May 6, 1924. 1,493,346

W. D. KMENTT

ABRADING MACHINE

Filed June 17, 1922 2 Sheets-Sheet 1

Fig. 1

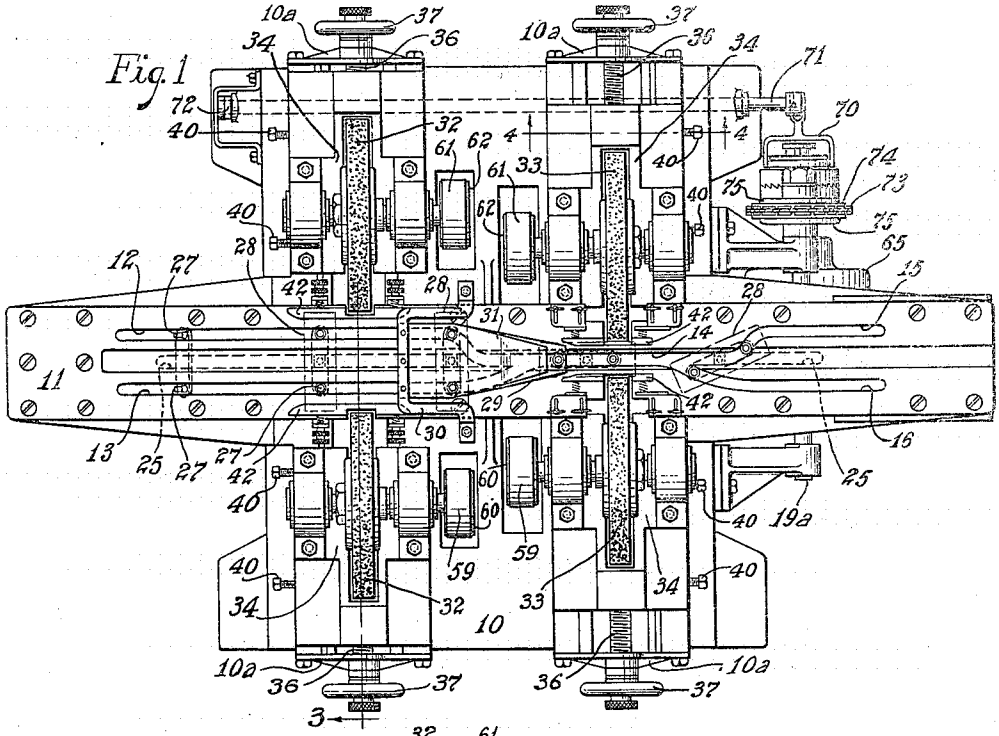
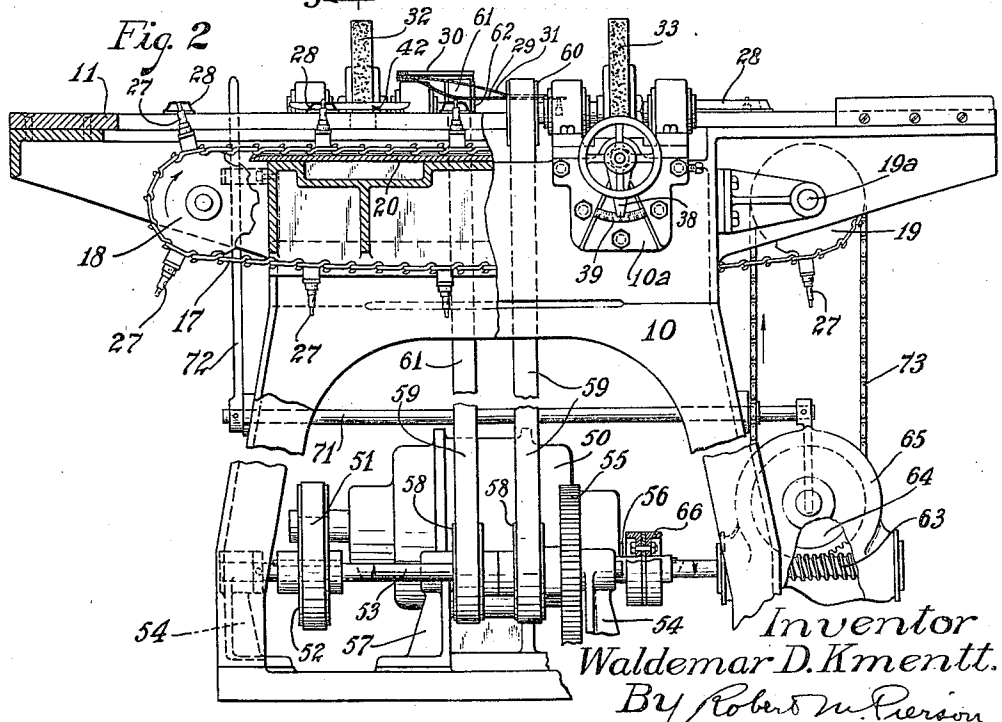


