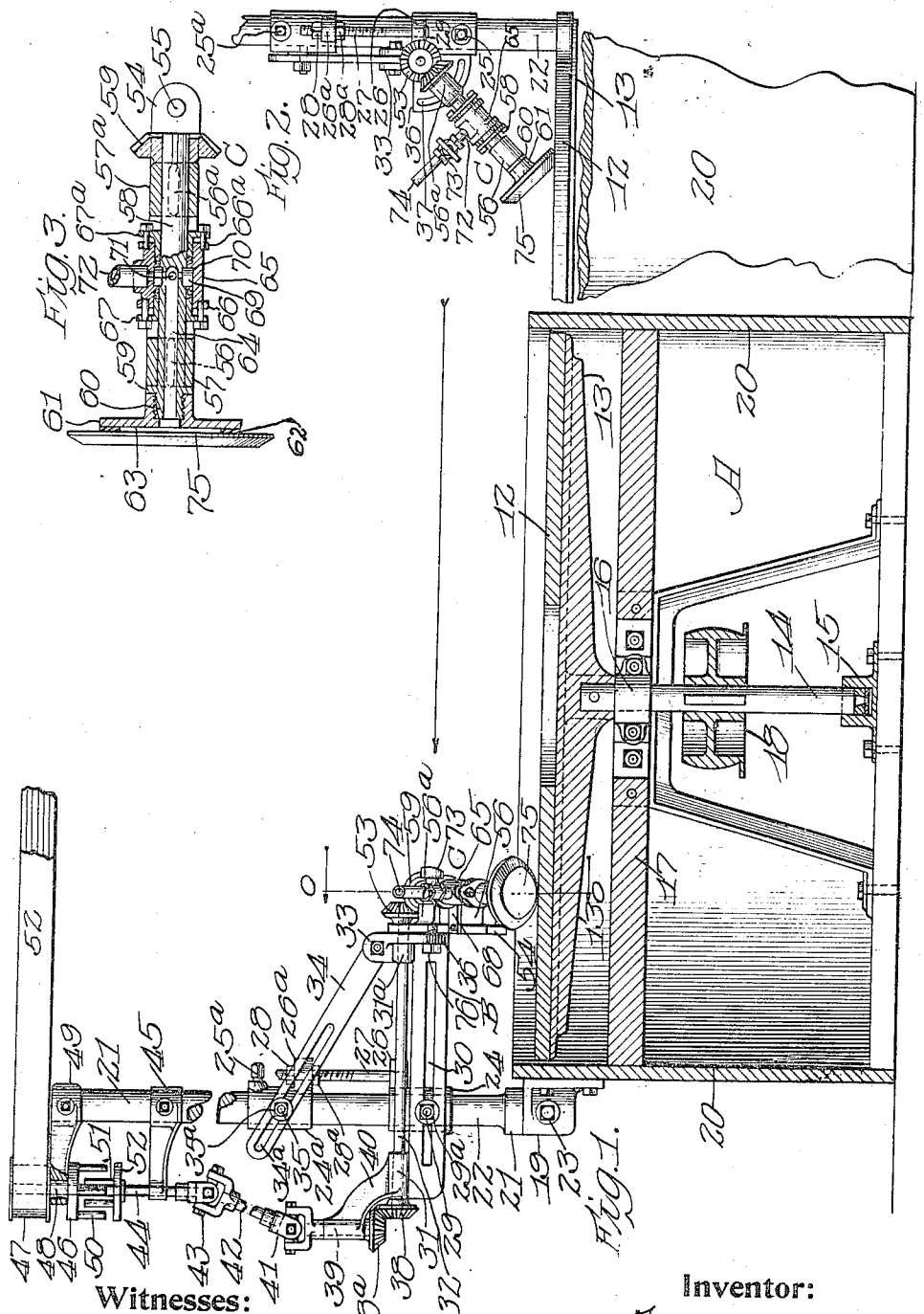
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GLASS GRINDING MACHINE.

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UNITED STATES PATENT OFFICE.

AUGUST W. HORNIG, OF CHICAGO, ILLINOIS.

GLASS-GRINDING MACHINE.

1,075,714. Specification of Letters Patent. Patented Oct. 14, 1913.

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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 the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Glass-Grinding Machines; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying sheet of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has general reference to improvements in glass grinding machines, and it is especially designed for grinding the peripheries or faces of glass disks and for the beveling of the edges thereof.

