Aug. 14, 1928. 1,680,920

K. A. WEBER

GLASS GRINDING MACHINE

Filed April 6, 1925 2 Sheets-Sheet 1

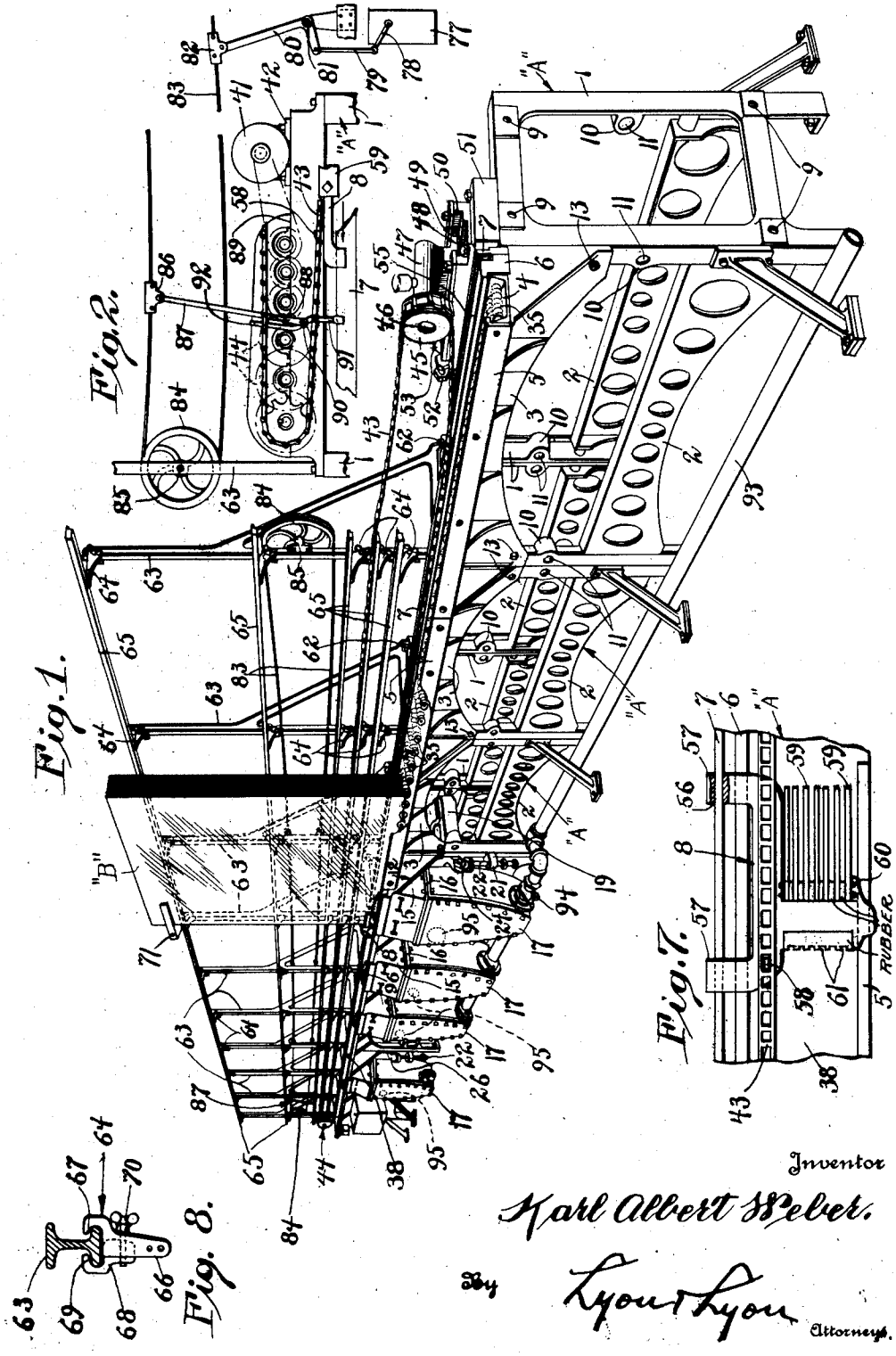


Fig. 1.