Fig. 2



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Fig. 3

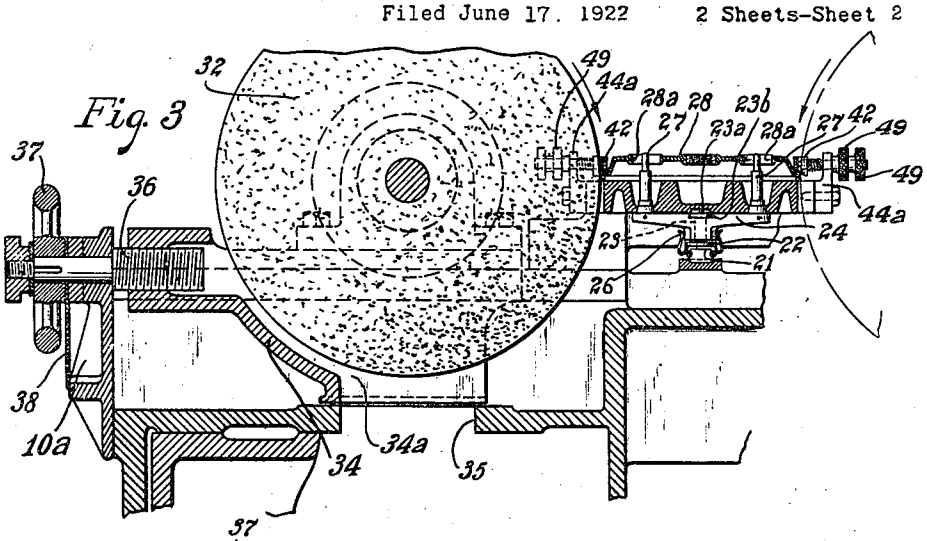


Fig. 4

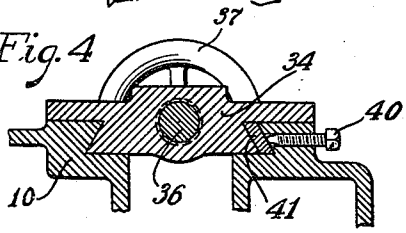


Fig. 5

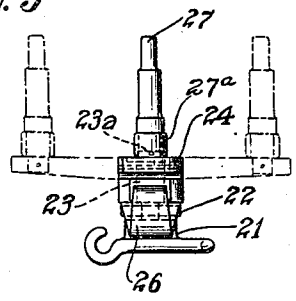


Fig. 6

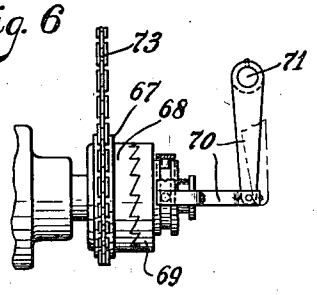
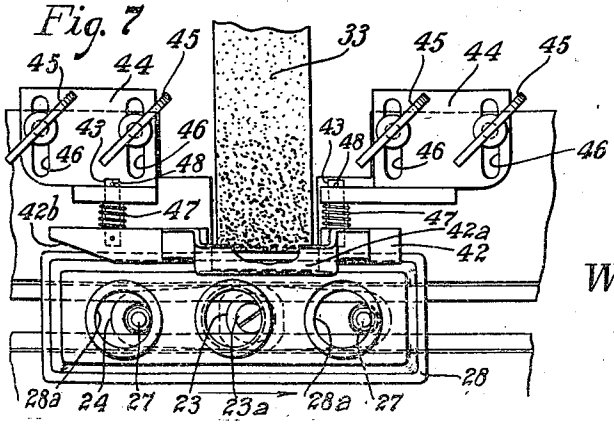


Fig. 7



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Patented May 6, 1924. 1,493,346

UNITED STATES PATENT OFFICE.

WALDEMAR D. KMENTT, OF AKRON, OHIO, ASSIGNOR TO THE B. F. GOODRICH COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ABRADING MACHINE.

Application filed June 17, 1922. Serial No. 569,046.

To all whom it may concern:

Be it known that I, WALDEMAR D. KMENTT, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Abrading Machine, of which the following is a specification.

This invention relates to abrading machines and especially to such as are adapted to carry an article along a predetermined path past an abrading member so as to abrade it to a determinate form or dimension.

My general object is to provide an improved, labor-saving machine of this character. More specific objects are to provide a simple, efficient and accurate machine adapted to abrade the several sides of an article, such as a battery jar cover, at one passage of the article therethrough, and to be readily adjusted for articles of different sizes.

Of the accompanying drawings:

Fig. 1 is a plan view of a machine embodying my invention.

Fig. 2 is a side elevation of the same, with parts broken away.

Fig. 3 is a section on line 3—3 of Fig. 1.

Fig. 4 is a section on line 4—4 of Fig. 1.

Fig. 5 is an elevation of a work-driving device.

Fig. 6 is an elevation of a drive-clutch for the work-driving mechanism, and parts associated therewith.

Fig. 7 is a fragmentary plan view, showing the work in abrading position.

