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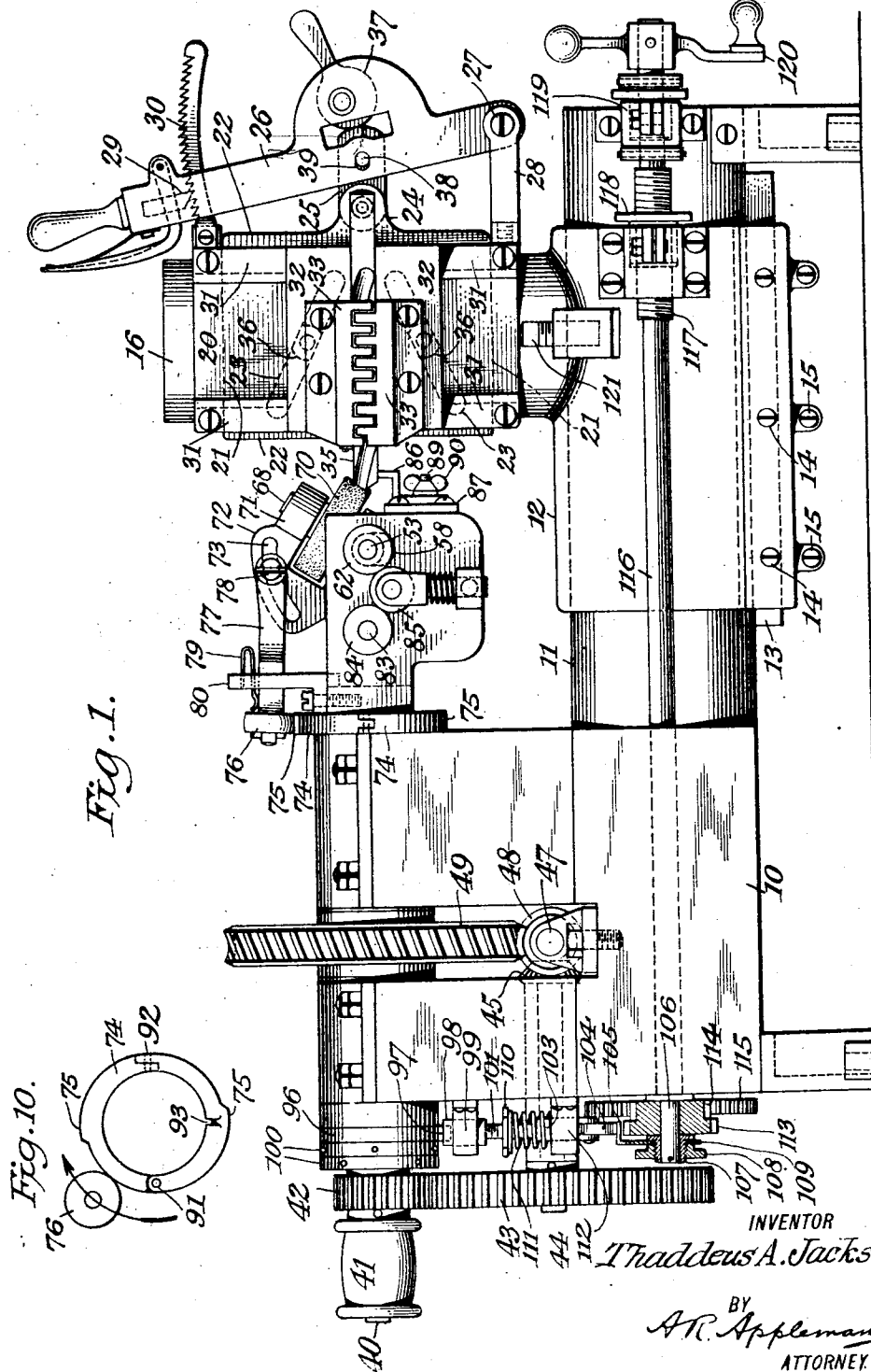
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T. A. JACKSON