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, this said invention being an improvement on a similar machine patented by me in the United States on Sept. 13, 1910, No. 969,871.

In the drawings already referred to, which serve to illustrate my said invention more fully, Figure 1 is an elevation of my device, certain parts being shown in section. Fig. 2 is an elevation of a fragment of the same, said elevation being taken in the direction of the arrow pointer in Fig. 1. Fig. 3 is a section of a detail of construction in line O O of Fig. 1, also taken in the direction of the above mentioned arrow pointer.

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

A in the drawing designates what is technically known as a "rub-bed." It comprises a circular, preferably cast iron disk 12, of suitable diameter and thickness, which is mounted upon a spider 13. This spider is affixed to the upper end of a vertically disposed shaft 14, revolving in a step bearing 15 at its lower end and a suitable journal box 16, near its upper extremity, the latter bearing being secured to a cross timber or other suitable member 17. Said shaft 14 is rotated by a pulley 18 and suitable belting, (not shown) or by any other of the several well known means of power transmission. Such rub-beds are in general use in establishments engaged in the grinding and polishing of glass, granite, marble, and other analogous materials in slabs or plates, which materials are placed upon the upper surface of the revolving disk 12, anchored there against movement, and, when necessary, weighted down. Water and sand applied to the surface of the disk, form, in general, the abrasive for the grinding or polishing operation.

In order to enable a rub-bed such as described to be successfully used for grinding the peripheral edges of glass disks, beveling the same, and also grinding or polishing the faces thereof, I have invented the mechanism hereinafter described, which devices may be readily attached to and removed from the usual rub-bed. This mechanism comprises first a bracket 19, pro erly secured to a casing 20 surrounding the rub-bed, said bracket being designed to support a vertically disposed post 22, which post has an integral collar 21, near its lower end, adapted to bear against the upper surface of bracket 19. A set screw 23 is provided in said bracket to secure said post in position, and, by partially withdrawing said set screw screw, said post 22 may be rotated about its axis. There is mounted on post 22, at a distance above the revolving disk 12, a slidable sleeve 24, held in position by a set screw 25. A suitable distance above this sleeve, on post 22, is likewise mounted a similar slidable sleeve 24^a which is maintained in place by a set screw 25^a, or other equivalent or analogous means. The said sleeves 24 and 24^a have projecting lugs 26 and 26^a, respectively, the former perpendicularly drilled and tapped for the reception of an adjusting rod 27, and the latter drilled sufficiently large for the free passage therethrough of said rod. On this rod, bearing upon the upper and under surfaces of the lug 26^a, are located nuts 28 and 28^a. Said rod 27 is threaded through the lower lug 26 and riveted over on the lower surface thereof, as seen at 29, Fig. 2, to prevent its rotation. The object of this construction is to permit of minute vertical adjustment of sleeve 24 by first fixing sleeve 24^a in positive position by set screw 25^a, and then manipulating the adjusting nuts 28 and 28^a in the proper direction. Sleeve 24 is possessed of a horizontal, outwardly extending stud 29, which stud is

engaged in a horizontal, longitudinally extending slot 30 in a radial arm B, hereinafter described. Over stud 29 is fitted a nut and washer 29ª, the function of which is to firmly clamp said arm B to the sleeve 24. Stud 29 also serves as a pivot about which the arm B may be rotated in a vertical plane, and, when nut 29ª is slacked off sufficiently, the said radial arm may be moved toward or away from the center of the grinding disk 12, in a manner readily comprehended.

The radial arm B has along its upper edge, at the outer and inner ends thereof, journal boxes 31 and 31ª for the reception of a horizontal shaft 32. Superimposed upon and formed integrally with journal box 31ª, is a fork end 33, between the open jaws of which there is pivotally fastened a brace bar 34. Said bar has a longitudinal slot 34ª at its opposite end, which is designed to engage stud 35 on the sleeve 24ª, whereby said bar may be clamped to said sleeve by nut and washer 35ª. This brace bar 34 is intended as a stiffening brace to maintain the inner end of radial bar B in any position to which it may be adjusted.

