

Feb. 5, 1935.

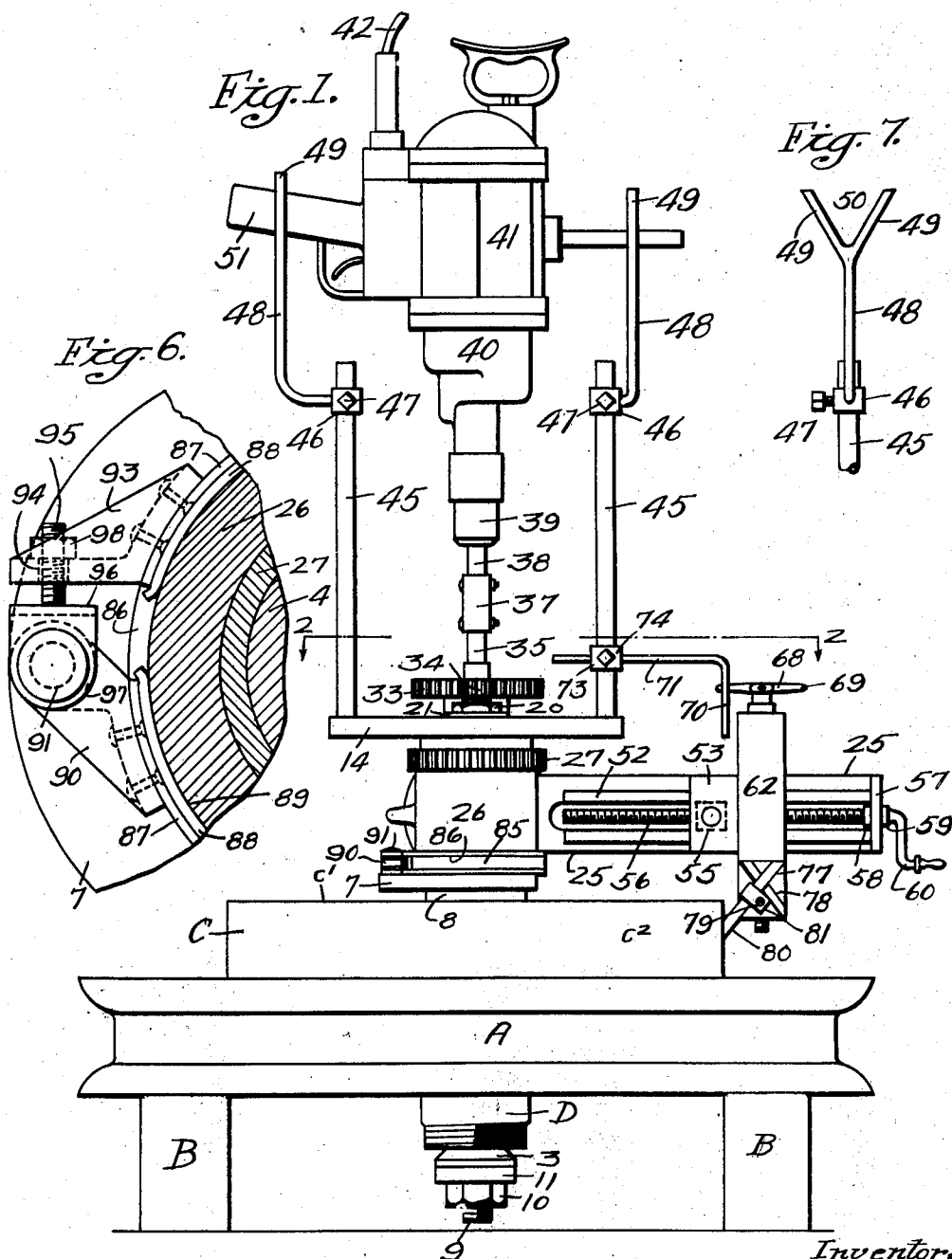
E. W. DENKE ET AL

1,990,270

BRAKE DRUM REFINISHING TOOL

Filed Jan. 21, 1929

3 Sheets-Sheet 1



Inventors,
Edward W. Denke,
Frank E. Bauerle,
by their Attorneys,
Howan & Howan

Feb. 5, 1935.

