

H. C. WATSON.  
MACHINE FOR GRINDING GLASS.

APPLICATION FILED MAR 19, 1904.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.

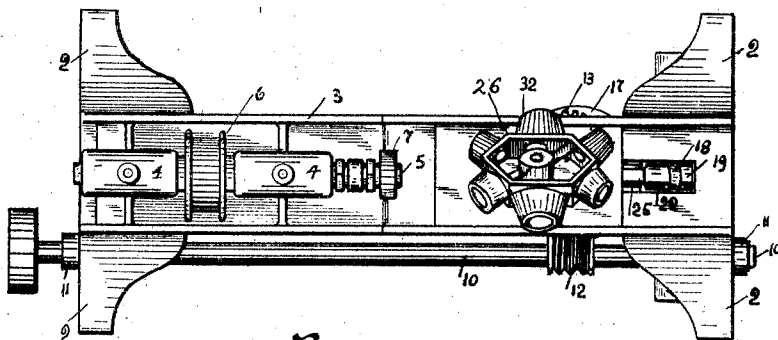
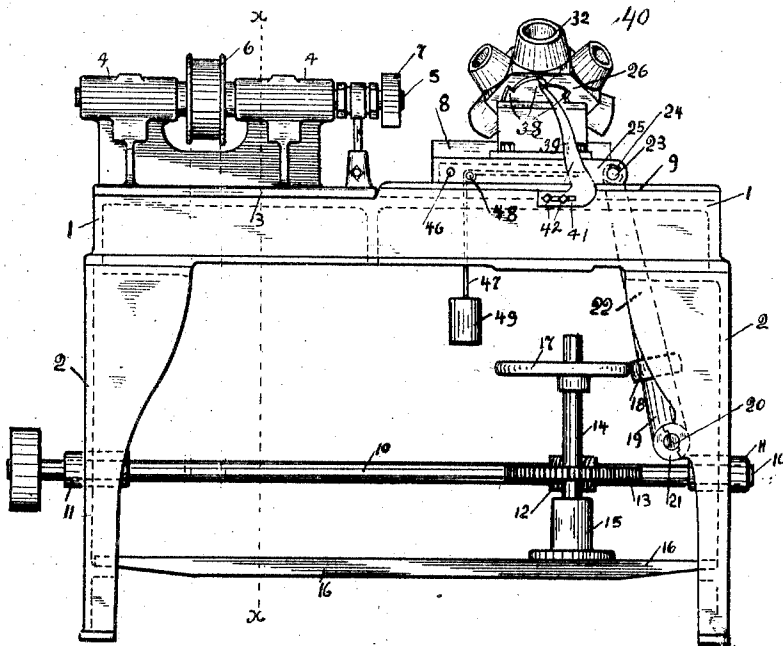


Fig. 4.

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No. 766,783.

PATENTED AUG. 2, 1904.

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3 SHEETS—SHEET 2.

Fig. 2.

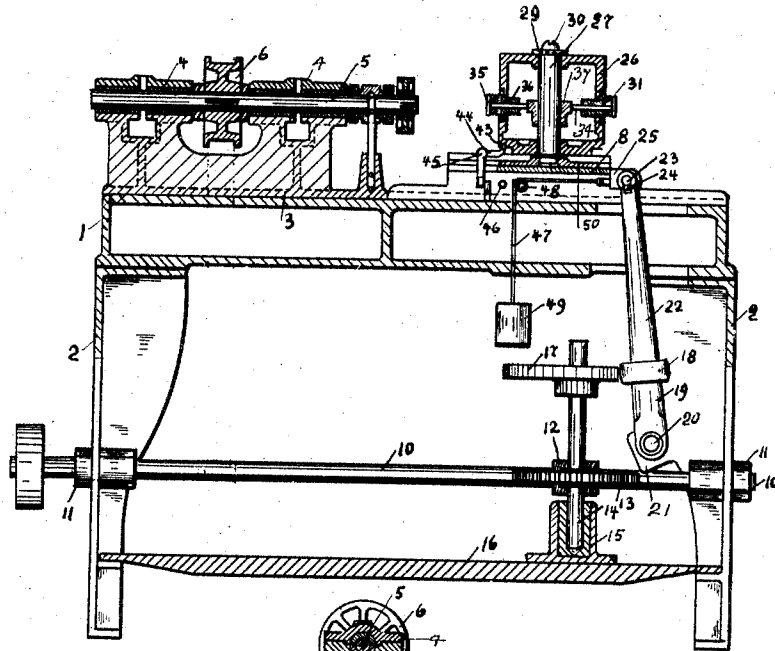
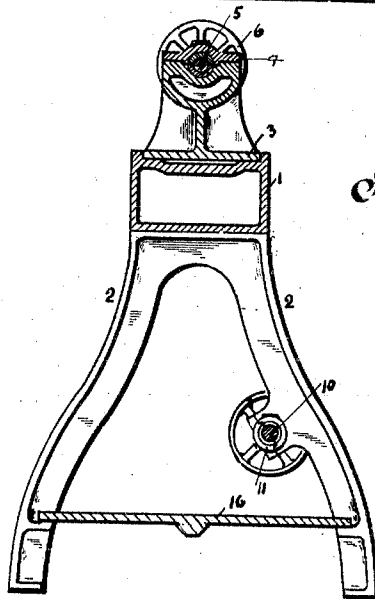


