No. 747,428. PATENTED DEC. 22, 1903.

F. A. HUBBUCH.

GLASS CUTTING MACHINE.

APPLICATION FILED DEC. 16, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

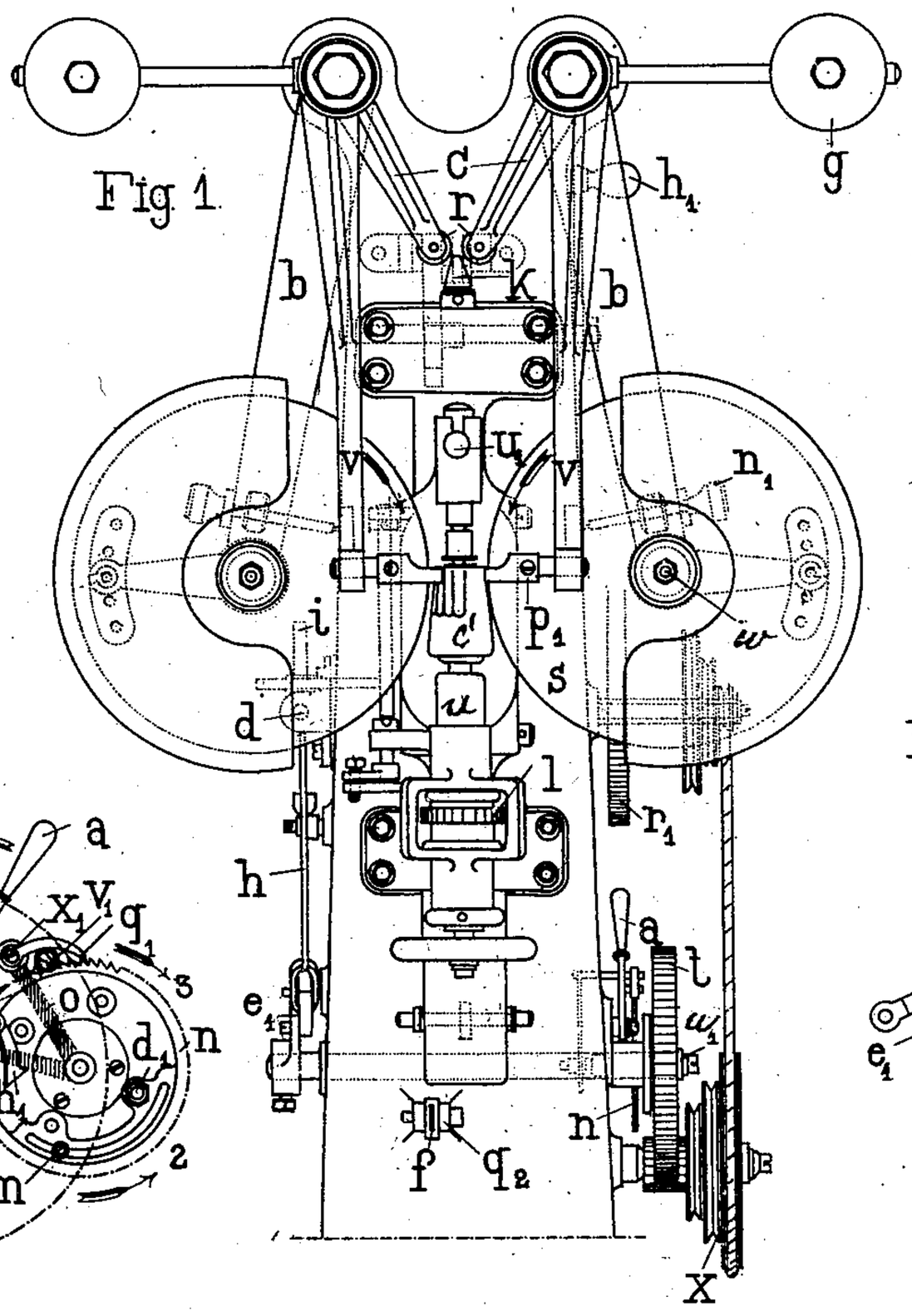


Fig. 4.