E. W. DENKE ET AL

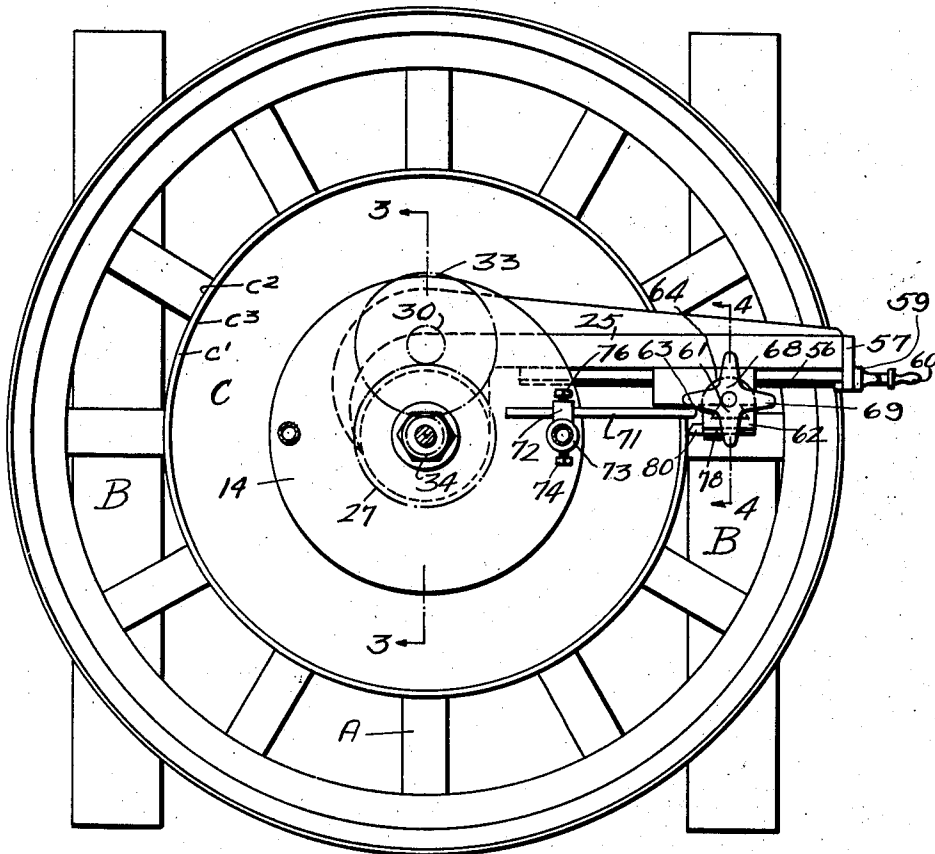
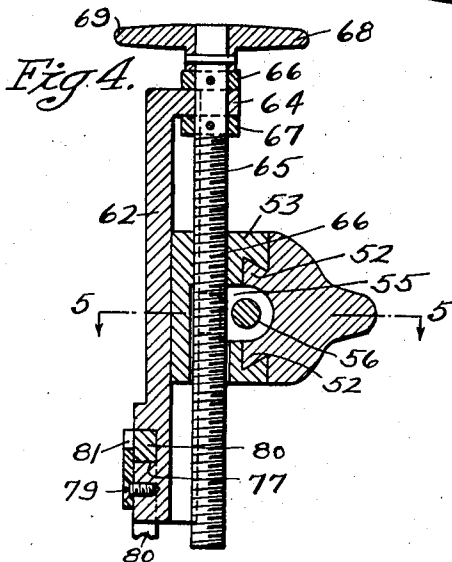
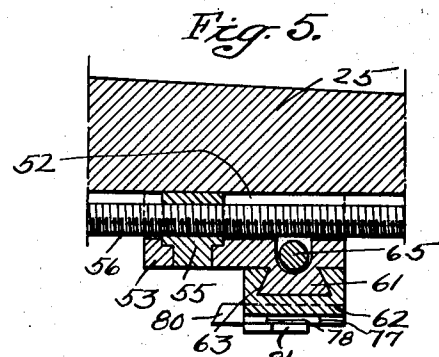
1,990,270

BRAKE DRUM REFINISHING TOOL

Filed Jan. 21, 1929

3 Sheets-Sheet 2

Fig. 2.



Inventors,
Edward W. Denke,
Frank E. Bauerle,
by their Attorneys,
Howan + Howan

Feb. 5, 1935.

