

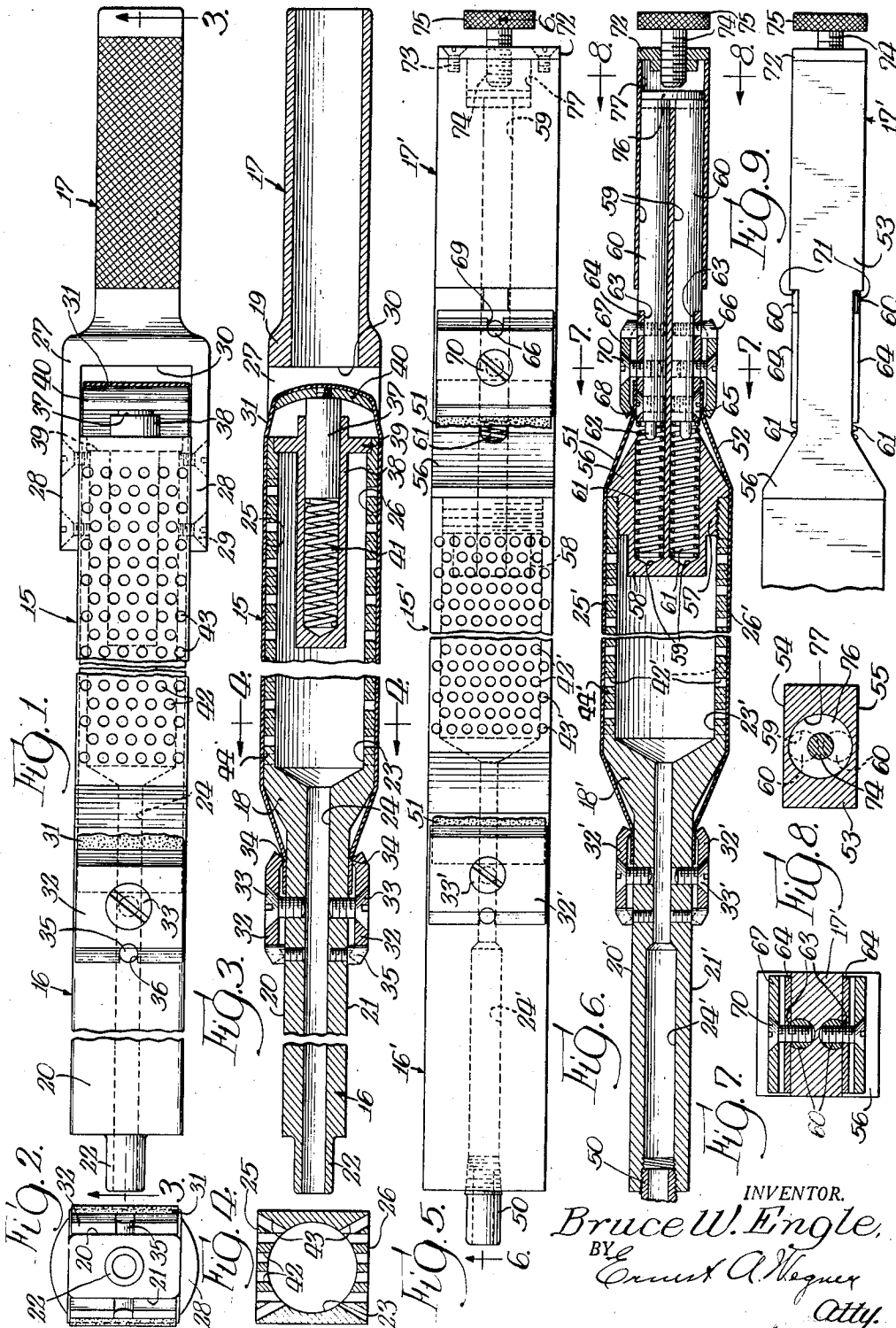
July 20, 1943.

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2,324,918

ABRADING DEVICE

Filed March 11, 1942



UNITED STATES PATENT OFFICE

2,324,918

ABRADING DEVICE

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Application March 11, 1942, Serial No. 434,161

16 Claims. (Cl. 51—187)

The invention relates generally to an abrading device and more particularly to an abrading hand tool for refacing the slide valves and valve seats of air brakes, such as for railway cars.