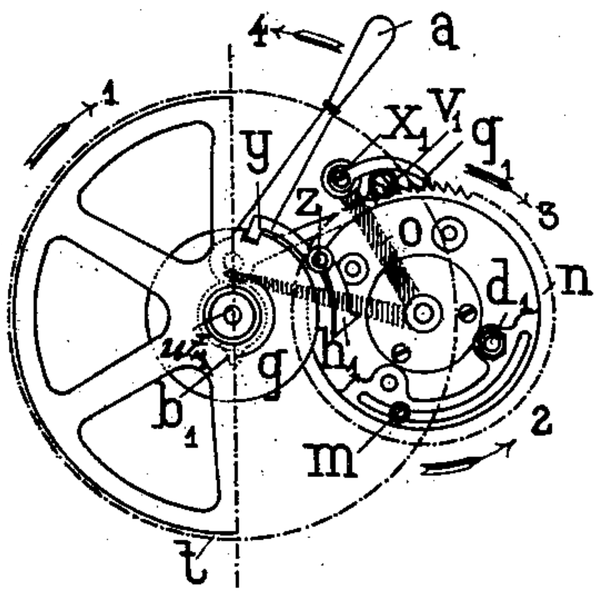


Fig. 3.

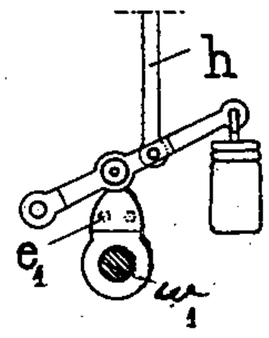
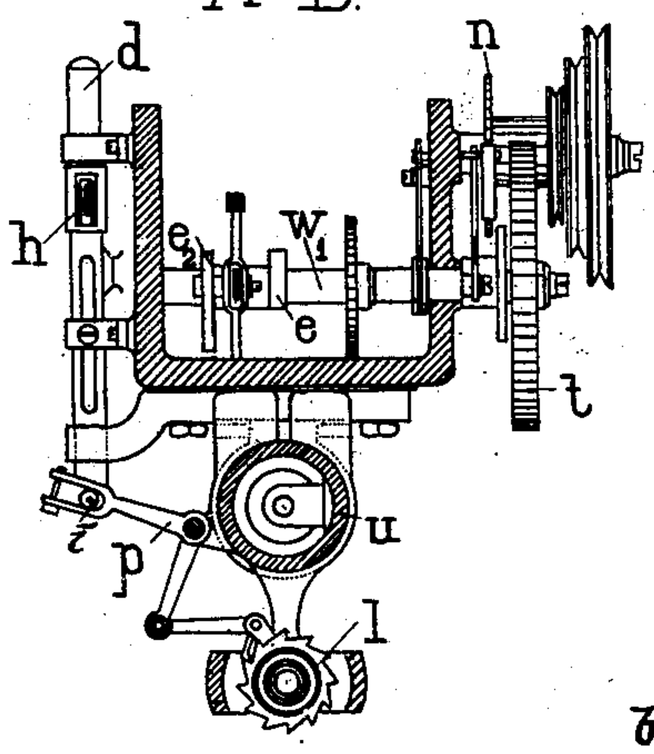


Fig. 2.

A–B.



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GLASS CUTTING MACHINE.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 5.