DRILL GRINDER

Filed Nov. 11, 1925

3 Sheets-Sheet 1



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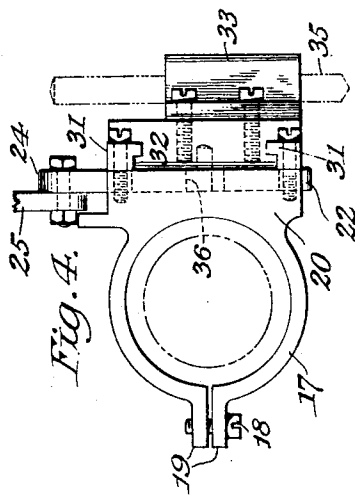
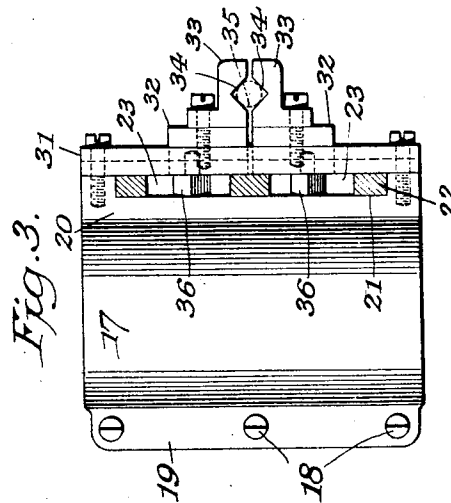
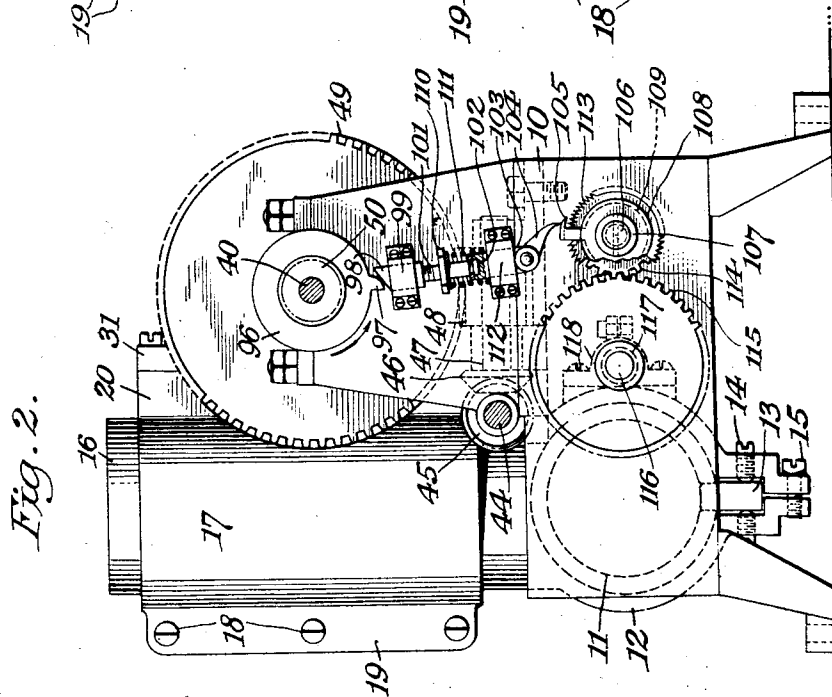
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