It is necessary frequently to reface the slide valves and valve seats of air brakes in order that they may have the close fit required for their proper operation. This refacing is an extremely difficult operation requiring great precision, and is usually performed by highly skilled mechanics only. Heretofore, a specially made file has been used which is comparatively expensive and, even so, can be employed a short while only before it becomes so worn or so filled with the fillings as to necessitate cleaning with acid or complete disposal. More often than not, the file is, after but a short use, thrown away. It is a general object of the invention, therefore, to provide a new and improved abrading hand tool of the character described making possible a better result in a shorter time, and even a satisfactory result by one not so highly skilled in the art.

One of the more particular objects is to provide a new and improved abrading hand tool which obviates the present necessity of throwing away the entire tool after but short usage thereof.

Another object is to provide an abrading hand tool having a removable and replaceable abrasive surface retained on the tool in a new and improved manner.

Still another object is to provide an abrading tool having a hollow, main portion with an external, flat, master lapped surface, means for tautly holding over the surface an abrasive strip, and additional means for holding the strip truly and uniformly on the surface.

Other objects and advantages will become apparent from the following detailed description taken in connection with the accompanying drawing, in which:

Fig. 1 is a top plan view of an abrading tool embodying the features of my invention, the tool being shown in actual size but with a portion broken out intermediate the ends thereof.

Fig. 2 is an end view taken from the left in Fig. 1.

Fig. 3 is a longitudinal sectional view taken approximately along the line 3—3 of Fig. 1.

Fig. 4 is a transverse sectional view taken approximately along the line 4—4 of Fig. 3.

Fig. 5 is a view like Fig. 1, but of a modified form of the invention.

Fig. 6 is a longitudinal sectional view taken along the line 6—6 of Fig. 5.

Fig. 7 is a transverse sectional view taken along the line 7—7 of Fig. 6.

Fig. 8 is a transverse sectional view taken along the line 8—8 of Fig. 6.

Fig. 9 is a fragmentary front elevational view of the right end only of the tool as shown in Fig. 5.

While the invention is susceptible of various modifications and alternative constructions, it is shown in the drawing and will hereinafter be described in two embodiments. However, it is not intended that the invention is to be thereby limited to the specific forms shown. On the contrary it is intended to cover all modifications and alternative constructions falling within the spirit and scope of the invention as defined in the appended claims.

Turning first to the form of the invention shown in Figs. 1 to 4, it will be seen that the abrading device or tool is comparatively long and slender, having an intermediate portion 15, which is the effective or abrading portion of the tool, and somewhat reduced portions 16 and 17 at either end forming hand grips for the mechanic using the tool. In the main, the tool is composed of but two parts 18 and 19, with the part 18 forming the main, effective, or abrading portion 15, and the reduced portion 16. The part 18 may be formed in any desired manner, but it has been found that for convenience in manufacture the part 18 is preferably initially of solid stock, rectangular in cross section. For the size of tool here shown, by way of example, the part 18 is preferably of square cross section, as clearly shown in Fig. 4, and is then narrowed at one end and on two sides only by suitable means to produce the rectangular (see Fig. 2), reduced portion 16, leaving two sides 20 and 21 of the same width as the main portion 15. At the extreme left end of the tool the reduced portion is further turned down to form a tubular extension 22 for the reception of an air hose, the purpose of which will later be made known.

The main portion 15 of the tool is made hollow, preferably by drilling from the end opposite the reduced portion 16, thereby forming a bore 23 of comparatively large diameter and having walls 44 of varying thickness. Extending axially of the tool from the bore 23 through the reduced portion 16 and the tubular extension 22 is a reduced bore 24, so that the bore 23 may be in communication with the air hose attached over the tubular extension 22. At least one face of

the main portion 15 of the tool is made absolutely flat with the surface ground and spotted to truth on a master lapping plate. In the present instance, two such true and flat surfaces 25 and 26 are provided. For reasons that will presently become apparent, these surfaces are on opposite sides of the tool and are on the same sides as the wide sides 20 and 21 of the reduced portion 16. Completing the main structure of the tool is the part 19, which is tubular to form the reduced portion 17 and terminates in a bifurcated end 27 the prongs or fingers 28 of which extend over the sides of the main portion 15 not bearing the lapped surfaces 25 and 26. The part 19 is rigidly attached to the part 18 by means of a plurality of screws 29 carried in the fingers 28 and engaging the main portion 15. The base 30 of the bifurcated end 27 is spaced from the end of the main portion 15 to provide the necessary room for operation of a tensioning device presently to be described, and the reduced portion 17 is preferably knurled to improve the grip that may be had by the mechanic.