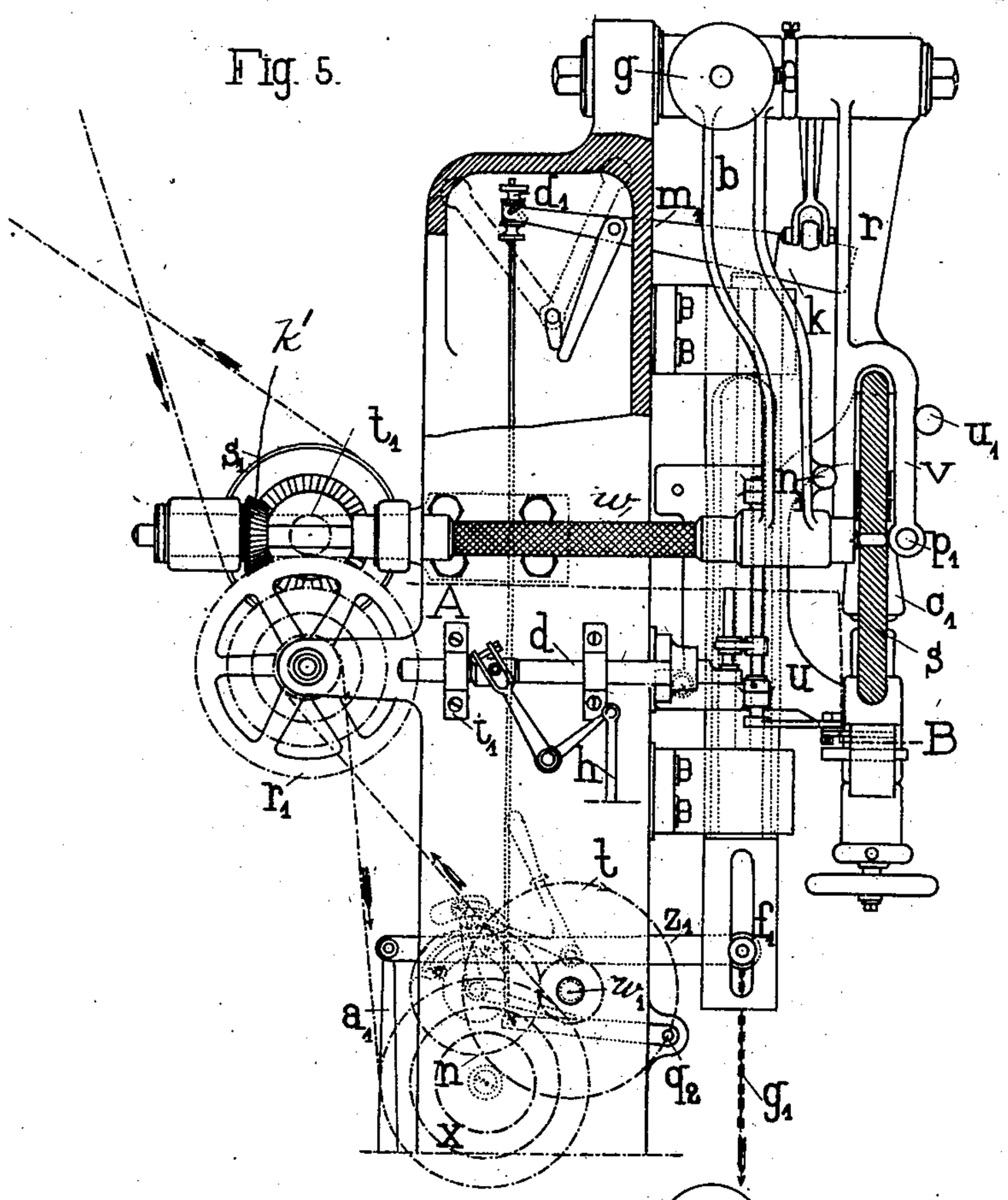
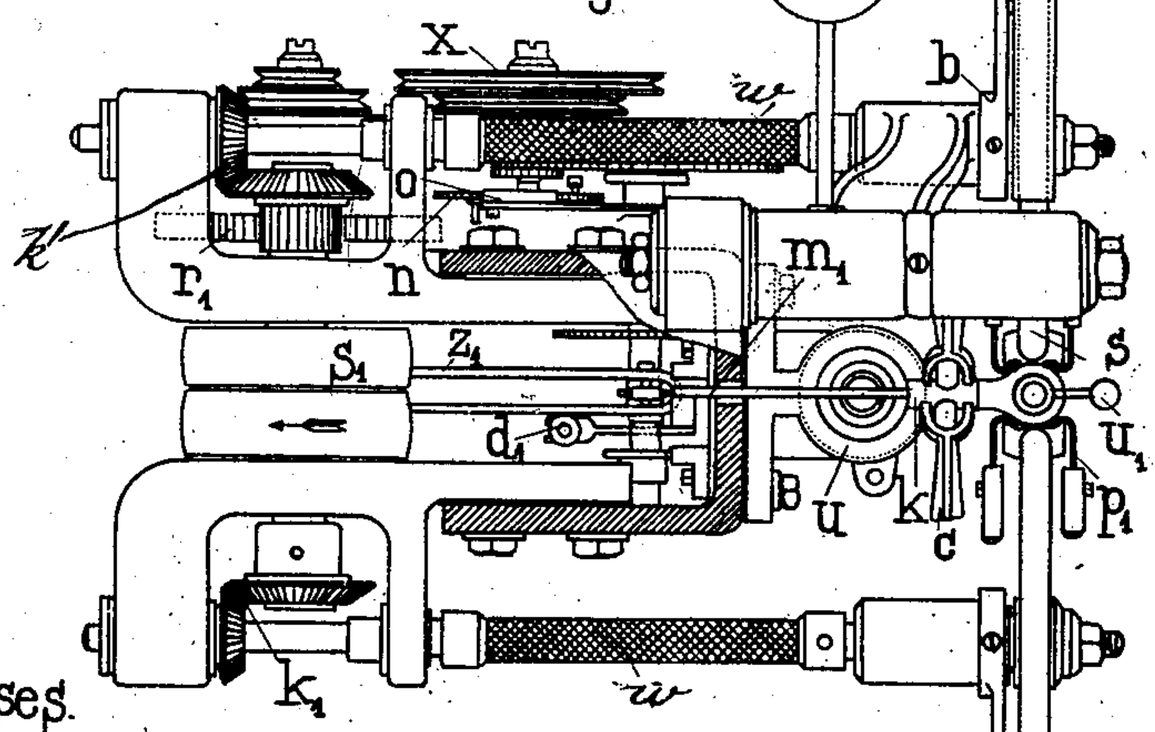


