

E. OFFENBACHER.
MACHINE FOR POLISHING FACETS AND SURFACES.
APPLICATION FILED JAN. 2, 1908.

1,013,559.

Patented Jan. 2, 1912.

3 SHEETS—SHEET 1.

Fig. 1

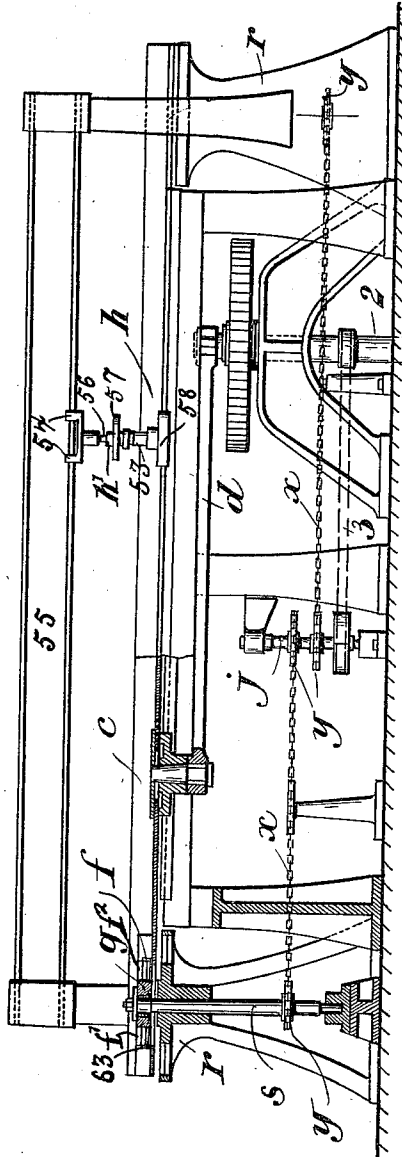
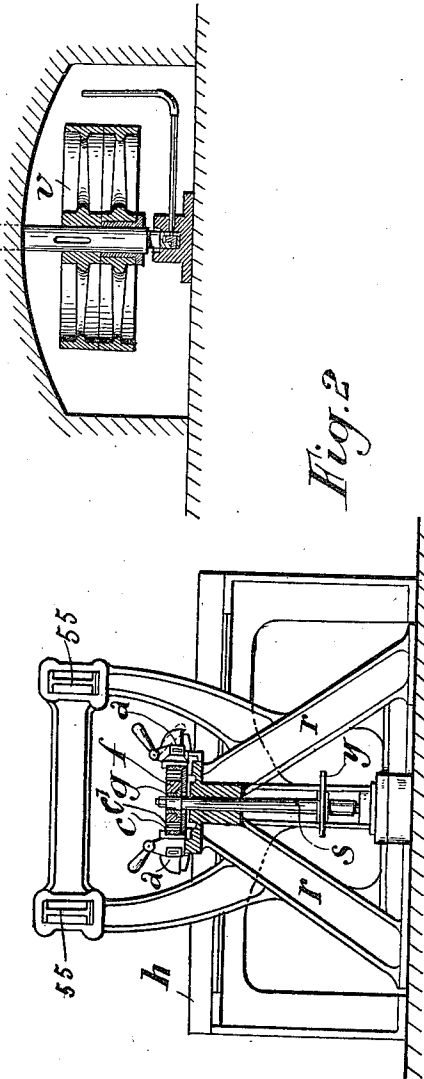