Referring to the drawings, 10 is a frame supporting a horizontal guide-plate 11 formed with a pair of longitudinal cam-slots 12, 13 (Fig. 1) said slots running together in the middle region of said plate to form a single or trunk slot 14, which latter branches into two slots 15, 16 toward the delivery end of the machine.

Under the guide plate 11 is an endless, work-propelling chain 17 (Fig. 2), mounted upon sprockets 18, 19 journaled on the frame 10, and 20 is a horizontal plate, preferably of brass or other non-friction metal, said plate being mounted upon the frame 10 directly under and parallel with the guide-plate 11, and adapted slidably to support the upper reach of the chain 17. At spaced positions in said chain certain links thereof are of special form, each having a bridge-piece connecting its side members, one of said bridge-pieces being shown at 21 in Figs. 3 and 5. Said bridge-piece is provided with a reinforcing plate 22 welded thereto, said bridge-piece and plate being tapped to receive the threaded end of a vertical pin 23 pivotally securing thereon a two-armed turret-member 24 underlying the guide plate 11. The upper end of said pin 23 is formed with a head 23^a slidably fitting the slot 14 and medial grooves 25, 25 (Fig. 1) formed in the under side of the guide-plate 11 in extension of said slot, and with a shoulder 23^b occupying a countersink in the upper side of the turret-member 24 to retain the latter upon said pin. Said turret-member is formed below with a hub having four flattened sides, and 26 is a spring clasp non-rotatably secured on the bridge-piece 21 and adapted to bear yieldingly against the flattened sides of said hub lightly to hold said turret member with its arms either parallel or at right angles to the chain 17, although permitting it to be forced from one to the other of said positions.