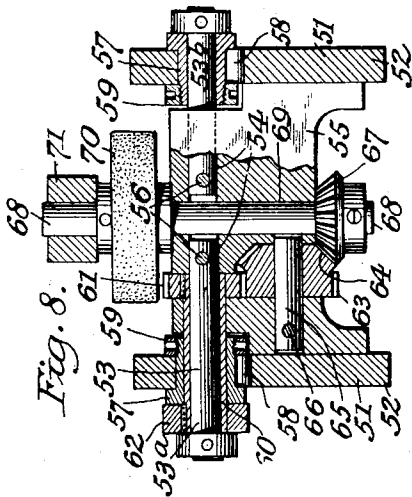
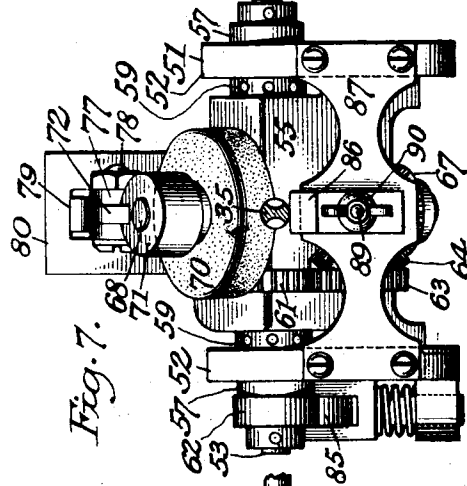
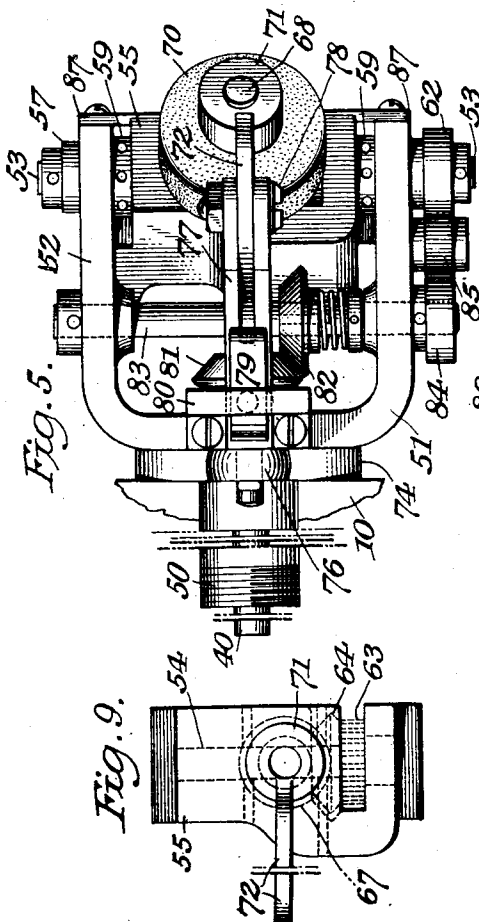
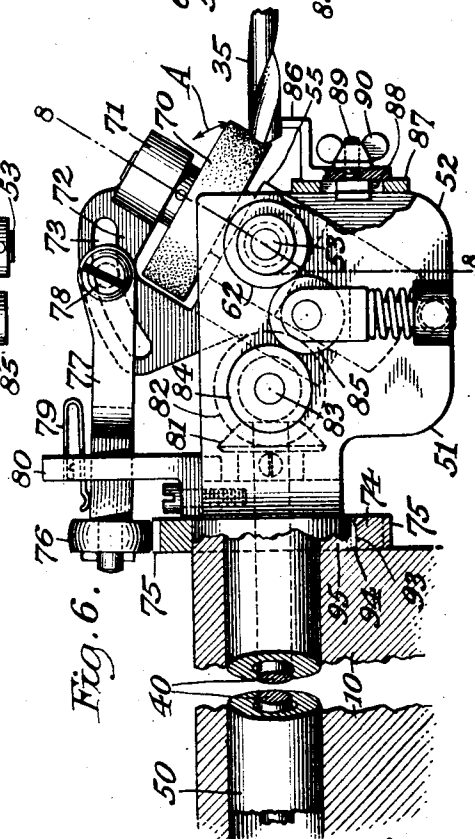
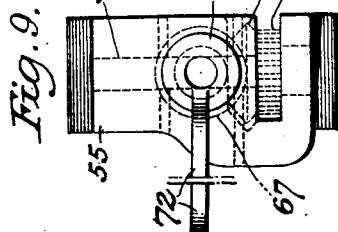
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DRILL GRINDER