The abrading means or surface of the tool is herein made removable and replaceable, in order that a clean sharp abrading surface may be had without the effort heretofore required in cleaning, or the expense of an entirely new tool as has been the case heretofore. This abrasive is in the form of a strip 31 either of emery cloth or paper which is adapted to overlie both surfaces 25 and 26. Means is provided herein for holding such a strip 31 of abrasive material removably and at the same time tautly and firmly in position over the faces 25 and 26. This means includes gripper plates 32 mounted one on each of the sides 20 and 21 and retained in position by a screw 33 extending therethrough and threaded into the reduced portion 16. Each gripper plate is, along the edge adjacent the main portion 15, bent slightly inwardly to form a knife edge 34 by means of which the plates are capable, when the screws 33 are turned in, of firmly and uniformly gripping the strip 31 over its entire width. Each plate 32 is held against rotation about its single screw 33 by means of a threaded peg 35 projecting into a notch 36 formed in the edge of the plate opposite the knife edge 34.

The strip 31 is always held taut and thus caused to lie flat over the surfaces 25 and 26 by means of a plunger 37 slidable in a tube 38 inserted into the open end of the bore 23. This tube 38 is closed at its inner end and near its outer end is provided with an annular flange 39 threaded to be screwed into the end of the bore 23 in air-tight relationship to form of the bore a chamber. At its outer end the plunger 37 carries a rounded head 40 over which the strip 31 runs. The plunger 37 is constantly urged outwardly by means of a compression spring 41 interposed between the closed end of the tube 38 and the plunger 37.

Because of the extreme precision required in the refacing of the slide valves and their seats, it is essential that the abrasive strip 31 be as true as the master lapped surfaces 25 and 26. While this is substantially accomplished by the means herein provided for securing the strip in position, additional means is provided for holding the strip firmly and uniformly against the surfaces 25 and 26 throughout the entire area of those surfaces. To that end, the walls having the surfaces 25 and 26 are made perforate with a large number of uniformly arranged perforations 42. Herein the perforations are arranged, as best seen in Fig.

1, in rows with the perforations in adjacent rows staggered. In order that the very edges of the strip 31 may be held tightly against the surfaces 25 and 26, the end perforations 43 of alternate rows are slanted outwardly from the bore 23, as best seen in Fig. 4, in order that they may terminate very closely adjacent the longitudinal edges of the surfaces 25 and 26. When in use, the tool is, through the tubular extension 32 and the air hose attached thereto, connected to vacuum so that the air is exhausted from the interior of the tool and, as a result of the differential in pressure, the abrasive strip 31 is firmly and uniformly, throughout the entire areas of the surfaces 25 and 26, pressed against those surfaces, thereby holding the abrasive strip just as true and uniform as the lapped surfaces 25 and 26 themselves.

It will be apparent from the foregoing that the strip 31 must be continuous at the end passing over the head 40 and that, therefore, the tool will have the same grade of abrasive surface on both sides. In Figs. 5 to 9, there is disclosed a modified form of abrading device constructed so that abrasive strips of different grades may be provided on the opposite faces of the tool. Basically, this tool is the same as that disclosed in Figs. 1 to 4. The tool has a main intermediate portion 15' and reduced portions 16' and 17' at the extremities, forming hand grips for the mechanic using the tool. The main portion 15' and the reduced portion 16' are formed from a single part 18' with the intermediate portion square in transverse cross section and provided with opposite walls 44' having true lapped surfaces 25' and 26' formed with perforations 42' opening through the walls to the bore 23'. The portion 16' is reduced in thickness to result in a rectangular, transverse cross section providing sides 20' and 21' of the same width as the main portion 15'. Extending through the reduced portion 15' is a bore 24' communicating at its inner end with the bore 23' and threaded at its outer end to receive a threaded nipple 50 for the attachment of an air hose (not shown). Gripper plates 32' constructed in identical manner with the plates 32 are secured by screws 33' on the sides 20' and 21'.