Fig. 2

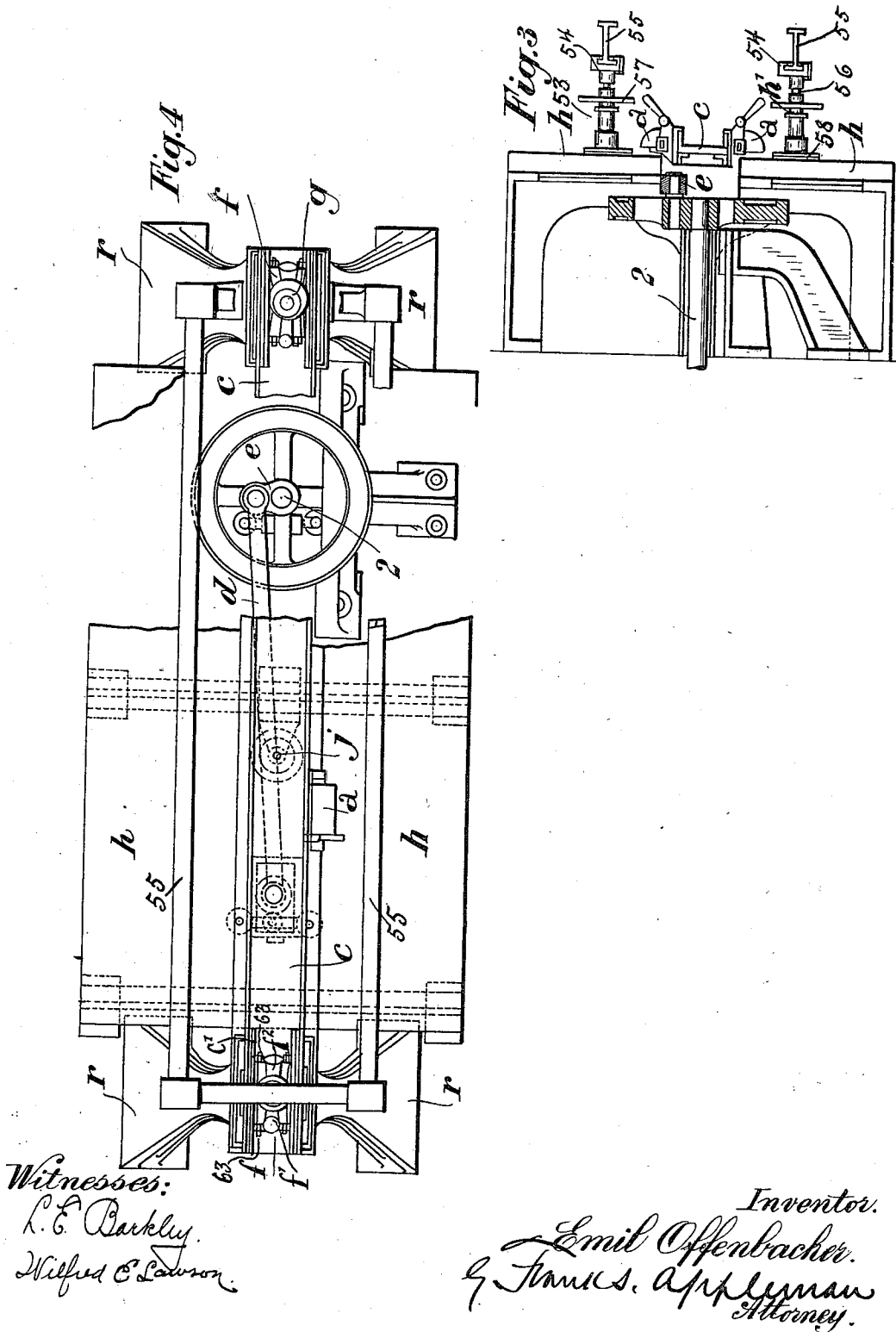


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3 SHEETS—SHEET 3.

Fig. 5.

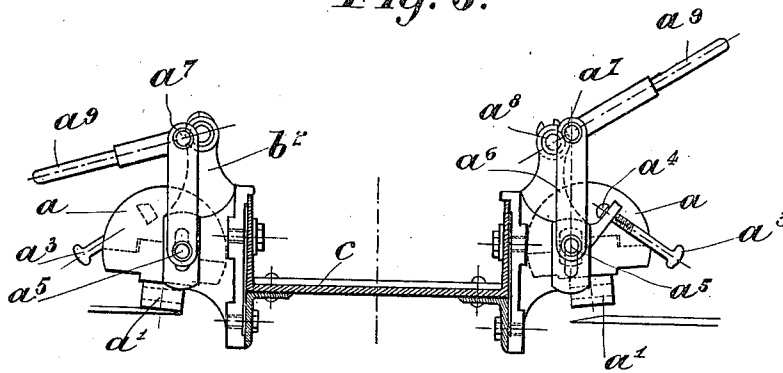


Fig. 6.

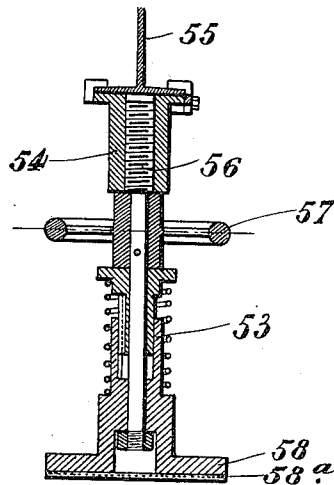
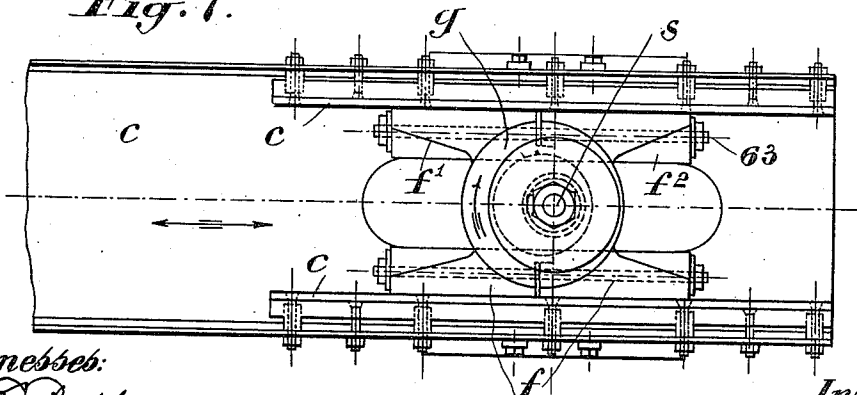


Fig. 7.