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

THADDEUS A. JACKSON, OF BROOKLYN, NEW YORK.

DRILL GRINDER.

Application filed November 11, 1925. Serial No. 68,325.

This invention relates to drill grinders and has for its object to provide a machine of this class having means to hold the drill in a fixed horizontal position, and means for imparting to the grinding member a planetary operative movement around the drill, to attain desirable results with respect to proper lip clearance back of the cutting edge, and assuring equal angles and equal lengths of the cutting lips to enhance the penetrative qualities of the drill, and to provide a resultant smooth bore, and further, high speed in operation.

It is well known in this art that a drill improperly ground or sharpened, with unequal lengths and unequal angles in the cutting lips will oversize a bore and form ridges or shoulders therein, and such a drill, when in operation, will be subjected to lateral strains or stresses and the axis, being off center will cause it to chip, burn or even break, but with my improved grinder, each lip of the drill is given like treatment thus assuring equal angles and equal lengths in the lips.

A feature of my improved drill grinder resides in the employment of interchangeable cams, a separate cam being used for each of the two, three, or four lip types of drills, to control the swing of the grinding member in the operation of the device.

To these ends, and to such others as the invention may pertain, the same consists, further, in a novel construction, combination, and adaptation of the parts, as will be hereinafter more fully described and then specifically defined in the appended claims.

In the accompanying drawings;—

Fig. 1 is a side elevational view of my improved drill grinder.

Fig. 2 is an end view thereof with parts removed.

Fig. 3 is a detail side view of the chuck-sleeve and its associated parts.

Fig. 4 is a plan view of the chuck-sleeve.

Fig. 5 is a plan view of the grinder head and its associated parts.

Fig. 6 is a side view of the grinder head.

Fig. 7 is a front or end view of the grinder head.

Fig. 8 is a plane section taken about on the line 8—8 of Fig. 6.

Fig. 9 is a detail plan view of the grinding member supporting block and Fig. 10 is a detail of the grinder oscillating cam.

Referring to the drawings, I provide a frame 10, with a rounded beam 11, on which a sleeve 12 is slidably mounted. A key 13, set screws 14, which bear against the sides of the key, and screws 15, are provided to prevent the sleeve from turning.

Formed with the sleeve 12, is a vertical circular post 16, on which is adjustably clamped a chuck-sleeve 17, by screws 18, passing through flanges 19, thereof, said sleeve being provided with an extension 20, formed with a channel 21, in which a cam-plate 22, having divergent cam slots 23, is adapted to slide. This plate also has an apertured side lug 24, to which a link 25, is connected and which is connected to a lever 26, pivoted at 27, to a post 28, on the extension 20, said lever having a dog 29, to engage a toothed rack 30.

Guide bars or gibs 31, are bolted to the face of the extension 20, to retain upper and lower chuck-blocks 32, in sliding relation, and to these blocks are bolted the chuck members 33, providing jaws 34, to hold a drill 35, to be sharpened or ground.

Cam-blocks 36, are carried by the chuck-blocks 32, and operate in the cam slots 23, to move the jaws into and out of engagement with the drill by operating the lever 26, over the rack 30, and the exact desired thrust of the cam-plate 22, may be attained by an eccentric disk 37, bearing on the outer end of the link 25, which has a pin 38, extending into a slot 39, in the lever 26.

I will now describe the improved mechanism for driving the grinding member and for imparting thereto a relative bodily planetary movement around the stationary drill.

This construction includes a high speed shaft 40, driven direct by a power pulley 41, and carrying a pinion 42, which drives a large gear 43, on a shaft 44, with a bevel gear 45, engaged with a companion gear 46, on a shaft 47, with a speed reducing worm 48, driving a worm wheel 49, carried on a sleeve shaft 50, to impart slow rotary movement thereto.

The sleeve shaft 50, carries a yoke 51, on which the grinder control mechanism is mounted and which, collectively, for the purpose of this description, I shall term the grinder head.

Mounted in the parallel arms 52, of the yoke is a shaft 53, constituted by two parts 53^a, 53^b, which are received in a bore 54, in a rock-block 55, and held in place by cross

pins 56. The said shaft parts pass through bushings 57, which are locked in desired adjusted positions, in slots 58, formed in the yoke arms, by lock nuts 59.

5 Revoluble on shaft section 53^a, is a sleeve 60, carrying a pinion 61, on the inner end, and a friction gear 62, on the outer end thereof. The pinion is in mesh with an idler gear 63, integral with a bevel gear 64, and loose on a short shaft 65, which is
10 locked in the head by a cross pin 66, and this bevel gear is engaged by a companion gear 67, keyed to a shaft 68, rotating in a bore 69, in block 55, and as shown in Fig. 8 this
15 shaft 68, is projected upwardly to receive a grinder or grinding disk 70, which is keyed thereto, above which the shaft is received in a bearing 71, on the end of a goose-neck web arm 72, carried by block 55, and being pro-
20 vided with a segmental slot 73, cut on an arc with the shaft 53, as the center.