Means is provided at the opposite end of the tool for tautly holding individual strips 51 and 52 of abrasive material. This means comprises a basic and preferably initially solid member 53 (see Fig. 9) which, throughout a major portion of its length is generally rectangular in transverse cross section (see Fig. 8), with its major dimension equal to the width of the main portion 15' so as to provide two flat sides 54 and 55 equal in width to the width of the main portion 15'. At its inner end, the element 53 flares outwardly from the sides 54 and 55 to form a square base 56, which in turn is turned to a round portion 57 of the diameter of the bore 23' and threaded to be received threadedly in the open end of the bore 23'. The base 56 inwardly of the threaded portion 57 is provided with a further reduced portion 58 so as not to block the apertures 42' opposite the reduced portion 58.

The element 53 has extending longitudinally thereof two bores 59 terminating short of the inner or left hand extremity of the element and opening through the outer or right hand extremity of the element. Reciprocable in each of the bores 59 is an elongated plunger 60 constantly urged outwardly by a compression spring 61 inserted in the bore between the closed end thereof

and the plunger. Each plunger 60 may, if desired, be at its inner end formed with a reduced and centered projection 62 for holding the end of the spring 61 bearing against the plunger in position. Each plunger 60 is at its inner end formed with a flat area 63 (see Figs. 6 and 7), and secured to this surface is a plate 64 approximately square and approximately equal to the width of the sides 54 and 55. Herein the plate is secured by a screw 65 and by a threaded peg 66, both extending through the plate 64 and threaded into the plunger 60 through the flattened area 63. Mounted over and cooperating with each plate 64 is a gripper plate 67 of identical construction as the gripper plates 32 and 32', having a knife edge 68 at its inner end and a notch 69 at its outer end for the reception of the peg 66. The plate is retained and adjusted to releasing or gripping position by means of a screw 70 threaded into the plate 64 and the plunger 60.

In order that the plungers with the plates 64 secured thereon may have a limited movement under the influence of the spring 61, the sides 54 and 55 of the element 53 are cut away at 71 and the plungers 60 are so proportioned as to terminate short of the outer end of the bores 59 when the abrasive strips 51 and 52 are drawn taut. The outer ends of the bores 59 are closed by an end plate 72 removably secured by screws 73. To facilitate application of the abrasive strips 51 and 52, means is provided for holding the plungers 60 in their inner positions against the action of the springs 61. To that end, there is threaded through the end plate 72 an adjusting screw 74 having a large knurled head 75. The end of the screw 74 bears against a disk 76 which partially overlies the ends of the plungers 60 and which moves in a third bore 77 formed in the end of the element 53 concentric with the screw 74 (see Fig. 8 in particular). Thus by turning the adjusting screw 74 inwardly it will bear against the disk 76, which in turn will bear against the ends of the plungers 60, thereby forcing the plungers inwardly against the action of the compression springs 61. In this inner position of the plungers 60 the strips 51 and 52 of abrasive material may conveniently be inserted underneath the gripper plates 67 and the screws 70 turned inwardly, causing the plates securely to grip the ends of the strips 51 and 52 which have already been secured at their other ends by the gripper plates 32'. The screw 74 is then again turned outwardly releasing the plungers 60 to the action of their respective springs 61, whereupon each plunger will be forced outwardly individually until its respective abrasive strip is drawn tautly over the lapped surface of the abrading tool. It is believed apparent that with this construction the strips 51 and 52, being independent and being independently secured, may, of course, be of different grades of abrasive, so that one surface of the tool may be employed for the roughing cuts, while the other surface may be employed for the finishing cuts. Like the tool disclosed in Figs. 1 to 4, it is intended, of course, that the tool during operation will be connected to vacuum so that the air within the tool will be exhausted, causing the difference in pressure firmly and uniformly to press the abrasive sheets onto the lapped surfaces 25' and 26' throughout the entire area thereby making the abrasive as true and uniform as the lapped surfaces themselves.

It is also believed apparent from the foregoing that I have perfected a tool adapted for abrading generally, but especially adapted for resurfacing slide valves and their seats in air brakes, which

permits the employment of an inexpensive abrading surface that may be replaced at frequent intervals to keep the tool constantly in proper condition. With my construction, the abrading surface may when worn be discarded and replaced at very slight cost, thus providing a great economy over the present practice of requiring the entire tool to be reconstructed or thrown away. Such replacement of the abrading surface is with my constructions readily and quickly accomplished so as to take little of the mechanic's time and will thus enable the tool to be kept in prime condition, enabling the mechanic to perform better work more quickly. Most important of all is the combination of the taut holding of the abrasive strip plus the application, by the employment of vacuum, of a uniform pressure on the outer surface of the strip throughout the entire area of the working surface so that, though the abrasive surface is separate and removable from the tool, it nevertheless is held so firmly and uniformly as to provide a true surface.