Fig. 3.



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3 SHEETS—SHEET 3.

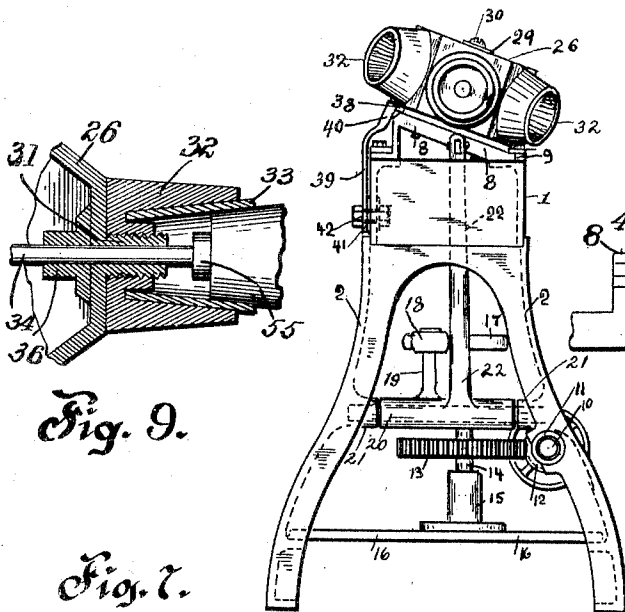


Fig. 9.

Fig. 7.

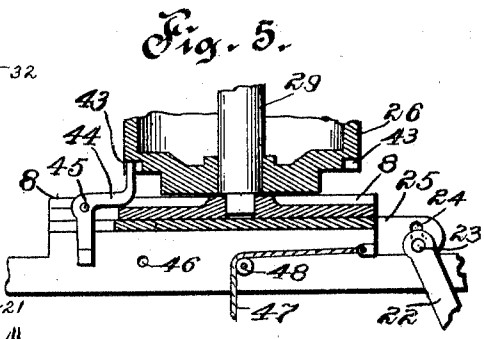
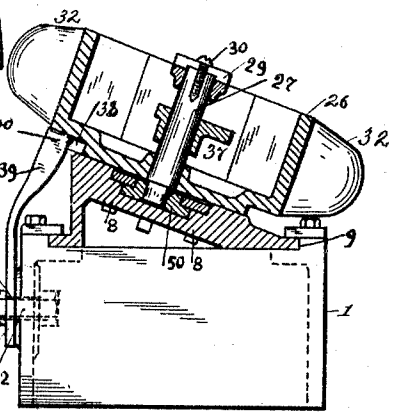
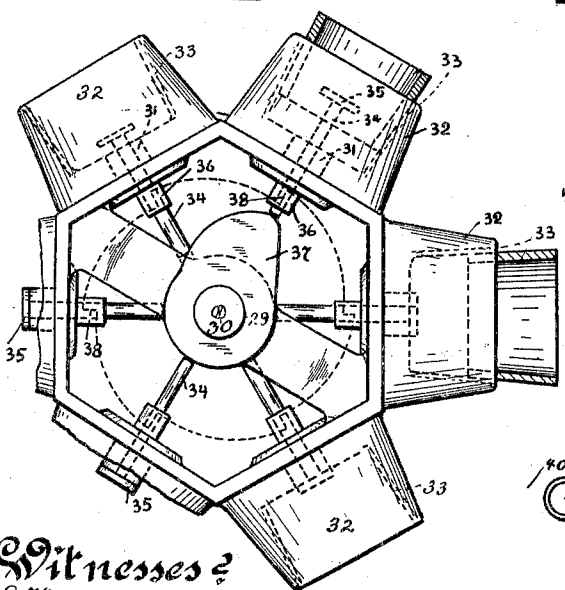


Fig. 5.

Fig. 8.

Fig. 6.



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# UNITED STATES PATENT OFFICE.