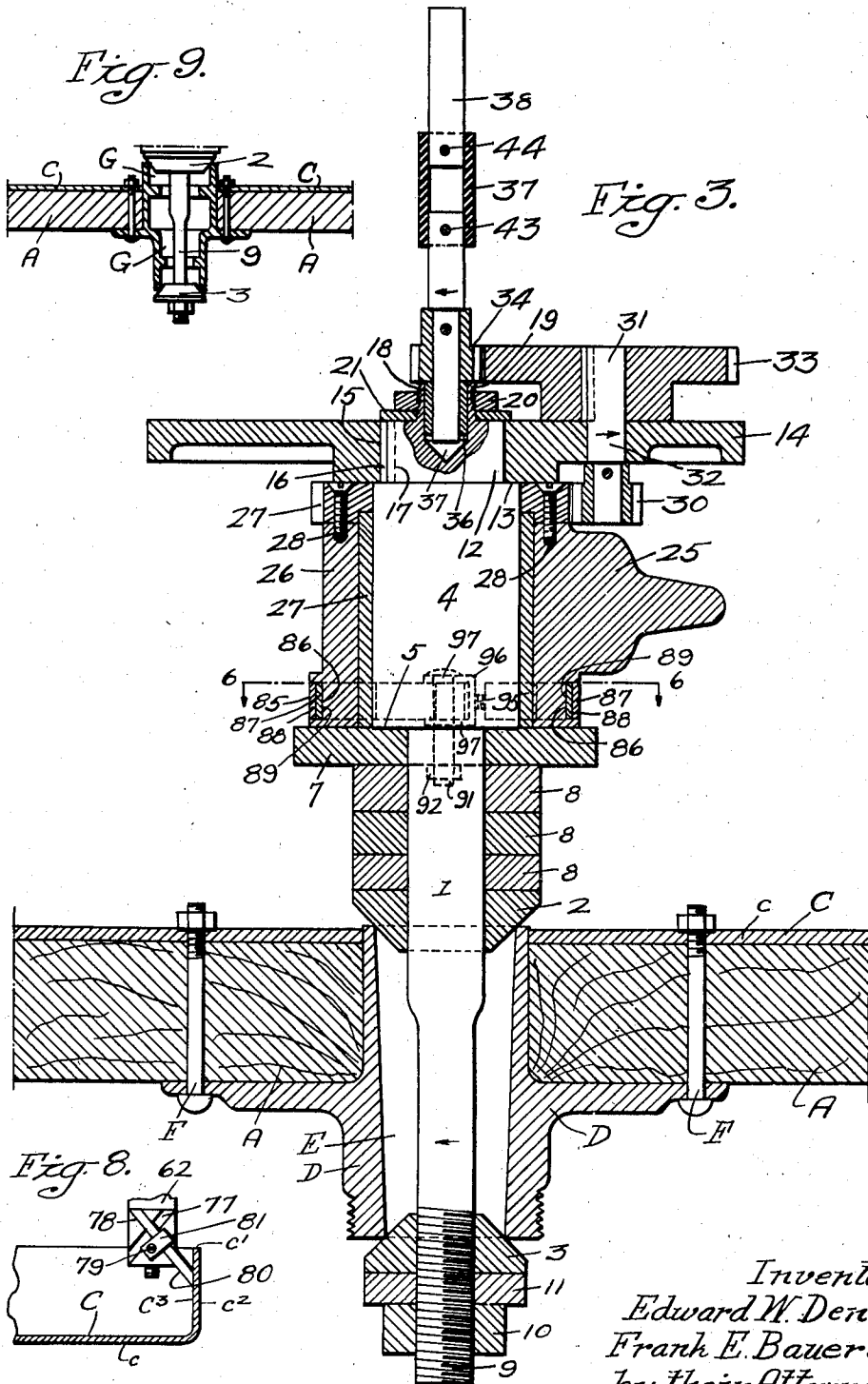
E. W. DENKE ET AL.

1,990,270

BRAKE DRUM REFINISHING TOOL

Filed Jan. 21, 1929

3 Sheets-Sheet 3



Inventors,
Edward W. Denke,
Frank E. Bauerle,
by their Attorneys,
Howan + Howan

UNITED STATES PATENT OFFICE

1,990,270

BRAKE DRUM REFINISHING TOOL

Edward W. Denke and Frank E. Bauerle, Philadelphia, Pa., assignors to said Frank E. Bauerle

Application January 21, 1929, Serial No. 333,822

11 Claims. (Cl. 82-4)

The principal object of this invention is to provide an inexpensive and efficient portable power-driven device for refinishing the brake drums of either front or rear automobile wheels.

5 Another object of the invention is to construct the device in such a manner that a conventional type of electric drill may be utilized to supply the necessary power for operating the device.

10 Another object of the invention is to provide the device with means for preventing chattering of the finishing tool during the refinishing operation, thus making an evenly finished face on the brake drum undergoing the refinishing operation.