On each arm of the turret-member 24 is secured a pin 27, adapted to enter and project upward through the slots of the guide plate 11 as the chain 17 is driven, to slide the work forward on said guide plate, each of said pins being provided with a roller 27^a (Fig. 5) on its base adapted to run in said slots. The work is here shown as consisting of battery-jar covers, 28, 28, the terminal-holes of which, 28^a, 28^a (Fig. 3), are adapted to receive the pins 27 as said covers are successively placed upon the guide-plate 11.

The slots of said guide-plate are so formed, as shown clearly in Fig. 1, that the turret-members 24 successively will be turned through 90°, from a position transverse to the chain 17 to a position parallel with said chain, as the pins 27 pass from the slots 12 and 13 into the slot 14, and further turned through 90°, to a transverse position, as said pins pass from the slot 14 into the slots 15, 16, the walls of said slots acting as cams against said pins. I do not

desire wholly to limit my claims, however, to such cam action or such slots for effecting the turning of the turret-members. Neither do I wholly limit myself to a chain as distinguished from other types of endless carriers.

For preventing the cover from being thrown from one or both of the pins 27 when it is abruptly turned by the passage of said pins from the slots 12, 13 to the slot 14, I provide a yielding presser-plate or spring 29 secured to a bridge or bracket 30 mounted upon the frame 10, said plate being adapted to bear upon the tops of the pins 27 during this turning part of their movement, said pins moving in sliding contact with said plate. The latter is secured to the bracket 30 only at its end first reached by the pins, and 31 is a spring secured to the bracket 30 and slidably bearing upon the outer end of the plate 29 to supplement its pressure.

A pair of transverse, spaced apart, abrading wheels 32, 32 are positioned opposite each other, on respective sides of the work-guiding plate 11, adjacent the slots 12, 13, and a second pair of such wheels, 33, 33, are similarly positioned, somewhat closer together, adjacent the slot 14, the first said wheels being adapted to grind the shorter sides of the cover as the latter passes between them on the plate 11, and the second pair of wheels being adapted to grind the longer sides of the cover as it passes between them after being turned through 90° by the cam action of the plate 11 upon the pins 27.

Each of these several abrading wheels is journaled upon a slide 34. Said slide is formed with a dust chamber 34^a (Fig. 3) into which the lower part of the wheel extends, said chamber communicating with an opening 35 through the part of the frame 10 upon which the slide is mounted, so that if desired a suitable vacuum system (not shown) may conveniently be installed for drawing off the abraded material or dust from said chamber.

Each of said slides is dovetailed on the frame 10, as shown clearly in Fig. 4, and is provided with an adjusting screw 36 swiveled in a bracket 10^a mounted on the frame 10 and threaded into said slide, for moving the abrading wheels of each pair from and toward each other to adjust them for work of different sizes. 37 is a hand-wheel secured to the rear end of said screw, for turning the latter, and 38 (Figs. 2 and 3) is an indicator secured to said wheel and adapted to run on a scale 39 (Fig. 2) secured to the bracket 10^a, for the operator's guidance in spacing the abrading wheels. A set screw 40, threaded through the wall of the guideway in which the slide is mounted and bearing against the usual slide-clamping plate 41 (Fig. 4) is provided, for securing the slide in adjusted positions.

For preventing the work from being knocked out of position by its contact with the abrading wheels, and to compel it to move forward in accurate alignment so that it will be abraded to substantially the same depth by each wheel of the pair, I provide a yieldingly mounted, overhanging guide or shoe 42 adjacent each abrading wheel, the arrangement of those adjacent the wheels 33 being most clearly shown in Fig. 7.