Fig. 2.

Fig. 7.

Fig. 8.

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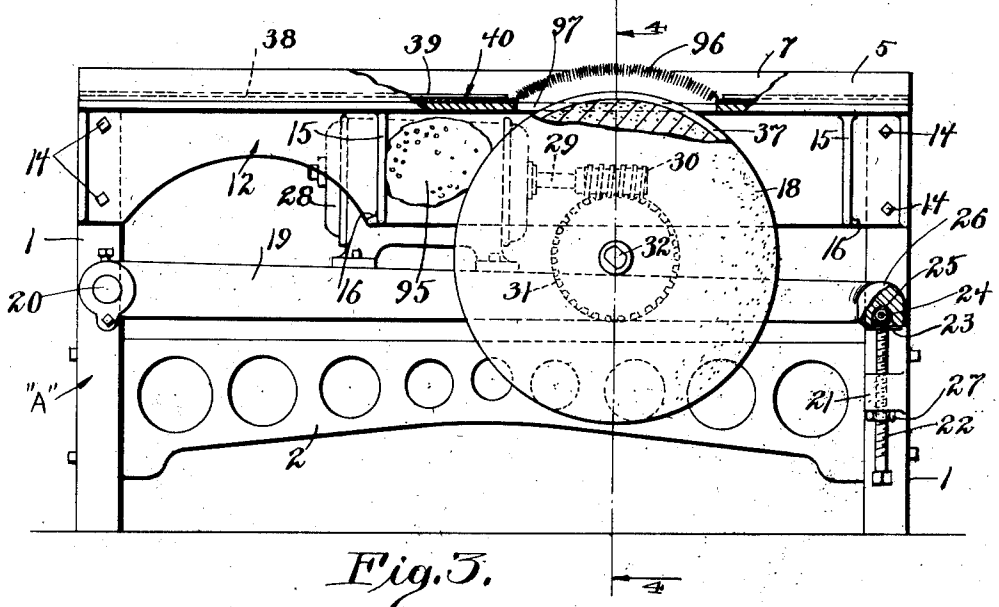


Fig. 3.

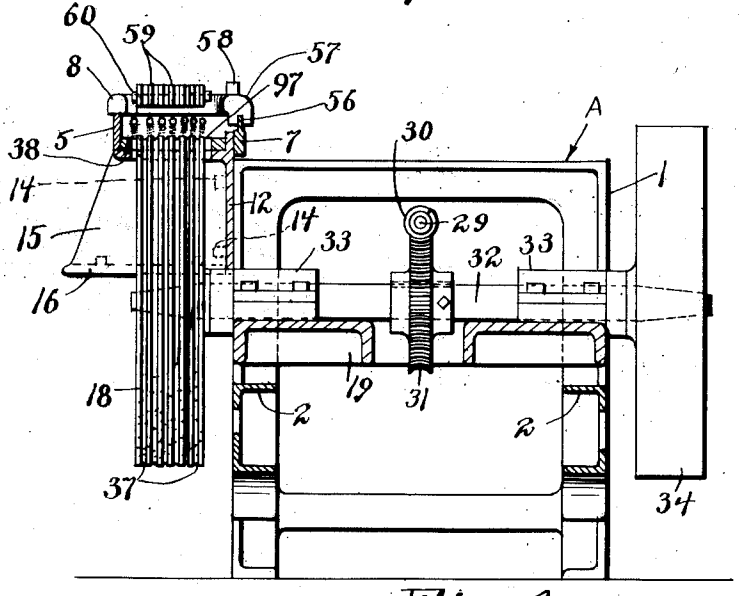


Fig. 4.

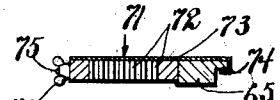


Fig. 9.

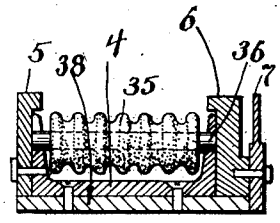


Fig. 6.

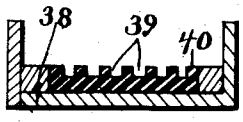


Fig. 5.