15 Another object of the invention is to construct the device in such a manner that it may be used for finishing either an external or internal brake-engaging face of the drum.

20 Another feature of the invention is the provision of an automatically controlled feed for the finishing tool to insure an even smooth face on the drum.

25 Other objects and the construction of the device in detail will hereinafter be described, reference being had to the accompanying drawings, of which:

Fig. 1 is a side elevation of the device, showing the device applied to an automobile wheel which has been removed from the automobile;

30 Fig. 2 is a sectional plan view taken on the line 2-2 of Fig. 1;

Fig. 3 is a sectional elevation taken on the line 3-3 of Fig. 2, and showing the apparatus applied to a rear automobile wheel;

35 Fig. 4 is a sectional elevation taken on the line 4-4 of Fig. 2;

Fig. 5 is a sectional plan view taken on the line 5-5, Fig. 4;

40 Fig. 6 is a fragmentary sectional plan view taken on the line 6-6, Fig. 3;

Fig. 7 is a side elevation of a detail of the invention;

45 Fig. 8 is a sectional elevation illustrating the finishing tool as operating on the internal brake-engaging face of a brake drum; and

Fig. 9 is a fragmentary sectional elevation showing the device applied to the front wheel of an automobile.

50 Fig. 1 illustrates an automobile wheel A as having been removed from the automobile and placed in a horizontal position on suitable blocks or trestles B, B with the brake drum C facing upwardly.

55 As shown in Fig. 3, the automobile wheel A comprises the usual hub member D having a

tapered bore E for the reception of the axle. The brake drum C, in the present instance, comprises a disk c having a flange c¹ provided with brake-engaging faces c², c³ adapted to be engaged by an external brake band and internal brake shoes respectively. The brake drum C is secured to the wheel, in the present instance, by bolts F.

The refinishing device, made in accordance with the principles of our invention, comprises a 10 post 1 which is adapted to be axially aligned with the wheel and the brake drum flange carried thereby. The post 1 is adapted to be centered with respect to the wheel and the drum flange by means of conical members 2 and 3 which 15 are adapted to be seated in the opposite ends of the hub member D, in the circular openings formed therein by the axle-receiving bore E.

The post 1 is provided with an enlarged head 4 forming a circular shoulder 5 which rests on a plate 7. Intermediate the plate 7 and the conical member 2 is provided a series of filler plates 8, 8 which are removably positioned on the post 1, in order that the device may be applied to various automobile wheels of which the 25 lengths of the hub members D vary.

The end of the post 1 is provided with screw threads 9 which, in the present instance, are shown as being left hand threads, the purpose of which will be hereinafter described. The screw threads 9 are adapted to receive a suitable securing nut 10 between which and the conical member 3 is located a suitable washer 11.

The device is adapted to be rigidly secured to the automobile wheel by tightening the nut 10 35 on the post 1, which draws the conical members 2 and 3 into firm contact with the opposite ends of the hub D, the shoulder 5 drawing the filler plates 7 and 8 tightly together and the nut 10 locking the whole rigidly to the wheel. Obviously the conical members 2 and 3 automatically center the post 1 with respect to the wheel as the nut 10 is tightened on the said post.

The end of the enlarged head 4, opposite to that from which the lower reduced portion of the post 1 projects, is provided with an extension 12 which is of a lesser diameter than the head 4 and thus provides a circular shoulder 13 on which 45 is seated a disk 14. The disk 14 is centrally bored to receive the circular projection 12, and is provided with a groove 15 which is adapted to receive a key 16. The key 16 is seated partly in the groove 15 and partly in a corresponding groove 17 formed in the extension 12. By this 55

means relative rotation between the post 1 and the supporting disk 14 is prevented.

The extension 12 is provided with a projection 18 of smaller diameter than the projection 12. The projection 18 is threaded as at 19 to receive a nut 20 by means of which the disk 14 is held against axial movement relative to the post 1, a suitable washer 21 being interposed between the nut 20 and the disk 14 and extending beyond the periphery of the circular extension 12 and overlapping the said disk 14.

Rotatably mounted on the head 4 is a tool-carrying arm 25. The arm 25 is provided with a hub 26 suitably bushed as at 27. The hub 26 is positioned intermediate the supporting disk 14 and the plate 7, and is provided on its end adjacent the supporting disk 14 with a spur gear 27 which is secured to the said hub 26 by means of screws 28.

