height in relation to the surface of the grinding-disk. The carrying frame or bracket of the slide may also be readily adjusted in height on the slide proper by screws c^2 c^2. The clutch is composed of two plates, d^2 f^2, between which the glass plates are clamped, the inner surfaces of the two plates having india-rubber or equivalent elastic or soft linings g^2 h^2, to bear immediately on the sides of the glass and prevent unequal pressure and avoid fractures of the plates. The clutch-plates are pressed against the glass plates by means of hook-catches i^2 i^2 on the under plate, reaching up through the upper plate, and a swinging bar, j^2, pivoted in the middle to the upper plate, so that the two ends may be swung under the said catch-hooks and press the clutch-plates together by wedge action. Any equivalent means may be used; but this means is simple and convenient. The rear edge of one clutch-plate is hinged at k^2 to the journal-bar of the clutch, as shown, for separating the plates. On top of the clutch are placed weights P P, one, two, or more, for giving the requisite pressure to the chuck for grinding with the requisite speed, a series of such weights being required for adjusting the pressure. The same means may be employed in relation to the circular-plate chuck, but not shown in the drawings.

I claim as my invention—

1. The combination of a revolving grinding-disk and one or more glass-plate-holding clutches having a reciprocating movement radially over the said grinding-disk across the plane face thereof.

2. The combination of a revolving grinding-disk and one or more glass-plate-holding clutches having a reciprocating movement radially over the face of the grinding-disk in adjustable positions, for the purpose herein specified.

3. The combination of a revolving grinding-disk and two glass-plate-holding clutches placed diametrically opposite to each other across the disk, and having a radial reciprocating movement over the disk, the movement of each clutch being outward, while that of the other is inward, for the purpose herein set forth.

4. The combination of a revolving grinding-disk, a circular-glass-plate-holding clutch having a reciprocating motion radially over the disk, and a rotating mandrel for imparting a rotary motion to the glass plates during the reciprocations of the clutch.

5. The combination of a revolving grinding-disk, a circular-glass-plate-holding clutch having a reciprocating motion radially over the disk, and a straight-edged glass-plate-holding clutch having a reciprocating motion over the disk imparted to it directly by the other clutch or its sliding carriage, substantially as and for the purpose herein specified.

6. The reciprocating circular-glass-plate-holding clutch provided with a revolving spindle or mandrel, and a revolving-mandrel driving-shaft constructed in two parts, one part sliding in and coupled to the other, substantially as and for the purpose herein specified.

7. A reciprocating circular-glass-plate clutch provided with a revolving spindle or mandrel, in combination with a longitudinally-movable driving-shaft geared to the mandrel, having its adjacent journal coupled in its bearing, and a holding and releasing catch, substantially as and for the purpose herein specified.

8. A circular-glass-plate clutch having two clamping-plates, one plate being smaller in diameter than the glass plate to be held, and the other plate being as large as or larger than the glass plates in diameter, for the purpose herein specified.

9. A circular-glass-plate clutch having two clamping-plates, one smaller and the other larger in diameter than the glass plates to be held between them, and the larger plate having a projecting rim or flange adapted to surround and hold in central position the said glass plates.

10. A circular-glass-plate clutch having two clamping-plates, one smaller and the other larger than or as large as the glass plates in diameter, and the surfaces of the two plates having a thickness of india-rubber or other elastic soft material upon them, substantially as and for the purpose herein specified.

11. In a glass-plate beveling or grinding machine, a reciprocating straight-edged-glass-plate clutch pivoted to its slide carrier, the bearings of the carrier having swinging caps to cover the removable journals of the clutches, substantially as and for the purpose herein specified.

12. The straight-edged-glass-plate clutch constructed with two clamp-plates hinged together at one edge and tightened by wedge-acting hooks projecting from one plate, and a swinging bar on the other plate catching into the hooks, substantially as herein specified.

13. A straight-edged-glass-plate clutch hinged at one edge to its slide-carrier, and provided with a series of attachable and removable weights for graduating the pressure of the glass plate on the grinding-disk, substantially as herein specified.

14. The combination of the movable part d' of the shaft M, and the handle h', in which said shaft freely turns, substantially as and for the purpose herein specified.

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Witnesses:
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