Fig. 6.



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No. 747,428. Patented December 22, 1903.

UNITED STATES PATENT OFFICE.

FRANZ ANTON HUBBUCH, OF STRASSBURG, GERMANY, ASSIGNOR TO THE AUTOMATIC GLASS CUTTING MACHINE SYNDICATE, OF LONDON, ENGLAND.

GLASS-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 747,428, dated December 22, 1903.

Application filed December 16, 1902. Serial No. 135,440. (No model.)

To all whom it may concern:

Be it known that I, FRANZ ANTON HUBBUCH, a subject of the Emperor of Germany, residing at Strassburg, Germany, have invented certain new and useful Improvements in Glass-Cutting Machines, of which the following is a specification.

My invention has reference to improvements in glass-cutting machines, and relates more especially to automatic twin machines with oscillating cutting-disks. It differs from the machine disclosed in United States Letters Patent No. 631,640 principally as regards the position of the arms carrying the cutting-disks and in having two cutting-wheels acting simultaneously on two opposite parts of the work.

My invention is illustrated by the appended drawings, in which—

Figure 1 is a front elevation of the machine, and Fig. 2 a section on the line A B of Fig. 5. Fig. 3 represents a detail view of the work-rotating cam to be hereinafter referred to. Fig. 4 is a side elevation of the disengaging mechanism. Fig. 5 is a side elevation of the machine, partly in section. Fig. 6 is a plan of the same.

In the drawings only the top part of the frame on which the mechanism is mounted is shown. At the top of the frame are two lugs which receive pins on which the oscillating arms b are mounted. The lower ends of these arms are bored and form bearings for the shaft carrying the cutting-disks s. The latter are driven by the flexible shafts w, coöperating by means of bevel-gearing k' and counter-shaft. The latter is provided with a pulley s', driven from the main shafting. From the bosses of the arms b horizontal arms extend carrying sliding weights g. The effect of these weights is to force the arms b in the direction toward each other, whereby the adjustable bolts n' are pressed against the levers v, which raise and lower the cutting-disks, determining the time during which the disk remains in contact with the work c' being cut. The levers v are mounted on the same pins as the arms b, but their bosses each carry a second arm c, so that arms $v\,c$ form a bell-crank lever. Rollers r are mounted at the extremities of the arms c, between which rollers a wedge k enters at intervals, so as to force the arms apart. The wedge k is located at the end of the double-armed lever m', which is drawn upon at d', Fig. 5. If the wedge k is raised, the arms c, and therefore also the arms v, will be forced apart, and the cutting-disks are removed from the work. The depth of cut is regulated by the stops p', Fig. 6, which are secured to the arms v and bear against the periphery of the work, the cutting-disks running between them. By turning the bolt n' the position of the cutting-disks relatively to the levers v and stops p can be varied. The wedge k is periodically raised and lowered by the shaft w', driven from the counter-shaft by means of the pinion t', gear-wheel r', and a cord passing round the grooved pulley x. This shaft w' is provided with suitable cams.

The work c' is carried by the support u, working up and down on the upright f'. The work is held in the support on a cork mandrel, which is connected with the work-rotating device, while the bottom of the inverted work—*e. g.*, tumbler—is pressed down on the mandrel by means of a spindle u'. The mandrel carries the ratchet-wheel l, the number of teeth of which is selected according to the number of facets to be cut on the tumbler. It will be noted that the latter during the whole period of working only has to make half a revolution. The upright f' is hollow, and the support u coöperates with a spindle in the interior of the upright. The lever z' is coupled to this spindle at one end, its opposite end being jointed to the rod a'. At the center of the lever z' is a roller running on a cam on the shaft w'. If the cam lifts the lever z', the work is likewise elevated and pushed between the disks s, which cut the facets required. If the cam allows the lever z' to sink, the work descends, the friction between support u and upright f' being overcome by a weight suspended by the chain g', Fig. 5. The work is rotated during this period by means of a cam e', Fig. 3, mounted on the shaft w'. The cam lifts a lever joint-

ed to the rod h, which reciprocates the horizontal spindle d in its bearings i'. The spindle d is provided with a pin i, engaging with one end of a bell-crank lever p, Fig. 2, the other arm of which lever p carries a pawl which engages in the teeth of the wheel l, so that the latter is advanced by one tooth at each rotation of the shaft w'.