Axial movement of the hub 26 and arm 25 with respect to the head 4 is prevented by the plate 7 and disk 14, however, the spacing of the shoulders 5 and 13 of the said spindle 4 is such that the arm 25 and its hub 26 are permitted free rotation about the head 4 of the post 1.

Meshing with the gear 27 is a pinion 30 which is secured to the lower end of a vertically disposed shaft 31, under the disk 14. The shaft 31 is rotatably mounted in a bearing 32 formed in the said disk 14. Secured to the opposite end of the shaft 31 and resting on the upper side of the disk 14 is a spur gear 33. The spur gear 33 meshes with a pinion 34 which is secured to one end of a short vertically disposed shaft 35. The shaft 35 is rotatably mounted in the threaded projection 18 within a bushing 36 located in a suitable bore 37 formed within the projection 18. The upper end of the shaft 35 is connected by means of a flexible joint 37 to one end of a spindle 38. The short shaft 35, the spindle 38 and the flexible connection 37 between these two elements constitute a driving spindle by means of which the device is operated.

The free end of the spindle 38 is adapted to be placed within and gripped by the chuck 39 of a conventional type of electric drill, such as that illustrated at 40. It will be understood that the electric drill comprises a motor 41 which is adapted to rotate the chuck 39, said motor being supplied with electric current from a suitable source of supply through a cable 42.

In the present instance, the flexible coupling 37, between the shaft 35 and spindle 38, is in the form of a tube composed of rubberized fabric and is connected to the shaft 35 and spindle 38 at its opposite ends by bolts 43 and 44 respectively. Obviously any form of flexible connection between the shaft 35 and spindle 38 may be provided without departing from the invention, the flexible joint being provided for the purpose of obviating the necessity of effecting absolute alignment between the shaft 35 and the spindle of the electric drill which carries and rotates the chuck 39.

As shown in Fig. 1, the electric drill is supported from the disk 14 by a pair of vertically disposed standards 45, 45 which are suitably secured in the said disk 14. Adjustably mounted on the standards 45 are collars 46, 46 respectively, which are adapted to be moved longitudinally of the standards 45 and to be secured in the positions to which they are adjusted by means of set screws 47. Each of the collars 46 is provided with a rod 48, on the upper end of which is formed a pair of divergent extensions 49, 49, forming a

crotch 50 which is adapted to receive one of the handles 51, 51 which project laterally from the electric drill 40.

With this construction, the electric drill may be readily detached from the device for use independent of the device, by merely loosening the chuck 39 to release the spindle 38, whereupon the electric drill may be raised, removing the handles 51, 51 thereof from the crotches 50 in which they normally rest when the drill is being used in connection with the device forming the subject of our invention.

The tool-supporting arm 25 is provided on one of its faces with a dovetailed guideway 52 which extends longitudinally of the arm and laterally with respect to the supporting post 1. Slidably mounted on the dovetailed guideway 52 is a tool-carrying carriage 53 which, in the present instance, is provided with a feed nut 55 adapted to receive a feed screw 56. The feed screw 56 is rotatably mounted in a plate 57 secured to the outer end of the arm 25, collars 58 and 59 being secured to the feed screw 56 for preventing longitudinal movement of the screw with respect to the arm 25. The collar 59 is provided with a handle 60, by means of which the screw 56 may be rotated to move the carriage 53 longitudinally of the arm 25 for purposes hereinafter set forth.

The horizontally movable tool-carrying carriage 53 is provided with a vertically disposed dovetailed guideway 61 which is adapted to receive and to guide a vertically movable tool head 62, the said head being provided with an undercut groove 63 which is adapted to engage the dovetailed guideway 61 on the carriage 53.

The tool head 62 is provided with a laterally extending lug 64 in which is rotatably mounted a feed screw 65. The feed screw 65 is threaded into a correspondingly threaded opening 66 formed in the carriage 53. Collars 66 and 67 are secured to the feed screw 65 at opposite sides of the lug 64 in order that longitudinal movement of the feed screw 65 will effect a corresponding movement of the tool head 62.

On the upper end of the feed screw 65 is a star wheel 68 having arms 69 which are adapted to be engaged by a depending extension 70 of a horizontally disposed rod 71. The rod 71 is adjustably mounted in a lug 72 formed on a collar 73 which is slidably mounted on one of the standards 45, a set screw 74 being provided to retain the collar 73 in the position to which it may be adjusted. A set screw 76 is provided for retaining the rod 71 in its adjusted position with respect to the lug 72. This construction constitutes a dog for operating the feed screw 65.