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UNITED STATES PATENT OFFICE.

EMIL OFFENBACHER, OF NUREMBERG, GERMANY.

MACHINE FOR POLISHING FACETS AND SURFACES.

1,013,559.

Specification of Letters Patent.

Patented Jan. 2, 1912.

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To all whom it may concern:

Be it known that I, EMIL OFFENBACHER, a subject of the German Emperor, and resident of Nuremberg, Germany, have invented certain new and useful Improvements in Machines for Polishing Facets and Surfaces, of which the following is a specification.

This invention relates to machines for polishing glass plates and other plain surfaces of like character, and it has for its object the provision of a machine particularly adaptable to a wide range of work owing to the complexity of the motions of the tool carrier.

The invention consists in the details of construction and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this specification where like characters denote corresponding parts in the several views, in which—

Figure 1, illustrates a view in elevation, partly in section, of a polishing machine embodying the invention; Fig. 2, illustrates an end view thereof, also partly in section; Fig. 3, illustrates a sectional view through the driving wheel; Fig. 4, illustrates a top plan view, parts being broken away; Fig. 5 illustrates a detail of the clamps *a* and their connections; Fig. 6 is a sectional elevation of a clamping device *h*¹; Fig. 7 is a detail view of the shaft *s*, and its top end connections.

The facet polishing machine shown in Figs. 1 to 4 is worked in such a manner that polishing tools secured to a tool carrier are moved forward and backward while the work table remains stationary.

The facet polishing machines of well known constructions work in such manner that polishing tools secured to a tool carrier are moved forward and backward together, while the working table remains stationary. In a surface polishing machine of well known construction the pigs or tools receive the form of rotary disks and the tool carrier is given a rotary motion by means of two cranks. This rotary motion transmits a rotary motion to the polishing disks during the operation of the machine. In other surface polishing machines the pol-

ishing tools receive an eccentric rotary motion while the tool carrier has an advancing and receding movement.

In the machine constructed according to the principles of the present invention the complexity of the motions of the tool carrier compared with all these above described machines is increased by the fact that the tool carrier, independently of the rotation proper of the polishing tools which according to the requirements is forced, allowed or prevented, receives a double transposing motion in the longitudinal and also in the transverse direction. This transposing of the motions is due to the relative number of lateral and longitudinal reciprocations of the tool carriage. If the gearing which connects the longitudinal mechanism with the transverse mechanism were such that the lateral and longitudinal vibrations were equal, it is obvious that the polishing tools would travel, in each consecutive cycle of the machine, over the same surface of the plate being polished. If the ratio of the longitudinal to the lateral reciprocations were as 2 is to 1, (longitudinal:lateral=2:1), then each line of travel of the tool would cross the preceding line, but would coincide in direction with the second preceding line. If, by making the said ratio uneven, (longitudinal:lateral=20:11), for instance, then each line of travel of the tools would cross the line traveled in the preceding cycle, and would continuously renew its line of travel. It is by a similar ratio of the motions, obtained through the gearing *x*, *y*, *z*, etc., that the said double transposing motion is imparted to the polishing tools.

The tool holders *a* are secured in any suitable manner to the beam like carrier *c* and they are adapted to carry a polishing tool *a'* adjustably mounted thereon and held in operative relation to the facet. The tool holder comprises a block *a*, pivotally mounted on a horizontal shaft *a*⁵ and carrying a polishing tool *a'*, which is secured to a bolt *a*². The shaft is supported by brackets *b*², the ends of said rods projecting through the slots *b*³, may be instantaneously raised or lowered therein by means of links *a*⁶, cranks *a*⁷ and a lever *a*⁹, on a rod *a*⁸ which carries said cranks. Portions adjacent to the ends of rods *a*⁵ are flattened, and to one of these

flattened portions is fitted an arm c^2 , the flattened portion fitting snugly into the slot c^3 of the arm. Said arm carries an adjusting screw a^3 which contacts with a lug a^4 , on the block a , for rotatably adjusting the tool holder and thereby changing the angle of the facets.