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Patented Aug. 14, 1928. 1,680,920

UNITED STATES PATENT OFFICE.

KARL ALBERT WEBER, OF LOS ANGELES, CALIFORNIA.

GLASS-GRINDING MACHINE.

Application filed April 6, 1925. Serial No. 20,986.

This invention relates to glass grinding machines and is more particularly directed to an improvement in glass grinding machines as is illustrated in my copending application Serial Number 700,055, filed March 18, 1924. In this specification the term "glass" is used in its generic sense to designate glass and substances of similar characteristics.

An object of this invention is primarily to provide a means for guiding the glass over the glass-supporting table while the same is being ground and polished.

Another object of this invention is to provide a glass grinding machine constructed of unit sections so that the sections may be used in any combination desired or so that the sections may be added to or taken from as the work requires.

An object of this invention is to provide an approach to the glass-supporting table upon which the glass is supported during the grinding and polishing operations, over which the glass is easily conveyed, and which will without resistance guide the plate of glass into the grooves formed in the supporting table.

Another object of this invention is to provide a simple, durable and comparatively inexpensive construction of glass grinding machine that is efficient in operation and inexpensive in maintenance.

Other objects and advantages of this invention will be apparent from the following detailed description of a preferred embodiment thereof as illustrated in the accompanying drawings.

In the drawings:

Fig. 1 is a perspective front elevation of a glass grinding machine embodying this invention.

Fig. 2 is a fragmental side elevation thereof, illustrating the drive mechanism and a form of automatic trip switch for preventing the carrying of the glass beyond the end of the supporting table.

Fig. 3 is a front elevation of a single unit of glass grinding machine illustrating a worm drive for driving the grinding or polishing wheel, and illustrating the supporting table side rail as partly broken away, and illustrating, partly in section, a form of adjustable supports formed in the grinding or polishing wheel.

Fig. 4 is a sectional end elevation taken substantially on the line 4—4 of Fig. 3.

Fig. 5 is a sectional end elevation of the glass-supporting runway embodied in this invention, illustrating the grooves formed therein.

Fig. 6 is a sectional end elevation of the approach runway, illustrating the manner of mounting the grooved rollers embodied in this invention.

Fig. 7 is a fragmental top plan view illustrating the pusher or guide blocks embodied in this invention.

Fig. 8 is a top plan view illustrating a manner of adjustably mounting the guide rails embodied in this invention.

Fig. 9 is an end elevation of a guide block embodied in this invention, illustrating the same as in position to travel along one of the guide rails.

In the preferred embodiment of this invention shown in the drawings, A designates a unit frame construction composed of end members 1 connected by the longitudinally extending braces 2 to which frame members 1 runway supports 3 are secured and to which front runway supports 3 channel irons 4 are secured and to which channel irons 4 the guide rails 5 and 6 are secured and to which guide rails 6 a longitudinal steel guide plate 7 is secured along which pusher blocks 8 are slid as will hereinafter be described.

The units A are secured together by means of bolts which pass through bolt holes 9 formed in the upper and lower transverses of the end frame 1. These end frames 1 are cast and have cast integral therewith bosses 10 having core holes 11.

Referring now to Fig. 3, it will be observed that the front support 12 is of a different construction than the support plate 3. Either the support plate 3 or the front plate 12 is secured to the end frame members 1 by means of bolts 13 and 14, respectively, so that it is a simple matter to change the plate 3 for the plate 12. The plate 12 is cast with outwardly extending ribs 15 having flanges 16 at their lower edge of which housings 17 are secured and in which housings 17 the polishing or grinding wheel 18 is operated so that by either changing the plate 12 or the plate 3 the sections A may be converted into grinding or polishing sec-

tions, or it is a simple matter to insert, where desired, a section A by merely loosening the bolts 13 or 14, or it may be desired to change the position of one of the grinding or polishing sections or to add a section or to add a section of approach or runway, and by this method of unit construction it will be obvious that the same could be easily accomplished.