The lower end of the tool head 62 is provided with a pair of diagonally disposed and intersecting grooves 77 and 78 respectively, either of which is adapted to receive a suitable form of finishing tool 80. A clamp 81 is provided to retain the tool 80 within one of the tool-receiving grooves 77, 78.

In Fig. 1, the tool 80 is shown in the operation of finishing the external brake-engaging surface c^2 of the brake drum C, the said tool being located within the tool-receiving groove 77 and in Fig. 8 the finishing tool is shown as operating upon the internal brake-engaging surface c^3 , the finishing tool 80 being located in the tool-receiving groove 78 in the head 62.

The clamp plate 81 is so disposed with respect to the diagonally disposed grooves 77 and 78 that it will engage and hold the tool 80 within the occupied groove, regardless of which of the grooves this may be, a screw 79 being provided to draw the

clamp plate 81 into firm contact with the finishing tool 80.

In operation the device is rigidly clamped to an automobile wheel in the manner above noted, the conical members 2 and 3 automatically centering the supporting post 1 with respect to the wheel A and the brake drum C, which is concentrically disposed on said wheel. The handle 60 is then operated to bring the finishing tool 80 into operative engagement with one or the other of the brake-engaging surfaces of the flange c^1 of the brake drum C. The dog 71 is then adjusted so that, as the arm 25 is rotated about the post 1, the said dog will lie in the path of the arms 69 of the star wheel 68, whereby the feed screw 65 will be rotated a portion of a revolution for each revolution of the arm 25 as it carries the finishing tool 80 around and in operative contact with the engaged brake-engaging surface of the flange c^1 of the brake drum C.

Assuming that the operation of the tool 80 is started adjacent the outer edge of the flange c^1 , each revolution of the arm 25 will bring one of the arms 69 into contact with the dog 70-71 which will gradually feed the tool 80 across the brake-engaging surface with which it is in contact, toward the body of the wheel A, it being understood that the rotation of the arm 25 is accomplished by supplying electric current to the motor 41 of the electric drill 40, which through the train of gears 34, 33, 30 and 27 effects rotation of the arm 25 about the supporting post 1.

In order to obviate any chattering of the tool 80 due to the teeth of the respective gears intermeshing with each other, we have provided a means for steadying the arm 25 in its rotation about the post 1, said means comprising a brake 85 adapted to ride in an annular groove 86 formed in the hub 26 of the arm 25. The brake 85 comprises a steel band 87 which is provided with a suitable lining 88 adapted to engage the base surface 89 of the groove 86. One end of the steel band 87 is provided with a lug 90, through which passes a stud 91 which is secured in the plate 7 by means of a nut 92. The opposite end of the steel band 87 is provided with a lug 93 having an opening 94, through which projects a threaded stem 95. The stem 95 has on one of its ends a yoke 96 which spans the lug 90 secured to the opposite end of the band, the stud 91 passing through the arms 97, 97 of the yoke 96 which respectively lie above and below the lug 90.

Adjustment of the brake band 85 with respect to the hub 26 is accomplished by an adjusting nut 98 threaded on the stem 95. By this means the brake band 85 may be tightened or loosened to any desired extent with respect to the hub 26, such tightening tending to retard the rotation of the arm 25 and thereby prevent the above mentioned chattering of the tool 80.

Fig. 9 illustrates the device as being secured to a front wheel of an automobile, the cone members 2 and 3 being seated within the circular cavities G in which the races of the ball or roller bearings of the front wheels normally rest, the operation of the device being the same regardless of whether the device is applied to a front or a rear wheel.

Obviously conical elements of various sizes may be used in applying the device to different wheels wherein the diameters of the opening at the opposite ends of the wheel hubs vary to any marked degree.

The left hand screw threads on the post 1 are provided so that as the arm 25 is rotated and the tool 80 offers resistance to such rotation, this

resistance being transmitted to the disk 14 will tend to tighten the post in the wheel rather than loosen the same, which would be the case in event of the threads 9 being right handed.

Obviously other forms of power units may be employed in place of the electric drill, shown in the drawings, without departing from the main features of the invention.

We claim:

1. A portable device, for refinishing the brake engaging surfaces of brake drums on automobile wheels, comprising a post adapted to be secured to the automobile wheel, means for axially aligning said post with said wheel and the brake drum concentrically disposed thereon, a tool-supporting element rotatably mounted on said post, a tool carried by said tool-supporting element, means for rotating said tool-supporting element about said post with said tool in engagement with a brake-engaging surface of said drum, and retarding means for said tool-supporting element for preventing chattering of the tool in its movement relative to said brake drum.