At the inner end of radial bar B is integrally formed in the process of casting, an arcuate lug 36, the face of which is in a perpendicular plane disposed at right angles to the length of said bar. This lug is provided with an arcuate through slot 37, the radius of which is struck from the axis of the shaft 32 hereinbefore described. The outer end of said shaft 32, exterior to journal box 31, is provided with a miter gear 38, which meshes into a like gear 38ª fixed to an upright shaft 39, which shaft is journaled in a vertical bracket 40, formed integral with the radial arm B. Shaft 39 has at its upper or free end a universal coupling 41, the opposite half of which is affixed to a substantially vertical tumbling shaft 42. At the upper end of last named shaft is located a similar universal coupling 43, which connects with an upright shaft 44. This shaft has bearing in a bracket 45, extending from upright post 22, and extends upwardly through a clutch disk 46, pulley 47, and integral connecting sleeve 48, the latter of which is journaled in a bracket 49 projecting from the upper end of post 22. Employing this mode of construction, it will be observed that shaft 44 has a long journal bearing at its upper end, and at the same time assists in imparting ample guidance to the clutch disk 46, pulley 47 and connecting sleeve 48.

Depending from the face and arranged concentric with the periphery of the clutch disk 46, are a series of equidistantly spaced clutch pins 50, which pins are adapted to engage with like, upwardly projecting pins 51 on a similar clutch disk 52, fastened on the shaft 44. The relative location of disk 52 on said shaft is such that when the inner end of the radial arm B is raised sufficiently for purposes hereinafter described, the said disk, by reason of the pivotal stud 29 on sleeve 24 and the other intervening mechanism, will be depressed until the pins 51 are out of engagement with the pins 50.

The inner end of shaft 32, on radial arm B, extends beyond the face of the arcuate lug 36 and has there pivoted around its periphery, a swiveling arm C, outside of which there is keyed on said shaft a miter gear 53. Swiveling arm C comprises a longitudinal base plate 54, held in proper angular position against arcuate lug 36 by a cap screw 76. Said base plate has at one end a circular aperture 55, which is adapted to fit over shaft 32, as hereinbefore mentioned. It has, in addition, two upstanding posts 56 and 56ª which terminate in longitudinally disposed upper and lower journal boxes 57 and 57ª, which bearings are for the reception of a chucking shaft 58. Said shaft has at its upper end, exterior of journal box 57ª, a miter gear 59 which meshes with like gear 53 on shaft 32 of the radial arm B. At its lower end, adjacent box 57, said shaft has an integral collar 59, Fig. 3, and exteriorly of that, a threaded nose 60, for the reception of a holding chuck 61. On the outer face of this chuck there is glued a soft rubber, annular gasket 62, the periphery of which is equal to the outside diameter of the chuck 61, thereby leaving on the interior of said gasket a circular chamber 63, which chamber is in communication with an axial, circular hole 64 in the shaft 58. This core extends only partially of the length of shaft 58, as seen in Fig. 3.

Medially between the journals 57 and 57ª of the swivel arm C, and embracing shaft 58, there is located a sleeve 65 which is provided with a stuffing box 66 and 66ª and a gland 67 and 67ª at each end, which stuffing boxes are properly packed with suitable rubber or asbestos packing to render the same air tight. The exterior of said sleeve 65 has a lateral lug 68, Fig. 1, which is fastened to the base plate 54, to prevent rotation of said sleeve when shaft 58 is revolved. Formed in the interior wall of sleeve 65, about medially of its length is an annular groove 69, Fig. 3, registering with a similar groove 70 turned in the periphery of shaft 58. This groove has communication with the interior core 64 of shaft 58 by means of a series of radial apertures 71. Groove 69 of the sleeve 65 communicates with the exterior by a short pipe nipple 72, at the free end of which is attached a commercial type of stop-cock 73. At its free end this stop stock is fitted with a short length of standard iron pipe 74, it being understood that when the stop cock is turned off, a small air vent to the atmosphere is opened. To the outer end of the

pipe 74 is attached a flexible hose (not shown) which leads to an air exhausting line, or, to one of the many types of air exhausting pumps now on the market.

Assuming that a glass disk 75 has been placed in position against the face of the gasket 62 on the face of the chuck 61, and the stop cock 73 turned into open position, the continuous operation of an air exhausting pump as described above, will at once create a partial vacuum in the chamber 63 of the chuck 61 and tenaciously retain the glass disk against said gasket. When it is desired to release the glass disk, all that is necessary is to turn the stop cock 73 to the closed position, when the air vent therein will be placed in communication with the interior of shaft 58 and the chamber 63, thereby destroying the partial vacuum and permitting the removal of the glass disk.