In the sections A, which are used for grinding or polishing wheels, a subframe 19 is mounted on a shaft 20 extending through the core holes 11 hereinbefore referred to. The subframe 19 is adjustably supported at its opposite end so that the height or position of the grinding or polishing elements 18 may be accurately and closely regulated. The preferred means for accomplishing this adjustment are a boss 21 which is secured to one of the frames 1 and a screw 22 which is screw threaded therethrough.

A hardened steel plate 23 is secured to the upper end of the screw 22 and a hardened steel ball 24 is mounted in a seat 25 formed in the outwardly extending arm 26 of the frame 19 so that the lower surface of the ball 24 rests upon the plate 23 and by turning the screw 22 the position of the element 18 may be regulated. A lock nut 27 is provided for locking this adjustment.

Mounted on the frame 19 is a motor 28, which motor 28 is connected to a drive shaft 29 to which the worm 30 is secured. The worm 30 meshes with the worm gear 31 mounted upon the shaft 32 which shaft 32 is journaled in bearings 33 mounted upon the frame 19. Secured to one end of the shaft 32 is the grinding or polishing element 18, and there may be mounted on the other end of the shaft 32 a balancing wheel or flywheel 34 to insure even running of the element 18.

The approach runway illustrated in Fig. 1 as extending throughout the length of the first three sections A, is preferably of the following construction:

Mounted in the channel irons 4 are grooved rollers 35 on pins 36 so that the rollers 35 are free to move transversely of the approach runway so that when a plate of glass B is set upon the approach runway, the rollers 35 will automatically adjust themselves in position. The grinding and polishing elements 18 are preferably grooved, as illustrated at 37 and the supporting runway 38, over which and upon which the glass is supported during its travel, is grooved as illustrated at 39 so that the grooves 39 align with and form an extension of the grooves 37 formed in the elements 18. The mat 40, in which the grooves 39 are formed, is preferably constructed of rubber or a like soft resilient material. By this manner of approach runway, when the plates of glass B approach the grooves 39, the rollers 35 automatically shift their position to cause the glass to travel directly into the grooves 39 formed in the mat 40. This is an important feature, as it insures that the glass plates will at all times be guided directly into the grooves 37 of the grinding elements 18 and that the same when guided will be so accurately guided as not to cause them to be chipped or to be unevenly ground on either edge due to improper positioning of the glass in relation to the elements 18.

Means are provided for guiding the glass along the approach runway and along the runway 38 which means are preferably of the following construction:

A motor 41 is mounted upon the top of the last unit A as illustrated at 42 and drives a sprocket chain 43 through a plurality of reducing gears 44. The sprocket chain 43 passes over an idler roller 45 mounted upon the other end section A, the roller 45 being secured to a pin 46 which is journaled in a bearing indicated at 47. The bearing 47 is secured to a plate 48, the lower end 49 of which form tongues to ride in the grooves 50 formed in a frame 51 mounted upon the upper transverses of the end frame 1 of the end section A. A bolt 52 is screw threaded through an end frame member 53 and engages at its end the slide 48 so that by turning the screw 52 the position of the slide 48, and hence the tension in the sprocket chain 43, may be varied. The lower link of the sprocket chain 43 is supported upon the upper surface 55 of the guide rails 6.

The pusher block 8 slides on the guide rails 5 and 6, and is maintained in position by means of the hardened steel plate 7 which fits within slots 56 formed in the arms 57 thereof. A lug 58 is formed on the body of the member 8 in position to be engaged by the sprocket chain 43. The plates of glass are positioned within the space formed between the fingers 59 secured to the rearward edge of the body of the pusher 8 as illustrated at 60. The spaces 61 formed upon the forward end of the body of the pusher 8 are aligned with the spaces 59 and the edges of the plate of glass B on the forward gang of plates, fit into the slots.

Secured to the top of the end frames 1 of the units A, as illustrated at 62, are uprights 63, which uprights 63 are formed of rails and are adapted to receive supports 64 for the guide rails 65 which supports 64 are formed of arms 66 to which the rails 65 are secured and in which arms 66 grooves 67 are formed. A finger 68 having a complementary groove 69 is secured to the arm 66 by means of a thumb screw 70 as is illustrated in Fig. 8 so that by loosening the thumb screw 70 the position of any one of the guide rails 65 may be adjusted as is required by the size of the plates of glass B which it is desired to grind and polish.