2. A portable device, for refinishing the brake engaging surfaces of brake drums on automobile wheels, comprising a post adapted to be secured to the automobile wheel, means for axially aligning said post with said wheel and the brake drum concentrically disposed thereon, a tool-supporting element rotatably mounted on said post, a tool carried by said tool-supporting element, means for rotating said tool-supporting element about said post with said tool in engagement with a brake-engaging surface of said drum, said means including a conventional form of electric drill which comprises a spindle-receiving chuck and a motor adapted for rotating said chuck, said device comprising a driving spindle operatively connected to the tool-supporting element and adapted to be detachably gripped and rotated by the chuck of said electric drill.

3. A portable device, for refinishing the brake engaging surfaces of brake drums on automobile wheels, comprising a post adapted to be secured to the automobile wheel, means for axially aligning said post with said wheel and the brake drum concentrically disposed thereon, a tool-supporting element rotatably mounted on said post, a tool carried by said tool-supporting element, means for rotating said tool-supporting element about said post with said tool in engagement with a brake-engaging surface of said drum, said means including a conventional form of electric drill which comprises a spindle-receiving chuck and a motor adapted for rotating said chuck, said device comprising a driving spindle operatively connected to the tool-supporting element and adapted to be detachably gripped and rotated by the chuck of said electric drill, and means carried by said post for removably supporting said electric drill on the device.

4. A portable device, for refinishing the brake engaging surfaces of brake drums on automobile wheels, comprising a post adapted to be secured to the automobile wheel, means for axially aligning said post with said wheel and the brake drum concentrically disposed thereon, a tool-supporting element rotatably mounted on said post, a tool carried by said tool-supporting element, means for rotating said tool-supporting element about said post with said tool in engagement with a brake-engaging surface of said drum, said means including a conventional form of electric drill which comprises a spindle-receiving chuck and a motor adapted for rotating said