Said shoe as here shown comprises two work contacting pieces of metal joined by a U-shaped bridge piece 42^a welded thereto and adapted to hold said pieces as a unit while its U-form accommodates the adjacent portion of the abrading wheel. The end of said shoe first reached by the work is tapered off as indicated at 42^b (Fig. 7), so as to insure the entry of the work between said shoe and its mate. The shoe is supported by spring-studs 43, 43 secured thereon and projecting slidably through holes in respective brackets 44, 44 adjustably secured upon the plate 11 by thumb-screws 45, 45 mounted in slots 46, 46 in the bases of said brackets and threaded into the plate 11. 47, 47 are compression springs mounted upon the studs 43 between the shoe 42 and the respective brackets 44, and 48, 48 are cotter-pins in the rear ends of said studs adapted to hold said springs under compression. Said shoes are so formed and positioned as to overhang the respective edges of the battery-jar cover 28 and hold it down against the plate 11, as well as yieldingly to press the cover in a horizontal direction, as is best shown in Fig. 3.

The shoes 42 adjacent the abrading wheels 32 are of substantially the same construction and mode of operation, except that the brackets 44^a, 44^a (Fig. 3), upon which they are mounted, are secured to the plate 11 without provision for adjustment thereon, adjustment of the shoes being provided by thumb nuts 49, 49 on the rear ends of the spring-studs projecting through said brackets from said shoes, this adjustment being sufficient in the particular embodiment here illustrated, which is adapted to work upon covers differing but little as to length although differing more widely as to their transverse dimension, the latter difference being compensated by the greater adjustability of the brackets 44 adjacent the second pair of abrading wheels, 33, 33.

It is important that the abrading wheels 32 and 33 be driven at such high speed with relation to that of the chain 17 that the work will not be moved between said wheels faster than they can be ground to size by the wheels so as to clear the latter, as jamming and breaking of the work against the wheels would otherwise occur.

It is also important that provision be made for the automatic stopping of the drive-chain 17 in case the work becomes clogged.

For driving the several abrading wheels, 32, 33, a motor 50 (Fig. 2) is mounted on the base of the frame 10 and adapted, through a belt 51 and pulley 52 to drive, clockwise as viewed from the right of Fig. 2, a counter-shaft 53 journaled in brackets 54, 54 mounted on said base. Secured on said counter shaft is a gear 55 meshed with a gear of the same size positioned directly behind it, as viewed in Fig. 2, and secured to a second counter-shaft 56 journaled in brackets of which one is shown at 57, the counter-shaft 56 thus being adapted to be driven counter-clockwise as viewed from the right of Fig. 2. Secured upon the counter-shaft 53 are pulleys 58, 58 connected by belts 59, 59 with respective pulleys 60, 60 secured on the shafts of the nearer abrading wheels of the pairs 32, 33. Directly behind the pulleys 58, as viewed in Fig. 2, are similar pulleys, of the same size, secured to the counter-shaft 56 and connected by belts 61, 61 with respective pulleys 62, 62 secured to the shafts of the farther abrading wheels of the pairs 32, 33. All of the four abrading wheels 32, 33, are thus adapted to be driven, at the same high speed, their peripheries moving downward past the plate 11. As the belts 59 and 60 are of substantial length and extend substantially at right-angles to the direction of adjustment of the slides 34, said slides may be adjusted through substantial ranges without unduly slacking or tightening said belts.

For driving the chain 17, a worm 63 and a worm-wheel 64 meshed therewith are journaled in a housing 65 mounted upon the base of the frame 10 (Fig. 2), the shaft of the worm 63 being connected by a flexible coupling 66 with the counter-shaft 56, said flexible coupling being used to avoid the necessity of perfect alignment of said shafts. The shaft of the worm-wheel 64 projects from the rear end of the housing 65 and rotatably mounted thereon is a sprocket 67 (Fig. 6) having a jaw-clutch hub 68, adapted to be engaged by a jaw-clutch member 69 slidably keyed on said shaft and adapted to be thrown into and out of engagement with said jaw-clutch hub by a shipper mechanism 70 including a rock shaft 71 journaled in the frame 10 and extending to the operator's position at the left end of the machine, as viewed in Fig. 2, where it is provided with a hand-lever 72. The sprocket 67 is connected by a sprocket-chain 73 with a sprocket 74, rotatably mounted on the shaft 19^a of the end-sprocket 19 of the work-driving chain 17, said sprocket 74 being embraced by a pair of friction discs 75, 75 secured on said shaft. The work-driving chain 17 is thus adapted to be frictionally driven at a definite low speed with relation to that of the abrading wheels, and to stop, although the clutch member 69 remains engaged and the wheels continue to be driven, in case the work becomes so jammed as to overcome the frictional grasp of the discs 75 upon the sprocket 74.