Referring now to Fig. 9, the upper sup-

porting block 71 which slides upon the rails 65 has a plurality of fingers 72 between which spaces corresponding to the spaces 59 are provided. To the upper side of this guide block 71 a strip of metal 73 is secured, which strip of metal is bent over and under as illustrated at 74 so that the same will at all times be retained upon the guide rail 65 during the grinding and polishing operation. The fingers 72 of this block 71 are secured upon a pin 75 and are free to rotate upon the pin 75 when the thumb screw 76 is screwed therethrough so that any finger 72 may be rotated on the pin 75 when it is desired to remove a single plate of glass B after the same has been ground and polished.

In order to insure that the plates of glass B will not pass beyond the end of the runway 38, a trip switch is mounted at the end of the table, which switch is preferably of the following construction:

A switch box 77 is mounted upon one side of one of the units A, and the switch lever 78 is connected by means of a link 79 to a toggle link 80 which bellcrank 80 is pivoted to a support as illustrated at 81. The upper end of the bellcrank 80 is pivotally secured to a rope clamp 82 through which rope clamp 82 a rope or cable 83 is extended and which rope or cable 83 passes around pulley wheels 84 mounted upon the end rails 63 as illustrated at 85.

Secured to the upper end of the rope or cable 83 is a second cable clamp 86 to which clamp 86 a link 87 is connected. The link 87 has a transversely extending portion 88 journaled on the frame member 89 which supports the reducing gears 44.

A transversely extending portion 88 of the link 87 is bent downward beyond the end of the frame 89 and is provided with a pin 90 upon which pin a trip arm 91 is pivoted so that when the pusher block 8 strikes the arm 91, the upwardly extending portion 92 of this arm strikes the transverse portion 88 of the lever 87 and operates to pull the cord or cable 83 to open the switch 77, which switch 77 is mounted in series in the electric circuit which controls the motor 41.

The casing 17 for the polishing and grinding elements 18 is supplied with water through the pipe 93 connected to a source of water supply not shown. A guide valve 94 is mounted in the pipe line 93 to control the flow of water into the casing 17.

I have discovered that by the use of such a member as the sponge 95, mounted in each housing 17 as illustrated in Figs. 1 and 3, the amount of water that can be maintained in the casing 17 is greatly increased so that the grinding and polishing elements 18 will remain at all times cool and will not therefore be subjected to such great wear.

In order to prevent the water within the housing 17 from splashing upon the plates of glass B, a plurality of brushes 96 are mounted upon the runway 38 directly over the slot 97 through which the grinding or polishing elements 18 are projected, these brushes 96 being so mounted as to press against the sides of the plates of glass B when the same are conveyed over the grinding or polishing elements 18 in the grooves 37.

It will be apparent from the foregoing that I have provided a simple and inexpensive form of construction of a glass grinding machine embodying interchangeable units which is extremely well adapted to carry out its purpose.

Having fully described a preferred embodiment of this invention, it is to be understood that I do not wish to be limited to the exact details of constructions herein set forth, which may, obviously, be varied in detail without departing from the spirit of the appended claims.

I claim:

1. In a machine for grinding an edge of a plate of glass, the combination of a supporting runway, a grooved mat of resilient material secured on the runway for guiding and supporting the plate of glass on edge in substantially vertical position, means for maintaining the plate of glass in substantially vertical position, means for feeding the plate of glass longitudinally along the runway support, and grinding means located substantially on a level with the said supporting runway and onto which the plate of glass moves and by which it is partially supported on edge while being ground.

2. In a machine for grinding an edge of a plate of glass, the combination of a grooved grinding element, a grooved supporting runway upon which the plate of glass may be stood on edge in substantially vertical position, the said groove formed in the runway being aligned with the groove formed in the grinding element for guidingly supporting the said plate of glass in position aligned with the groove formed in the said grinding element, means for maintaining the plate of glass in said vertical position, means for feeding the plate of glass longitudinally along the supporting runway onto the said grinding element, said grinding element being adapted to support a portion of the weight of said plate of glass while it is being ground.