In polishing facets, rectangular tools are used. They are secured to the holder a so that they cannot rotate. The glass plate to be operated on lies on the work-table h and is held thereon by means of a suitable clamping device h' . This device consists of a standard 53 carrying a head having four claws 54 which engage the flanges of the beams 55. The standard 53 has a threaded bore in which a screwed spindle 56 with a hand wheel 57 keyed thereon is mounted. The presser-plate 58 is faced with felt 58^a and is mounted on the end of the spindle 56. By rotating the spindle 56 by means of the hand wheel 57, to the right or to the left, the presser plate is raised or lowered. The carrier c itself is moved alternately forward and backward *i. e.* longitudinally by means of a simple crank mechanism d, e , working in a horizontal plane.

For the purpose of obtaining the horizontal transverse movement at right angles to the longitudinal movement just referred to, the carrier c , is provided at its ends with inner guide plates c' between which a cross head f is slidably seated, and which consists of two halves f^1, f^2 connected by tightening screws 63, and its cross heads each embrace an eccentric g keyed on a vertical shaft s . The eccentrics rotate accordingly in a horizontal plane and the carrier c is reciprocated transversely independently of its longitudinal movement.

The work table h is stationary in the embodiment of the invention shown in Figs. 1 to 4. Arranged in front and behind the work table are standards r wherein the shafts s are vertically located, each of these shafts carrying at its upper end one of said eccentrics g . The shafts s are uniformly driven by transmission means 3, x , and y connected with the shaft 2. The shaft 2 is rotated or left at rest by means of the fast and loose pulleys v .

The action of the machine is as follows: When it is intended to polish facets, fixed tools must be mounted upon the tool support a . The latter is then reciprocated longitudinally by the instrumentality of the crank mechanism d, e , along the facet to be polished while at the same time the eccentric shafts s produce a reciprocating motion of the tools transversely with reference to the facets. Owing to this double motion (which takes place at the same time longitudinally and transversely) the polishing of the facets is finished in a much shorter time than is the case in the older machines serv-

ing the same purpose, wherein the tools were only moved forward and backward.

Having now fully described my said invention, what I claim and desire to secure by Letters Patent is:—

1. In a polishing machine the combination with the frame work of a beam shaped tool carrier, of polishing tools and means for connecting these tools with the said tool carrier, a crank mechanism for causing the said tool carrier to be bodily reciprocated longitudinally, a longitudinal slot in each of the ends of the said tool carrier, an eccentric adapted to work in each of the said slots, two vertical shafts carrying the said eccentric under the same angle and means for causing the said vertical shafts to rotate at the same speed and in the same direction, substantially as and for the purpose set forth.

2. In a polishing machine, a frame, a table on the frame, a tool carrier extending the entire length of said table, a shaft, a wheel on said shaft, a crank connected to said wheel and said tool carrier by means of a connecting rod whereby the carrier may be reciprocated longitudinally, and means comprising an eccentric whereby the carrier may be reciprocated transversely.

3. In a polishing machine, a frame, a table on the frame, a trough shaped tool carrier extending from end to end of said table, a shaft, a wheel on said shaft, a crank connected to said wheel and to said tool carrier through the medium of the connecting rod whereby the carrier may be reciprocated longitudinally, said tool carrier having slots in its opposite ends, shafts extending through said slots, eccentrics on the ends of said shafts, and means for rotating said eccentrics in the same direction from said first mentioned shaft whereby said tool carrier is reciprocated transversely of the frame.

4. In a polishing machine, a frame, a table on the frame, a tool carrier, means for reciprocating said tool carrier longitudinally of the table, means for reciprocating said tool carrier transversely of the table, beams supported above the table on each side thereof, clamps adjustable on said beams and means for raising and lowering said clamps with relation to the table.

5. In a polishing machine, a frame, a table on the frame, beams horizontally disposed above the table, clamps disposed between said beams and said table for the purpose specified, and an elongated tool carriage horizontally disposed and having flanges, said carriage being above said table and having apertures through its end portions, vertically disposed and rotatable shafts through said apertures, eccentric disks carried by said shafts, guides oppositely disposed and secured to the inside surfaces of said flanges, a cross head having

slidable engagement with said guides and
coacting with said eccentric for imparting
lateral reciprocating motion to said carriage,
and means for imparting longitudinal re-
ciprocating motion to the said tool carriage.

5 6. In a polishing machine, a frame, a tool
on the frame adapted to hold a plate to be
polished, means for clamping the plate on
the table, a beam-like tool carrier horizon-
10 tally movable above said table, said tool
carrier having slots through the end por-
tions thereof, oppositely disposed guides
screwed to each end portion of said carrier,
a vertically disposed and rotatable shaft

through each of said slots, a cam on each 15
shaft and coacting in conjunction with the
guides for imparting lateral reciprocating
motion to said carrier, means for recipro-
cating said carrier longitudinally, and means
for clamping the polishing tools to the car- 20
rier.

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

EMIL OFFENBACHER.

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OSCAR BOCK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."