I claim as my invention:

1. A hand-held abrading device comprising a first elongated part providing a main portion and a reduced portion forming a hand grip at one end, said elongated part having a chamber in the main portion formed by a bore opening through the end remote from the reduced portion, walls with opposed flat working surfaces on the exterior of the main portion extending longitudinally thereof and a plurality of perforations in each of said walls opening through the working surface and communicating with said chamber, a tubular member threaded into the open end of the bore to close the same, said tubular member being closed at one end and open at the other, a plunger reciprocable in the tubular member and projecting through the outer end thereof, a compression spring constantly urging the plunger outwardly, a bore in the reduced portion communicating with the chamber in the main portion and opening at the other end through the end of the reduced portion, said reduced portion terminating in means adapted for connection to an exhausting device for exhausting the air in the chamber during use of the device, means on opposite sides of the reduced portion for releasably gripping the ends of a strip of abrasive material overlying both working surfaces and engaged intermediate its ends by said plunger to draw the abrasive material taut and smooth to permit the pressure differential further to hold the material truly on the working surfaces, and a second part having a reduced portion forming a hand grip and means adapting it for attachment to said first part opposite the reduced portion of said first part.

2. A hand-held abrading device comprising an elongated part providing a main portion and a reduced portion forming a hand grip at one end, said elongated part having a chamber in the main portion formed by a bore opening through the end remote from the reduced portion, walls with opposed flat working surfaces on the exterior of the main portion extending longitudinally thereof, and a plurality of perforations in each of said walls opening through the working surface and communicating with said chamber, a tubular member threaded into the open end of the bore to close the same, said tubular member being closed at one end and open at the other, a plunger reciprocable in the tubular member and projecting through the outer end thereof, a compression spring constantly urging the plunger outwardly, a bore in the reduced portion communicating with the chamber in the main portion and opening at

the other end through the end of the reduced portion, said reduced portion terminating in means adapted for connection to an exhausting device for exhausting the air in the chamber during use of the device, and means on opposite sides of the reduced portion for releasably gripping the ends of a strip of abrasive material overlying both working surfaces and engaged intermediate its ends by said plunger to draw the abrasive material taut and smooth to permit the pressure differential further to hold the material truly on the working surfaces.

3. A hand-held abrading device comprising an elongated body having a hollow intermediate portion and reduced end portions forming hand grips, means communicating with the hollow intermediate portion terminating in means adapted for connection to a device adapted to maintain the hollow intermediate portion below atmospheric pressure during operation of the abrading device, said elongated body having at least one wall with an elongated and flat working surface on the exterior of the intermediate portion and a plurality of apertures in said wall opening through the working surface and communicating with the hollow interior of the intermediate portion, and means for detachably holding an abrasive strip in smooth and uniform contact with the working surface including a gripper plate having a knife edge extending fully across the abrasive strip to hold the same flatwise over the working surface, and means at the other end of the working surface engaging the strip of abrasive material to draw the same taut.

4. A hand-held abrading device comprising an elongated body having hand grips at each end thereof, a hollow intermediate portion adapted to be maintained below atmospheric pressure during operation of the device, walls with oppositely disposed working surfaces on the exterior of the intermediate portion and a plurality of apertures in each of said walls opening through the working surface and communicating with the interior of the intermediate portion, means communicating with the hollow intermediate portion terminating in means adapted for connection to a device for maintaining the hollow intermediate portion below atmospheric pressure, and means for detachably holding an abrasive strip tautly in overlying relation to the working surfaces comprising a pair of means each adjustable to grip or release an end of a strip of abrasive overlying both surfaces, a tube disposed largely within the hollow intermediate portion closed at its inner end and opening through its outer end, a plunger reciprocable in the tube carrying a head for engagement with the inner side of a strip of abrasive material, and a compression spring constantly urging said plunger outwardly to draw the abrasive strip taut and tightly against the working surface.