In the operation of the machine, the abrading wheels 32, 33 are suitably spaced for the work by turning the hand-wheels 37 and setting up the set screws 40, their spacing being facilitated by the indicator 38 and its scale 39 or by a suitable gauge held between the wheels of each pair. The motor is then started and the clutch 68, 69 engaged, driving the chain 17 as indicated by the arrow in Fig. 2 and driving all four of the abrading wheels 32, 33, their sides adjacent the work-guiding plate 11 passing downward. As each pair of pins 27 on the chain 17 rises through the slots 12, 13 of the plate 11, the operator places the work, here shown as a battery jar cover 28, upon said plate in position to be engaged by said pins, the terminal holes, in the case of a battery jar cover, receiving said pins. Said pins slide the cover forward on the plate 11, carrying it between the first pair of guide-shoes 42, which hold it in alignment, while it passes between the first pair of abrading wheels, 32, the latter grinding off the end margins of said cover. The springs by which said guide-shoes are backed, exerting substantially equal forces on the opposite sides of the work, cause it to move with its median line substantially midway between the abrading wheels, so that it is ground to substantially the same depth and its movement resisted with substantially the same force by the two wheels, and twisting, cramping or jamming of the work is thereby avoided.

As the cover passes beyond said wheels 32 it is turned through 90° by the cam action of the walls of the slots 12, 13 upon the pins 27, one of said pins following the other into the slot 14, and the cover is thus carried endwise between the second pair of abrading wheels 33, where its side margins are ground off in the manner just described as to the wheels 32. By their passage into the slots 15, 16, the pins 27 turn the turret member 24 again to transverse position, so that said pins will be in position again to enter the slots 12, 13, and said pins are withdrawn from the work, leaving it upon the delivery end of the plate 11, as they pass downward around the sprocket 19. Each cover, before said pins are thus withdrawn therefrom, shoves the preceding cover toward the delivery end of the plate 11, said covers thus dropping successively from the end of said plate into any suitable receptacle (not shown).

The covers do not require to be gauged

after the grinding operation, as they are accurately ground to size, the operation is very rapid, and the operator is required only to place the successive covers upon the plate 11 over the pins 27.

Modifications may be resorted to without departing from the scope of my invention and I do not wholly limit my claims to the specific construction shown.

I claim:

1. An abrading machine comprising means adapted slidably to support the article to be abraded, an abrading member adapted to abrade a part of said article as it moves in a straightway course on said supporting means, a second abrading member adapted to abrade a part of said article as it moves further in said straightway course on said supporting means, and means for sliding said article on said supporting means past the first abrading member in abrading relation thereto with one part of said article foremost and past said second abrading member in abrading relation thereto with another part foremost.

2. An abrading machine comprising means adapted slidably to support the article to be abraded, a pair of abrading members adapted simultaneously to abrade opposite sides of said article as it moves in a straightway course between said members while supported by said supporting means, a second pair of abrading members adapted simultaneously to abrade opposite sides of said article as it moves further in a straightway course between them on said supporting means, and means for sliding said article first between the first-mentioned pair of abrading members with one part of said article foremost and then between the second pair of abrading members with another part of said article foremost.