- chuck, said device comprising a driving spindle operatively connected to the tool-supporting element and adapted to be detachably gripped and rotated by the chuck of said electric drill, said
- 5 driving spindle including a flexible connection permitting relative misalignment between said electric drill and the remaining elements of the device, and means carried by said post for removably supporting said electric drills on the device.
- 10 5. A portable device, for refinishing the brake engaging surfaces of brake drums on automobile wheels, said wheel including a hub having a circular opening extending longitudinally there-through, comprising a post adapted to pass
- 15 through said hub opening and to be secured to the automobile wheel, means for axially aligning said post with said wheel and the brake drum concentrically disposed thereon, said aligning means comprising a pair of conical elements disposed in
- 20 opposed relation to each other on said post with their beveled sides respectively seated in the said circular opening at the opposite ends of said hub, a shoulder formed on said post at the outer end of one of said conical elements, a nut threaded
- 25 on said post at the outer end of oppositely disposed conical element for drawing said conical elements into said circular opening and thereby centering said post relative to said wheel, spacer plates on said post between said shoulder and
- 30 adjacent conical element, a tool-supporting element rotatably mounted on said post, a tool carried by said tool-supporting element, means for rotating said tool-supporting element about said post with said tool in engagement with a brake-
- 35 engaging surface of said drum, and a brake engaging said tool-carrying element and anchored to one of said spacer plates for preventing chattering of the tool relative to the brake drum.
- 40 6. A portable device, for refinishing the brake engaging surfaces of brake drums on automobile wheels, comprising a post adapted to be secured to the automobile wheel, means for axially aligning said post with said wheel and the brake drum concentrically disposed thereon, a tool-supporting
- 45 element rotatably mounted on said post, a tool carried by said tool-supporting element, means for rotating said tool-supporting element about said post with said tool in engagement with a brake-engaging surface of said drum, said means
- 50 including a conventional form of electric drill which comprises a spindle-receiving chuck and a motor adapted for rotating said chuck, said device comprising a driving spindle operatively connected to the tool-supporting element and adapted
- 55 to be detachably gripped and rotated by the chuck of said electric drill, means carried by said post for removably supporting said electric drill on the device, said means comprising a disk secured to said post, standards on said disk, and
- 60 crotch ends on said standards adapted to receive the handles of said electric drill which extend laterally from said electric drill.
7. A portable device, for refinishing the brake engaging surfaces of brake drums on automobile
- 65 wheels, comprising a post adapted to be secured to the automobile wheel, means for axially aligning said post with said wheel and the brake drum concentrically disposed thereon, a tool-supporting element rotatably mounted on said post, a
- 70 tool carried by said tool-supporting element, means for rotating said tool-supporting element about said post with said tool in engagement with a brake-engaging surface of said drum, said means including a conventional form of electric
- 75 drill which comprises a spindle-receiving chuck and a motor adapted for rotating said chuck, said device comprising a driving spindle operatively connected to the tool-supporting element and adapted to be detachably gripped and rotated by the chuck of said electric drill, means carried by said post for removably supporting said electric drills on the device, said means comprising a disk secured to said post, standards on said disk, crotch ends on said standards adapted to receive the handles of said electric drill which extend laterally from said electric drill and means for adjusting said crotch ends relative to standards to accommodate various conventional types of electric drills.
8. A portable device, for refinishing the brake engaging faces of brake drums on automobile wheels, comprising a post adapted to be secured to and axially aligned with said wheel and the brake drum concentrically disposed thereon, a tool-carrying arm rotatably mounted on said post, a
- 20 tool carried by said arm and adapted to engage a brake-engaging surface of said brake drum, a disk rigidly secured to said post, means on said disk for supporting a conventional form of electric drill which comprises a motor and a chuck
- 25 rotated by said motor, a driving spindle rotatably mounted at one of its ends in said post, its opposite end being adapted to be gripped and rotated by said chuck, a pinion secured to said driving spindle adjacent said disk, a flexible connection
- 30 included in said driving spindle between said pinion and said chuck, a gear secured to said tool-carrying arm, and a train of gears rotatably mounted on said disk and operatively connecting said pinion with the gear on said tool-carrying
- 35 arm.
9. A portable device for refinishing a brake drum on an automobile wheel, said device comprising a post arranged to pass through a central opening in the hub of the wheel, a tool-carrying arm rotatably mounted on the post, an element rigidly secured to the post and forming a shoulder at one side of the arm to prevent movement of the arm in one direction longitudinally of the post, a bearing plate on the post at the
- 45 opposite side of the arm providing a shoulder to prevent movement of the arm in the opposite direction longitudinally of the post, a pair of conical elements adjustable longitudinally on the post and arranged to be seated respectively in the opposite ends of the hub opening to vary the position of the post and consequently the plane of rotation of the arm relative to the plane of the wheel and to center the post relative to the drum, a plurality of readily detachable filler plates on the post between one side of one of said conical elements and the bearing plate to rigidify the post between the wheel and the arm, and a nut threaded on the post at the opposite side of the other of said conical elements for drawing the post assembly into rigid contact with the wheel.
- 50 10. A portable device for refinishing a brake drum on an automobile wheel, said device comprising a post arranged to pass through a central opening in the hub of the wheel, a tool-carrying arm rotatably mounted on the post in a fixed position longitudinally of the post, a pair of conical elements adjustable longitudinally on the post and arranged to be seated respectively in the opposite ends of the hub opening to vary the position of the post and consequently the plane of rotation of the arm relative to the plane of the wheel and to center the post relative to the drum, a motor support rigidly secured to the post

above the arm and preventing movement of the arm in one direction longitudinally of the post, means on the post below the arm preventing movement of the arm in an opposite direction on the post, a motor carried by said support in fixed relation to the post and operatively connected to the arm for rotating the same around the post, a tool carriage slidably mounted for movement on the arm radially with respect to the post, a tool head slidably mounted on the carriage for movement transversely of the arm and parallel to the post, a tool carried by said head for engagement with the drum, and means for automatically feeding the tool and tool head in said direction parallel to the post upon each revolution of the arm about the post.

11. A portable device for refinishing a brake drum on an automobile wheel, said device comprising a post arranged to pass through a central opening in the hub of the wheel, a tool-carrying arm rotatably mounted on the post in a fixed position longitudinally of the post, a pair of conical elements relatively adjustable longitudinally on

the post and arranged to be seated respectively in the opposite ends of the hub opening to center the post relative to the drum, a motor support rigidly secured to the post above the arm and preventing movement of the arm in one direction longitudinally of the post, means on the post below the arm preventing movement of the arm in an opposite direction on the post, a motor carried by said support in fixed relation to the post and operatively connected to the arm for rotating the same around the post, a tool carriage slidably mounted for movement on the arm radially with respect to the post, a tool head slidably mounted on the carriage for movement transversely of the arm and parallel to the post, a tool carried by said head for engagement with the drum, and means for automatically feeding the tool and tool head in said direction parallel to the post upon each revolution of the arm about the post.

EDWARD W. DENKE.
FRANK E. BAUERLE.