5. A hand-held abrading device comprising an elongated body having hand grips at each end thereof, a hollow intermediate portion adapted to be maintained below atmospheric pressure during operation of the device, walls with oppositely disposed working surfaces on the exterior of the intermediate portion and a plurality of apertures in each of said walls opening through the working surface and communicating with the interior of the intermediate portion, means communicating with the hollow intermediate portion terminating in means adapted for connection to a device for maintaining the hollow intermediate portion below atmospheric pressure, and means for detachably holding an abrasive strip tautly

in overlying relation to the working surfaces comprising a pair of means each adjustable to grip or release an end of a strip of abrasive overlying both surfaces, and means engaging the strip of abrasive intermediate its ends yieldably drawing the abrasive strip taut to cause the same to lie flat and smooth over and in contact with the working surfaces.

6. A hand-held abrading device comprising an elongated member having a chamber therein adapted to be maintained below atmospheric pressure during operation of the device, a wall with a working surface on the exterior of the member extending longitudinally thereof and a plurality of apertures in said wall opening through the working surface and communicating with the chamber, means in communication with the chamber adapted for connection to pressure reducing means, and means for detachably holding an abrasive strip tautly in overlying relation to the working surface comprising a stationary means at one end of the working surface adjustable to grip or release one end of a strip of abrasive, and yieldable means at the other end of the working surface engaging the strip of abrasive for drawing the same taut.

7. A hand-held abrading device comprising an elongated member having hand grips at each end thereof, a hollow intermediate portion adapted to be maintained at below atmospheric pressure during operation of the device, a wall with a working surface on the exterior of the intermediate portion and a plurality of apertures in the wall opening through the working surface and communicating with the interior of the intermediate portion, means communicating with the hollow intermediate portion terminating in means adapted for connection to a device for maintaining the hollow intermediate portion below atmospheric pressure, and means for detachably holding an abrasive strip tautly in overlying relation to the working surface.

8. A hand-held abrading device comprising a member having at least one hand grip and a main portion having a chamber therein adapted to be maintained at below atmospheric pressure during operation of the device, a wall with a working surface on the exterior of the main portion and a plurality of apertures in the wall opening through the working surface and communicating with the chamber, means in communication with the chamber adapted for connection to pressure reducing means, and means for detachably holding an abrasive sheet tautly in overlying relation to the working surface.

9. A hand-held abrading device comprising an elongated body having a main portion with a bore therein, a wall with a flat surface extending longitudinally of the main portion and a plurality of apertures in the wall opening through the flat surface and to the bore, said apertures being disposed in rows with the apertures in alternate rows staggered and the end apertures in each second row inclined outwardly from the bore to the surface to open through the surface closely adjacent the longitudinal edge thereof, a reduced portion forming a hand grip having a bore therein communicating with the bore in the main portion and adapted to be connected to an exhausting device during use of the abrading device to reduce the pressure in the bore of the main portion, and means for replaceably holding a strip of abrasive material tautly in overlying relation to the flat surface sealing the apertures therein.

10. A hand-held abrading device comprising an elongated body having a main portion with a

chamber therein adapted to be maintained below atmospheric pressure during use of the device, a wall with a flat surface extending longitudinally of the main portion and a plurality of apertures in the wall opening through the surface and communicating with the chamber, means in communication with the chamber adapted for connection to pressure reducing means, a hand grip portion at one end of said main portion having a flat side offset inwardly from the surface, said side having a width equal to the width of the surface, and means for removably holding a strip of flexible abrasive flat on the surface including a gripper plate cooperating with the flat side to hold the strip on a line across its entire width.

11. A hand-held abrading device comprising an elongated member having a chamber therein adapted to be maintained below atmospheric pressure during operation of the device, walls with diametrically oppositely disposed working surfaces on the exterior of the member extending longitudinally thereof and a plurality of apertures in each wall opening through the working surface and communicating with the chamber, means in communication with the chamber adapted for connection to pressure reducing means, and means for holding independently and detachably an abrasive strip tautly in overlying relation to each working surface.

12. A hand-held abrading device comprising an elongated member having a chamber therein adapted to be maintained below atmospheric pressure during operation of the device, walls with diametrically oppositely disposed working surfaces on the exterior of the member extending longitudinally thereof and a plurality of apertures in each wall opening through the working surface and communicating with the chamber, means in communication with the chamber adapted for connection to pressure reducing means, and means for holding independently and detachably an abrasive strip tautly in overlying relation to each working surface, comprising a stationary means at one end of each working surface adjustable to grip or release one end of an abrasive strip, and independent means at the other end of each working surface adjustable to grip or release the other end of the abrasive strip and yieldably urged outwardly to draw the strip tautly in overlying relation to the working surface.