3. An abrading machine comprising means adapted slidably to support the article to be abraded, a pair of abrading members adapted simultaneously to abrade opposite sides of said article as it moves between said members while sliding upon said supporting means, a second pair of abrading members adapted simultaneously to abrade opposite sides of said article as it moves between them on said supporting means, an endless-carrier mechanism under said supporting means having pivoted portions adapted to project upward past the latter and engage the work and drive it forward thereon, and means for turning said pivoted portions as they pass, from said first abrading members to said second abrading members, to present to the latter sides of the work which were not presented to the first abrading members.

4. An abrading machine comprising an endless-carrier, work-driving members pivoted thereon, means for turning said pivoted members to predetermined angular positions as they move forward on said carrier, abrading members positioned at different stations along said carrier, and means for guiding the work as it is driven forward by said work-driving members so as to cause it to pass said abrading members successively in abrading relation thereto.

5. An abrading machine comprising a work-driving structure adapted to be moved along a predetermined path, a work-driving turret structure pivoted thereon, abrading members positioned at different stations along said path, and a stationary contact-member positioned adjacent said path and adapted to contact said turret structure to turn it on its pivot to a predetermined angular position as it moves forward on said work-driving structure so as to cause said turret structure to present different sides of the work in abrading relation to successive abrading members.

6. An abrading machine comprising a work-driving structure adapted to be moved along a predetermined path, a work-driving turret structure pivoted thereon, a brading members positioned at different stations along said path, a contact member adapted to turn said turret structure, and a spring clasp associated with said turret structure and adapted to hold it yieldingly in the angular position to which it is turned by said contact member.

7. An abrading machine comprising an endless carrier, a set of spaced apart turret members pivoted thereon, a plate adapted slidably to support the work, said plate being formed with cam slots, and positioned over said carrier, a pair of pins on each of said turret members adapted to project upward through the cam-slots of said plate, the walls of said cam-slots being adapted to act upon said pins to turn each of said turret-members to a predetermined angular posion as it moves forward on said carrier, to turn the work on said plate, and abrading members positioned at different stations along said carrier and adapted to abrade different sides of the work as it is slid forward in different angular positions on said plate by said carrier.

8. An abrading machine comprising an endless carrier, a turret member pivoted thereon, a plate adapted slidably to support the work and positioned over said carrier, said plate being formed with a slot branched at each end, a pair of work-engaging pins mounted on said turret member and adapted to project upward through said slot and the branches thereof in said plate, to engage the work, said slot and its branches being so formed that their walls by cam action against said pins turn said turret-member on its pivot as said pins pass from the first pair of said branches into the trunk of said slot and again as said pins pass from said

trunk into the branches at the other end of said trunk, a pair of abrading members positioned at opposite sides of said plate adjacent said first branches of the slot and a pair of abrading members positioned at opposite sides of said plate adjacent the trunk of said slot, said abrading members being adapted to abrade the work as it is slid between them on said plate by said pins.

9. An abrading machine comprising a plate adapted slidably to support the article to be abraded, a pair of abrading members positioned on opposite sides of said plate and adapted to abrade opposite sides of said article as it is slid between them on said plate, an endless carrier mounted under said plate, pins mounted on said carrier and adapted to project upward past said plate to engage the work and slide it on said plate, and a pair of spring-backed guide shoes positioned respectively adjacent said abrading members, their guiding surfaces diverging from each other at their ends first reached by the work, said shoes being adapted to center the work with respect to the space between said abrading members.

10. An abrading machine comprising a work-driving structure adapted to be moved along a predetermined path, a work-driving turret-member pivoted thereon, a pair of work-engaging pins mounted on said turret-member, a contact member adapted to turn said turret-member as it moves forward on said work-driving structure, a yielding presser plate adapted to bear upon the tops of said pins to retain the work in driving relation thereto during such turning of said turret member, and abrading members positioned at different stations along the path of said turret member and adapted to abrade different sides of the work as it is carried past them by said turret member.

In witness whereof I have hereunto set my hand this 13 day of June, 1922.

WALDEMAR D. KMENTT.