In the grinding operation, the grinder 70, is given oscillatory movements toward and from the axis of the drill 35, as indicated
25 by the arrow A, Fig. 6 by a stationary cam 74, shown here as having two high spots 75, for two lip drills, over which travels a roller 76, on an arm 77, which may be locked in adjusted position on the web arm
30 72, by a bolt 78, passing through the slot 73. The roller 76, is yieldingly held against the face of the cam 74, by a spring 79, carried on a bridge bracket 80, bolted to the base of the yoke 51.

35 The high speed shaft 40, passes through the sleeve shaft 50, and into the yoke 51, to receive a friction bevel gear 81, having contact with a spring pressed companion gear 82, slidable on a key on a shaft 83, jour-
40 nalled in the arms of the yoke 51, back of the rock-block 55, and parallel with shaft 53, and it is extended beyond the side of the yoke to receive a friction drive gear 84, which gives motion to the gear 62, through
45 a spring pressed idler 85, in the operation of grinding a drill.

The drill 35, is supported against side thrusts, when the grinder is operating, by an arm 86, adapted to engage the side of
50 the drill opposite the grinder, and this arm is adjustably carried on a cross plate 87, fastened to the front of the yoke arms 52, said plate being slotted as at 88, to receive a bolt 89, on which a wing nut 90, is threaded to engage an extension of said arm.
55

The cam 75, Fig. 10, is made up of two parts, here shown connected at one side by a hinge joint 91, and at the opposite side by a pin 92, the cam has a key groove 93,
60 to receive a key 94, which projects from a boss 95, on the frame 10.

I will now proceed to describe the mechanism which I employ to automatically feed the drill to the grinder in its operation.

65 On the rear threaded end of the sleeve

shaft 50, I mount a cam 96, to rotate therewith and which is provided with a projection 97, to engage a bevel faced block 98, slidable in a bracket 99, said cam being held in place by nuts 100. The block 98
70 has threaded connection with a bolt 101, which is swivelled as at 102, to a pawl-block 103, carrying a pawl 104, normally resting on a gage plate 105, which is held stationary on a stud shaft 106, by a threaded sleeve
75 107, pinned thereon, and a jamb nut 108, screwed up against a ring 109, formed with the plate.

The bolt 101, has a collar 110, under which a spring 111, is placed and bears on a bracket 112, which guides the pawl-block, and this spring holds the bolt 101, and the said blocks in an elevated position with the beveled face of the block 98, in the path of the cam projection 97, so that at each rota-
80 tion of the cam, the pawl 104, will be operated to engage the teeth of a ratchet 113, formed integral with a gear 114, loose or free on shaft 106, and meshed with a larger gear 115, which is keyed to a shaft 116,
85 extending forwardly through and along the frame, and which is provided with a feed thread 117, engaging a feed nut 118, on the slidable sleeve 12, and beyond said sleeve, the shaft passes through a bracket 119, to
90 confine it against longitudinal movement, and a handle 120, to its extreme front end, to be manually operated when withdrawing the drill from the grinder after the grinding operation is completed.
95

A bed screw 121, provides supplemental means for retaining the chuck-sleeve 17, in proper position on the post 16.

The gage plate may be adjusted and locked in desired positions to control the action of the pawl 104, on the teeth of the ratchet 113, to obtain from one to a five
105 tooth feed at each engagement, depending on the drill feed desired or required.

The bolt 101, may also be used for adjustment of the pawl action by raising or lowering the bevelled face of the block 98, relative to the extension 97, on cam 96.
110

The cam shown in Fig. 10 is for use in connection with the grinder when operating on a two lip drill, and when the roller 76, travelling in the direction of the arrow, contacts with one of the high spots 75, the grinder 70, will be dipped to the right, see
115 Figs. 1 and 6 to engage the tail of the lip and the gradual decline of the cam will permit spring 79, to slowly move the grinder to the left until it has passed the lip point, when it will again be dipped to engage the tail of the next lip, thus assuring equal
120 treatment and proper clearance.