One workman has to attend some six machines and cannot, therefore, always be present when the work on the machine is finished. The machines must therefore stop automatically, and this is done by uncoupling the shaft w', on which the cams e and e' are mounted and which is rotated by the toothed wheel t, Figs. 2 and 4. The cam e effects the up-and-down motion of the work, while the cam e' raises and sinks the cutting-disks.

Fig. 4 shows to a somewhat enlarged scale the parts which effect uncoupling of the shaft w' after a desired number of rotations. The toothed wheel t, which is rotated from the counter-shaft pulley s' by means of toothed gearing and cord-pulleys, is not mounted directly upon the shaft w', Figs. 1 and 2, but is carried by a disk q, keyed to the shaft w' and provided with a peripheral slot, in which engages the hook y of the pivoted arm z, which is secured to an arm of the wheel t. The hook y of the arm z is held in the slot of the disk q by means of a flat spring, and the shaft w' is rotated in the direction of the arrow 1 when the wheel t is set in rotation by the counter-shaft. The hook y therefore must be withdrawn from the slot as soon as the shaft w' has made the predetermined number of revolutions. For this purpose a ratchet-wheel n is mounted on a pin projecting from the frame of the machine, Figs. 1 and 2. The hub of this wheel is formed as a casing and contains a spring tending to turn the wheel n in the direction of the arrow 2, Fig. 4. At the other end of the said pin a double-armed lever o is loosely mounted, the horizontal arm of which rests on a small cam of the shaft w', so that at each rotation of the latter a cam b' lifts the one arm of the lever o through an angle of such extent that the other arm of this lever o by means of the pawl q', pivoted to it at x', Fig. 4, advances the wheel n farther in the direction of the arrow 3. In order that the wheel n may not spring back again owing to the spring already described, a double-armed lever a is provided on the main frame vertically above the shaft w', having a pawl v', which after the advance of the wheel by one tooth falls behind the latter. The pawl q' can now retreat each time in order at each revolution of the shaft w' to advance the wheel n by one tooth. When the shaft w' has made the desired number of revolutions, the wheel n has to effect disengagement. For this purpose a peripheral slot is provided in which a pin m, projecting from the wheel n, is located. When disengagement is required, the pin m has traveled so far that the slanting end h' of the arm z during the rotation of the wheel t strikes the pin m. This causes the hook y to be lifted from the notch in the disk q, and the wheel t now rotates farther without the disk q and shaft w'. When the tumbler has been removed and a new piece of work introduced, so that the machine has to be started again—*i. e.*, the shaft w' caused to rotate—it is only necessary to pull the handle of the lever a in the direction of the arrow 4. This will cause the pawl v', and thus also the pawl q' above it, to be raised out of the wheel n. The spring in the hub of the wheel n, which during the rotation of the work was gradually compressed, now comes into action and turns the wheel n backward until a pin d', secured to it and projecting rearwardly, strikes against a stop on the frame of the machine. The handle of the lever a must now be let go, and the machine commences to work again instantly, the hook y snapping into the notch in the periphery of the disk q. In order that the machine may thus be automatically stopped after a smaller number of revolutions of the shaft w', four holes are provided in the wheel n for the pin d', which can thus be adjusted as desired. Final adjustment is effected by sliding the pin m in the slot in the wheel n.