13. A hand-held abrading device comprising an elongated member having a chamber therein adapted to be maintained below atmospheric pressure during operation of the device, walls with diametrically oppositely disposed working surfaces on the exterior of the member extending longitudinally thereof and a plurality of apertures in each wall opening through the working surface and communicating with the chamber, means in communication with the chamber adapted for connection to the pressure reducing means, and means for holding independently and detachably an abrasive strip tautly in overlying relation to each working surface comprising a stationary means at one end of each working surface adjustable to grip or release one end of an abrasive strip, independent means at the other end of each working surface adjustable to grip or release the other end of the abrasive strip and yieldably urged outwardly to draw the strip tautly in overlying relation to the working surface, and a common means for said independent means adjustable to hold said independent means in an inner position for convenience in attaching the abrasive strips.

14. A hand-held abrading device comprising

an elongated member having a main intermediate portion with a chamber therein adapted to be maintained below atmospheric pressure during operation of the device and reduced end portions forming hand grips, walls with diametrically oppositely disposed working surfaces on the exterior of the main portion extending longitudinally thereof and a plurality of apertures in each wall opening through the working surface and communicating with the chamber, means in communication with the chamber adapted for connection to pressure reducing means, and means for holding independently and detachably an abrasive strip tautly in overlying relation to each working surface comprising stationary means on opposite sides of one reduced portion corresponding to the working surfaces on the main portion adjustable to grip or release one end of the abrasive strips, and independent and movable means for holding the other ends of the strips comprising parallel longitudinally extending bores in the remaining reduced portion closed at their inner ends, a plunger reciprocable in each bore, a compression spring in each bore interposed intermediate the closed end thereof and the plunger to urge the plunger outwardly, and means carried by each plunger for releasably gripping an abrasive strip.

15. A hand-held abrading device comprising an elongated member having a main intermediate portion with a chamber therein adapted to be maintained below atmospheric pressure during operation of the device and reduced end portions forming hand grips, walls with diametrically oppositely disposed working surfaces on the exterior of the main portion extending longitudinally thereof and a plurality of apertures in each wall opening through the working surface and communicating with the chamber, means in communication with the chamber adapted for connection to pressure reducing means, and means for holding independently and detachably an abrasive strip tautly in overlying relation to each working surface comprising stationary means on opposite sides of one reduced portion corresponding to the working surfaces on the main portion adjustable to grip or release one end of the abrasive strips, and independent and movable means for holding the other ends of the strips comprising parallel longitudinally extending bores in the remaining reduced portion closed at their inner ends, a plunger reciprocable in each bore, a compression spring in each bore interposed intermediate the closed end thereof and the plunger to urge the plunger outwardly, each plunger having a flattened area near the inner end thereof, said reduced portion being cut away on opposite sides to expose the plungers at their flattened areas, a plate secured to each plunger on its flattened area to provide a flat surface equal to the width of the working surfaces, and a gripper plate mounted over said first mentioned plate and cooperable therewith to grip an abrasive strip.

16. A hand-held abrading device comprising an elongated member having a main intermediate portion with a chamber therein adapted to be maintained below atmospheric pressure during operation of the device and reduced end portions forming hand grips, walls with diametrically oppositely disposed working surfaces on the exterior of the main portion extending longitudinally thereof and a plurality of apertures in each wall opening through the working surface and communicating with the chamber, means in communication with the chamber adapted for con-

nection to pressure reducing means, and means for holding independently and detachably an abrasive strip tautly in overlying relation to each working surface comprising stationary means on opposite sides of one reduced portion corresponding to the working surfaces on the main portion adjustable to grip or release one end of the abrasive strips, and independent and movable means for holding the other ends of the strips comprising parallel longitudinally extending bores in the remaining reduced portion closed at their inner ends, a plunger reciprocable in each bore, a com-

pression spring in each bore interposed intermediate the closed end thereof and the plunger to urge the plunger outwardly, means carried by each plunger for releasably gripping an abrasive strip, and means including an adjustable screw operable when turned in to engage both plungers and force the same inwardly against the action of their compression springs to hold the same in an inner position during attachment of the abrasive strips.

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