What I claim and desire to secure by Letters Patent is:—

1. In a drill grinder, a frame, a head revoluble thereon, a grinder, constituted by an
125

abrading disk, journaled in the head, a slidable support to clamp the drill and hold it in fixed axial relation to said grinder, means for oscillating the said grinder toward and from the axis of the drill, means for driving the grinder, means for rotating the head to carry the grinder around the drill in its operation, and means for feeding the drill to the grinder.

2. In a drill grinder, a frame, a head revoluble thereon, including a yoke and a block mounted to rock therein, a grinder journaled in said block, a support slidable on said frame and adapted to hold the drill in fixed axial relation with said head, means for rocking the block to move the grinder toward and away from the axis of the drill, means for imparting high rotary speed to the grinder, means for turning the head to carry the grinder around the drill in its grinding operation, and means for feeding the drill to the grinder.

3. In a drill grinder, a frame, a head mounted thereon including a yoke having parallel arms, a rock-block mounted in said yoke, a disk grinder carried by said block in a goose-neck extension thereof, a drill holder slidable on the frame to support the drill with its axis in fixed relation to the working face of the grinder, means for rotating the grinder, means for imparting radial movements thereto relative to the center of the drill, means for turning the head to carry the grinder around the drill, and means for feeding the drill to the grinder in the operation thereof.

4. A drill grinder comprising a frame, a rotatable head carried thereon, a rock-block in said head, a grinder mounted on a shaft passing through said block, a support to hold the drill, a cam for oscillating the grinder toward and away from the axis of the drill, means for driving the grinder, means for turning the head to carry said grinder around the drill in its operation, and means for feeding the drill to the grinder.

5. A drill grinder including a drill support comprising a slidable sleeve, a post on said sleeve, a chuck-sleeve clamped on said post, a cam plate slidably carried by the chuck-sleeve and having divergent slots, blocks movable in said slots, chuck members controlled by the cam plate through said blocks, means for imparting a thrust to the chuck members to clamp the drill, and supplemental means for imparting a further desired thrust to said chuck members while the first named thrust action is maintained.

6. A drill grinder including high and low speed shafts, a head carried on the low speed shaft, a grinder carried by said head, a train of gears operated from the high speed shaft to drive the grinder, a holder to support the drill in fixed axial relation with said head,

means for turning the head to carry the grinder around the drill, and means for feeding the drill to the grinder, as described.

7. A drill grinder including telescoped high and low speed shafts, a yoke on the low speed shaft, a block mounted to rock in said yoke, a grinder rotatable on said block and geared in connection with the high speed shaft, a support adapted to hold the drill in fixed axial relation with said shafts, means for operating the shafts to turn the yoke and carry the grinder around the drill and to drive the grinder, and means for feeding the drill.

8. A drill grinder including a rotary grinder disk, a support to present the drill to said disk and hold it in fixed axial relation thereto, said disk having intermittent oscillatory movements toward and away from the drill center, and bodily planetary movement around said drill, means for imparting the described motions to the disk and means for feeding the drill.

9. A drill grinder including high and low speed shafts, a head on the low speed shaft, a block supported to be rocked in said head, a grinder revoluble with a shaft on said block, gearing connecting the high speed shaft with the grinder shaft, a support for the drill, means for operating the shafts to drive the grinder and to carry it bodily around the drill, means for imparting an oscillatory movement to the grinder in its travel around the drill, and means for feeding said drill to the grinder.

10. In a drill grinder having a drill support and means for feeding the same, a revoluble head, a grinder mounted to oscillate thereon, means for turning said head to carry the grinder around the drill and means for causing said grinder to operate on all of the drill lips at each revolution of the head.

11. In a drill grinder having a drill support and means for feeding the same, a revoluble head, an oscillatory grinder mounted thereon, means for operating the head, means for imparting high rotary speed to the grinder, and a cam for oscillating the grinder toward and away from the drill, said cam having a plurality of high and low spots, each corresponding in number to the lips on the drill in the machine.

12. In a drill grinder having a drill holder and means for feeding the same, a grinder mounted to operate at an obtuse angle to the axis of the drill, a revoluble carrier for said grinder, means for driving said carrier and said grinder, and means for oscillating the grinder to cause it to intermittently engage said drill to grind all lips thereof at each revolution of the grinder therearound.

In testimony whereof, I have signed my name to this specification, this 10th day of November, 1925.

THADDEUS A. JACKSON.