I wish now to call attention to the fact that a series of my grinding devices may be arranged around a casing 20, surrounding the revolving grinding disk 12. The first of these devices may have the swivel arm C arranged in a horizontal plane to grind the disk into true circular form; the second device may have its radial arm swung slightly more inwardly to present a new rubbing path on the disk 12, with its swivel arm set at angle of 45 degrees, so as to bevel the edge of the periphery of the disk; and the third device may have its radial arm swung still farther inwardly, with the swivel arm set in a perpendicular plane, so as to grind or polish the face of its particular disk, so that one operator may have charge of all the progressive operations. In practice I shall provide each rubbing bed with such or similar series of devices, leading the air exhausting tubes to a common exhaust line located near the ceiling of the room. This line is, naturally, in constant *vacuo*. When the operation on one of the disks is completed, the operator simply slacks off on nuts 29^a and 35^a and swings radial arm B upwardly a sufficient distance to disengage the clutch pins 51 from the like pins 50, thereby stopping the revolution of the disk 75. He then closes stop cock 73, removes the glass disk from chuck 61, places a succeeding disk in position, turns on the stop cock 73, and replaces the arm B in its operative position.

It is evident that by the adjustments provided for the radial arm B and swivel arm C any diameter of disk within the range of the device may be trued up, and that any desired degree of bevel may be ground.

Herein I have described the preferred mode of carrying my invention into effect, but I wish it understood that I may make changes in the details thereof without departing from the spirit or scope of the invention.

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

1. In a glass grinding machine, a rubbing bed and casing therefor, an upstanding post on said casing, an arm on said post reaching in over said rubbing bed, a shaft on said arm extending the length thereof and parallel thereto, a swiveling arm pivoted on the inner, free end of said shaft, and adjustably held at the free end of said first named arm, a shaft in said swiveling arm, bevel gears on both of said shafts meshing into each other, means for rotating said first named shaft, a chuck on the free end of the shaft in said swiveling arm, and means for establishing a partial vacuum between said chuck and a plane surface placed thereagainst.

2. In a glass grinding machine, a rubbing bed and casing therefor, an upstanding post on said casing, an arm on said post reaching in over said rubbing bed, a swiveling arm at the free end of said first named arm and maintained in adjustable relationship thereagainst, a shaft mounted longitudinally of said swiveling arm, there being an interior longitudinal channel within said shaft for a portion of its length and radial openings therefrom to the exterior of said shaft, a hollow sleeve having stuffing boxes at both ends encircling said shaft, there being a chamber within said sleeve registering with said openings, a pipe communicating with said chamber, a stop cock on said pipe, a chuck at the lower end of said shaft, and means for rotating said shaft.

3. In a glass grinding machine, a rubbing bed and casing therefor, an upstanding post on said casing, an arm on said post reaching in over said rubbing bed, means on said post adapted for vertical adjustment of said arm, a shaft on said arm extending the length thereof and parallel thereto, a swiveling arm pivoted on the inner, free end of said shaft, and adjustably held at the free end of said first named arm, a shaft in said swiveling arm, bevel gears on both of said shafts meshing into each other, means for rotating said first named shaft, a chuck on the free end of the shaft in said swiveling arm, and means for establishing a partial vacuum between said chuck and a plane surface placed thereagainst.

4. In a glass grinding machine, a rubbing bed and casing therefor, an upstanding post on said casing, a sleeve on said post, means for vertically adjusting said sleeve, a longitudinally slotted arm held in adjustable contact with said sleeve, said arm reaching in over said rubbing bed, means for adjustably bracing the free end of said arm against said adjusting means, a shaft on said arm extending the length thereof and parallel thereto, a swiveling arm pivoted on the inner, free end of said shaft, and adjustably held at the

free end of said first named arm, a shaft in said swiveling arm, bevel gears on both of said shafts meshing into each other, means for rotating said first named shaft, a chuck on the free end of the shaft in said swiveling arm, and means for establishing a partial vacuum between said chuck and a plane surface placed thereagainst.

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

AUGUST W. HORNIG.

In the presence of—
W. HARDING,
WILLIAM O. STARK.