HARRY C. WATSON, OF ROCHESTER, PENNSYLVANIA, ASSIGNOR TO H. C. FRY GLASS COMPANY, OF ROCHESTER, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

## MACHINE FOR GRINDING GLASS.

SPECIFICATION forming part of Letters Patent No. 766,783, dated August 2, 1904.

Application filed March 19, 1904. Serial No. 198,971. (No model.)

*To all whom it may concern:*

Be it known that I, HARRY C. WATSON, a citizen of the United States of America, residing at Rochester, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Grinding Glass, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention has relation to machines for grinding glass, and relates in particular to machines for grinding the edges of tumblers.

The invention has for its object the provision of a machine of novel character which will automatically and successively present the tumblers to and press them against a grinding-wheel and remove them therefrom when the grinding operation has been completed and eject the tumblers from the machine in succession, so as to prepare the tumbler-holding chucks for the reception of unground tumblers.

The invention consists in the novel construction, combination, and arrangement of parts hereinafter described and claimed.

Referring to the accompanying drawings, Figure 1 is a side elevation of a glass-grinding machine constructed according to my invention. Fig. 2 is a vertical longitudinal sectional view of the same. Fig. 3 is a vertical cross-section on the line  $x x$  of Fig. 1. Fig. 4 is a top plan view of the machine. Fig. 5 is an end view of the same. Fig. 6 is a sectional view of the turret-head. Fig. 7 is a plan view thereof. Fig. 8 is a detail sectional elevation showing the locking means for the turret-head. Fig. 9 is a detail sectional view of one of the work-holding chucks.

In the drawings the same numerals designate like parts in the several figures, and 1 designates the bed of the machine, which is mounted on end standards 2, these parts being constructed substantially in the same manner as the bed and standard of a lathe.

Upon the bed 1 is mounted a head-stock 3, having journal-bearings 4, which receive a shaft 5, that is rotated by means of a pulley 6, said shaft carrying on its end the grinding-

wheel 7, the latter being of disk or other forms suitable for grinding the edges of tumblers and similar articles. Upon the bed 1 and in alinement with the head-stock 3 is arranged a sliding carriage 8, mounted in ways 9, said carriage moving in alinement with the shaft 5. A horizontal shaft 10 is journaled at 11 11 in the standards 2 2, and said shaft receives motion from any suitable source, preferably from the driving-shaft, from which motion is also communicated to the pulley 6 on the shaft 5.

The shaft 10 carries a worm 12, that turns a worm-wheel 13, carried on a vertical shaft 14, that is journaled in a bearing 15, supported by a cross-bar 16, extending between the standards 2 2. A cam 17 is fixed on the shaft 14, and the periphery of this cam contacts with a roller 18, journaled on a rocking arm 19, carried on a horizontal shaft 20, which has bearings in lugs 21, formed on one of the standards 2. A rocking lever 22 has one end fixed to the shaft 20 and has a wrist-pin 23, that works in a slot 24, formed in a bracket 25, that projects from the rear of the sliding carriage 8. The top of the carriage 8 is inclined at an angle to the horizontal top of the bed 1, and on said carriage is mounted a turret-head 26, which is supported on a fixed shaft 27, mounted on the carriage 8, being retained in position on the shaft by a washer 29 and screw 30. The turret-head 26 is provided with screw-threaded bosses 31, disposed radially at equidistant points around the outside of the turret-head, these bosses serving to support chucks 32, which are of the character usually used in glass-grinding apparatus, being composed of a single block with a tapering central opening that is lined with cork or other suitable material 33. The bosses 31 are pierced for the reception of ejector-rods 34, which carry heads 35, that bear against the bottom of the tumblers in the chucks 32, and within the turret-head the ejector-rods 34 pass through collar 36, and the inner ends of the ejector-rods bear against a cam 37, fixed on the stationary shaft 27, so that as the turret-head revolves each ejector-rod will at a certain point in the rota-

tion of the turret-head be projected outwardly and will eject the tumbler from the chuck into which such ejector-rod projects. Each ejector-rod will be returned to its normal position by gravity as it reaches a position at the higher side of the carriage 8, and thus as the turret-head turns each ejector-rod will be successively pushed outwardly and be returned by gravity to its normal position.