The above-described devices coöperate in such manner that the whole of the work is regulated by the shaft w'. When a tumbler has been finished and a second is to be set in the machine, the disks s are first drawn apart by turning over the lever h', so that the wedge k is lifted as high as possible and held in the position of rest. The counter-shaft during this time is not stopped, since the shaft w' is uncoupled by the automatic disengaging device. When the tumbler has been adjusted in the lowest position of the support u, the disks s must be gradually lowered upon it. The disks therefore engage first at the bottom of the tumbler. By slightly turning the lever a the shaft w' is now coupled with the wheel t, which is continually in rotation, being driven from the counter-shaft, whereupon the various cams come into action. The tumbler is first pushed upward a certain definite distance for the cutting of the facets. Immediately on reaching its highest position the cutting-disks are lifted, a small lever f, pivoted at q^2, being depressed by a cam on the shaft w', whereby at d' a pull is exercised which forces the wedge k between the rollers r. The cam now allows the tumbler, with its support, to descend into the lowest position, and during this time the pawl of the lever p engages with the ratchet-wheel l and rotates the work by the amount of one facet. Thus if the tumbler, *e. g.*, has twelve surfaces to be cut, the wheel l must be turned through six teeth distributed over one-half of the wheel. This operation of the machine will continue until all the facets are cut. The wheel n counts the number and disengages

the wheel *t* from the shaft *w'* immediately all the surfaces have been cut.

What I claim is—

1. A glass-cutting machine, comprising two oscillating bell-crank levers, a vertical cutting-disk carried by one arm of each of said levers, flexible shafts driving said disks, a wedge-headed lever engaging between the ends of the other arms of said bell-crank lever, a cam-shaft actuating said wedge-headed lever whereby the disks may be pressed apart, a vertically reciprocating and rotating work-holder, means actuated by said cam-shaft for rotating said work-holder, and clutch mechanism for throwing the cam-shaft out of gear on completion of the work, all substantially as described.

2. A glass-cutting machine, comprising two oscillating bell-crank levers, vertical cutting-disks carried by one arm of each of said levers, counterweighted oscillating lever-arms, devices carried by said arms for maintaining the proper distance between work and cutting-disks, flexible shafts driving said disks, a wedge-headed lever engaging between the ends of the other arms of said bell-crank lever, a cam-shaft actuating said wedge-headed lever whereby the disks may be pressed apart, a vertically reciprocating and rotating work-holder, means actuated by said cam-shaft for rotating said work-holder, and clutch mechanism for throwing the cam-shaft out of gear on completion of the work, all substantially as described.

3. A glass-cutting machine, comprising two oscillating bell-crank levers, vertical cutting-disks carried by one arm of each of said levers, counterweighted oscillating lever-arms, devices carried by said arms for maintaining the proper distance between work and cutting-disks, flexible shafts driving said disks, a wedge-headed lever engaging between the ends of the other arms of said bell-crank lever, a cam-shaft actuating said wedge-headed lever, whereby the disks may be pressed apart, a vertically reciprocating and rotating work-holder, means actuated by said cam-shaft for rotating said work-holder, consisting of a lever system operated by said cam-shaft, a horizontal sliding spindle actuated by said lever system, a pivoted bell-crank lever having a pawl-arm actuated by said spindle, and a ratchet-wheel on the tool-holder rotated by said pawl, and clutch mechanism for throwing the cam-shaft out of gear on completion of the work, all substantially as described.

4. A glass-cutting machine, comprising two oscillating bell-crank levers, vertical cutting-disks carried by one arm of each of said levers, counterweighted oscillating lever-arms, devices carried by said arms for maintaining the proper distance between work and cutting-disks, flexible shafts driving said disks, a wedge-headed lever engaging between the ends of the other arms of said bell-crank lever, a cam-shaft actuating said wedge-headed lever, whereby the disks may be pressed apart, a vertically reciprocating and rotating work-holder, means actuated by said cam-shaft for rotating said work-holder, consisting of a lever system operated by said cam-shaft, a horizontal sliding spindle actuated by said lever system, a pivoted bell-crank lever having a pawl-arm actuated by said spindle, and a ratchet-wheel on the tool-holder rotated by said pawl, and clutch mechanism for throwing the cam-shaft out of gear on completion of the work, comprising a toothed wheel, receiving its motion from the shafting, a notched disk keyed to the cam-shaft, a clutch-arm carried by the toothed wheel engaging in said notch, a ratchet-wheel pivoted to a stationary part of the framing, spring means tending to rotate said ratchet-wheel in a contrary direction to the direction of rotation of the toothed wheel, a bell-crank lever loosely mounted on the axis of said ratchet-wheel, one arm of which lever is actuated by the cam-shaft, a pawl carried by the other arm engaging in the ratchet-wheel teeth, a double-armed hand-lever carrying a pawl engaging in said ratchet-wheel below the first-mentioned pawl and a laterally-projecting pin on the ratchet-wheel which releases the clutch-arm on striking it, all substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

FRANZ ANTON HUBBUCH.

Witnesses:

GUSTAV SCHWEISS,

MARTHA L. BRITTAIN.