3. A machine for grinding the edge of a plate of glass comprising a grinding element, a supporting runway having a guide groove formed therein and in which guide groove the plate of glass is adapted to be supported on its edge in substantially vertical position, means for maintaining the plate of glass in said vertical position, means for feeding the plate of glass along the supporting runway, the upper periphery of said grinding means being located substantial-

ly on a level with the line of support formed by the said groove in the runway said grinding element being adapted to support a portion of the weight of said plate of glass while it is being ground.

4. In a machine for grinding an edge of a plate of glass, the combination of a supporting runway, a resilient mat mounted on the runway and having guide grooves formed therein for guidingly supporting a plate of glass on edge, an approach runway upon which the plate of glass is mounted on edge in a substantially vertical position on a plurality of grooved rollers having grooves adapted to align the plate of glass with the grooves formed in the said resilient mat, means for feeding the plate of glass longitudinally along the approach and support runways, and grinding means located substantially on the level with the line of support formed by the grooves in the runway and onto which the plate of glass moves and is partially supported on edge by, while being ground.

5. In a machine for grinding an edge of a plate of glass, the combintion of an approach runway upon which the plate of glass may be stood on edge in a substantially vertical position, said approach runway having a plurality of grooved rollers mounted on pins and movable axially in a direction transverse of the approach runway, a supporting runway having a resilient mat mounted thereon and which mat has a plurality of grooves formed therein for yieldingly guiding the substantially vertical faces of the plate of glass, means for feeding the plate of glass along the approach runway over the said grooved rollers so that the plate of glass is guided into one of the grooves formed in the said resilient mat, and grinding means located substantially on a level with said line of support and onto which the plate of glass moves and is partially supported on edge by, while being ground.

6. In a machine of the class described, the combination of a grinding or polishing element having a plurality of circumferential grooves formed therein, a glass plate supporting runway having a plurality of longitudinally extending grooves formed therein and adapted to align with the grooves formed in the polishing or grinding element, and an approach runway having means mounted therein for permitting a free travel of the glass plates therealong, and for aligning the glass plates with the grooves formed in the said supporting runway, and means for feeding the glass plates longitudinally on edge along the approach and support runways so that the said glass plates are first guided into the grooves formed in the supporting runway from the approach runway and so that the edges of the glass plates are yieldingly guided in the grooves formed in the supporting runway into the grooves formed in the grinding or polishing element, which grinding or polishing element is located substantially on the level with the line of support formed by the grooves in the supporting runway and onto which the glass plates move and are partially supported on edge by, while being ground.

7. A machine for grinding an edge of a glass plate comprising means for supporting the glass plate on edge in substantially vertical position, means for guiding and maintaining the glass plate in such position, means for feeding the glass plate longitudinally along the said support and grinding means located substantially on a level with the line of support formed by the grooves in the runway and onto which the glass moves and by which the glass is supported on edge while being ground, and means at the delivery end of the said support adapted to engage the forward vertical edge of the said glass for arresting the said feeding means to stop the feeding of the glass along the support.

8. A machine for grinding the edge of a plate of glass, comprising a grinding element having a groove formed in its periphery, a supporting runway having a guiding groove formed therein, and in which guiding groove a plate of glass is adapted to be supported on its edge in substantially vertical position, the line of support formed by the groove in the runway and the groove in said grinding element being located substantially on a level, said grinding means being adapted to receive and partially support the weight of said plate of glass.

9. A machine for grinding edges of glass plates comprising an edging table having an opening provided intermediate its ends and channels provided in the upper surface of the table and extending throughout the length thereof, a rotatable grinding element formed with circumferentially extending grooves, mounted beneath the table at said opening and having its circumferential face intersecting a plane forming the upper surface of the edging table, and driving means for said grinding element.

10. In a machine for grinding edges of glass plates, the combination of an edging table having an opening intermediate its ends and a channel provided in the upper surface of the table leading to and from said opening, and a rotatable circumferentially grooved grinding element mounted beneath the table at said opening and having its circumferential face intersecting the plane of the bottom of said table channel.

Signed at Los Angeles, California, this 28th day of March 1925.

KARL ALBERT WEBER.