The turret-head 26 is formed with a series of teeth 38, equal in number to the number of chucks carried by the turret-head, and an upwardly-projecting arm 39 carries a dog 40, which engages with the teeth 38, so that as the carriage is drawn backwardly by the lever 22 the turret will be caused to make a partial revolution, so as to bring the chucks thereon successively into alinement with the grinding-wheel. The arm 39 is slotted at 41 for the reception of bolts 42, that screw into the bed 1 and serve to hold the arm in any position to which it may be adjusted. Notches 43 are formed in the bottom of the turret-head at equidistant points, and these notches serve to receive the updrawn end of an L-shaped catch 44, which is pivoted at 45 in the sliding carriage 8, the depending leg of said catch striking a pin 46 when the carriage is moved backwardly, so as to draw the upturned end of the catch, with which it is engaged, out of the notch and permit the rotation of the turret-head by the dog 40.

The sliding carriage above described is connected by a cable 47, which runs over a pulley 48, to a weight 49, by means of which the carriage is impelled toward the grinding-wheel, and the parts being constructed and arranged as above described operate in the following manner: Motion is communicated from a suitable source to the shaft 5 through the pulley 6 and also to the shaft 10. The grinding-wheel 7 is thereby set in rapid motion, and the movement of the shaft 10 is communicated, through the worm 12 and worm-wheel 13, to the vertical shaft 14. The cam 17 revolving, as soon as the wider part of the cam's surface comes into contact with the roller 18 on the rocking arm 19 the sliding carriage is drawn backwardly through the movement of the rocking lever 22. The backward movement of the sliding carriage bringing one of the teeth 38 into contact with the dog 40 causes the turret-head to revolve and present a chuck toward the grinding-wheel, a tumbler being placed in each chuck as the same reaches its highest position in the revolution of the turret-head. The continuation of movement of the cam 17 brings the narrower part of the cam-surface into engagement with the roller 19, and the carriage and turret-head are impelled toward the grinding-wheel by the weight 49. When the tumbler in the chuck which is presented to the grinding-wheel contacts with the grinding-wheel, the roller 18 then riding on that portion of

the periphery of the cam-wheel 17 which is concentric with the shaft, the sliding carriage will remain stationary until the grinding has been completed, the turret being held in fixed position and prevented from rotating while in this position by the engagement of the catch 43 with one of the notches in the bottom of the turret-head. The continuation of movement of the cam-wheel 17 again brings the wider part of the cam-wheel into engagement with the roller 18, whereupon the sliding carriage 8 is again moved backwardly, being rotated as before by the engagement of the dog 40 with one of the teeth 38.

As the carriage moves backwardly the catch 43 strikes the pin 46 and releases the catch from engagement with the turret-head. As the turret-head revolves the ejector in the chuck which has been last presented to the grinding-wheel is pushed out by the stationary cam 37 and the tumbler in that chuck is unseated, and by reason of the inclined position of the turret-head the tumbler falls into a suitable receptacle. Meanwhile tumblers have been placed in position in the chucks at the upper side of the turret-head, the ejectors having fallen back to their normal positions, and the operation above described is continued unintermittently.

Provision is made for grinding tumblers of different height by adjustably mounting the turret-head on the carriage by means of a movable plate 50, that carries the shaft 27, on which the turret-head revolves, and by adjusting the arm 39, which carries the dog 40.

Having described my invention, I claim—

1. In a machine of the type described, the combination of a rotary grinding-wheel, a movable turret-head, chucks mounted on said turret-head, a sliding carriage on which said turret-head is mounted and means for automatically moving said carriage and automatically rotating said head.

2. In a machine of the type described, the combination of a rotary grinding device and sliding carriage, a rotary turret-head mounted on an inclined axle on said carriage, and means for moving said carriage and rotating said turret-head.

3. In a machine of the type described, the combination of a rotary grinding-wheel and sliding carriage, means for moving said carriage, a turret-head mounted on the carriage, chucks carried by said turret-head, and means for ejecting the articles from the chucks after the articles have been ground.

4. In a machine of the type described, the combination of a rotary grinding-wheel, means for rotating said wheel, and sliding carriage, a turret-head mounted on said carriage, means for automatically moving said carriage toward and from said grinding-wheel, means for automatically rotating the turret-head, chucks carried by said head, ejectors arranged in said chucks, and means for automatically

operating said ejectors successively at one position of the turret-head.

5 In a device of the character described, the combination of head-stock and grinding-wheel  
rotatively mounted on said head-stock, a slid-  
ing carriage, a turret-head mounted on said  
carriage, a horizontal shaft, a worm carried  
by said shaft, a vertical shaft, a worm-wheel  
carried by said vertical shaft and engaging  
10 said worm, a cam carried by said vertical

shaft, a rocking arm engaging said cam, a horizontal shaft on which said rocking arm is fixed, and a rocking lever carried by rocking-arm shaft and connected to the said sliding carriage.

In testimony whereof I affix my signature in 15  
the presence of two witnesses.

HARRY C. WATSON.

Witnesses:

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