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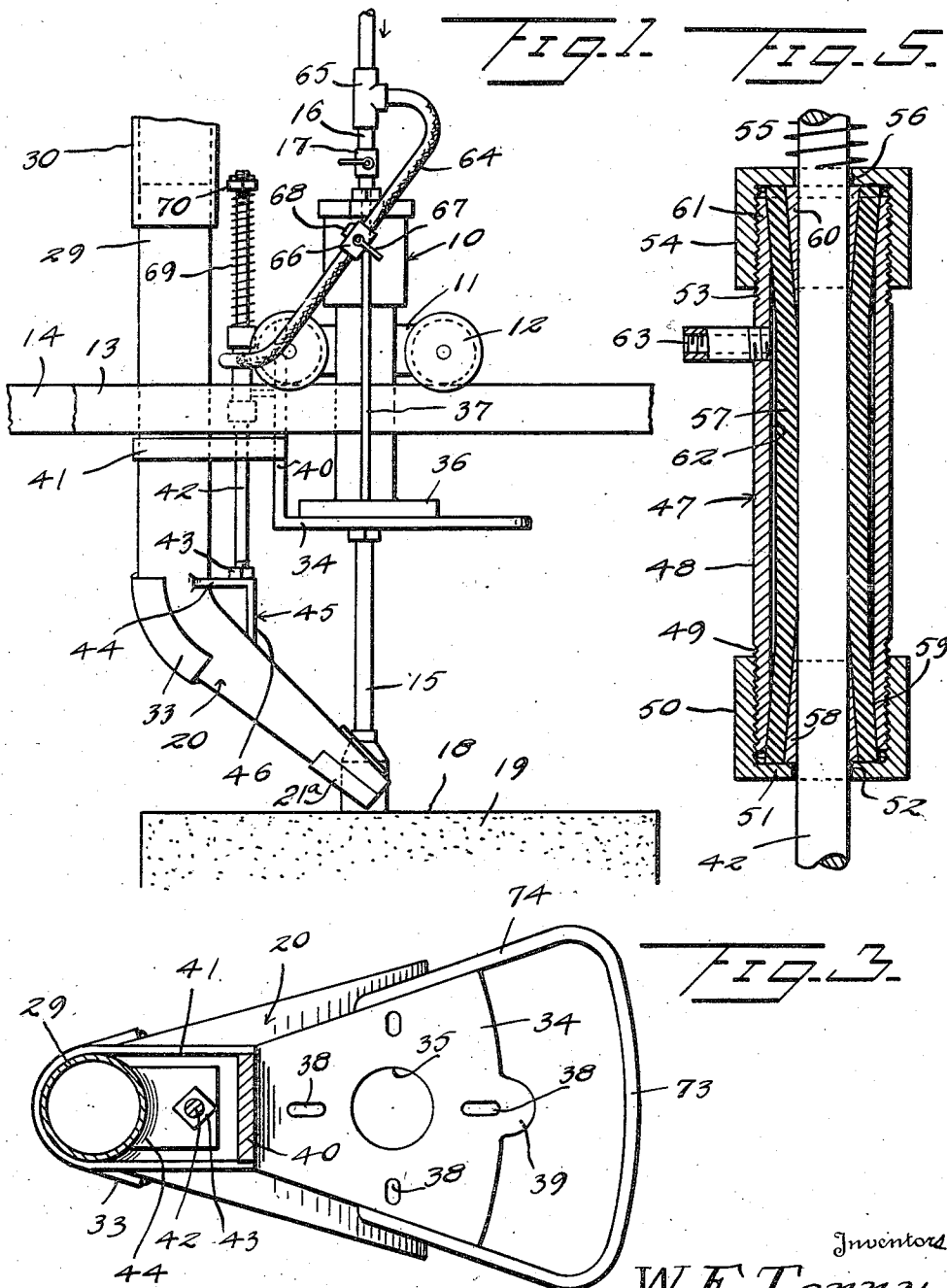
W. F. TERRY ET AL.

2,308,403

COMBINATION EXHAUST HOOD AND CLAMPING DEVICE

Filed Oct. 2, 1941

2 Sheets-Sheet 1



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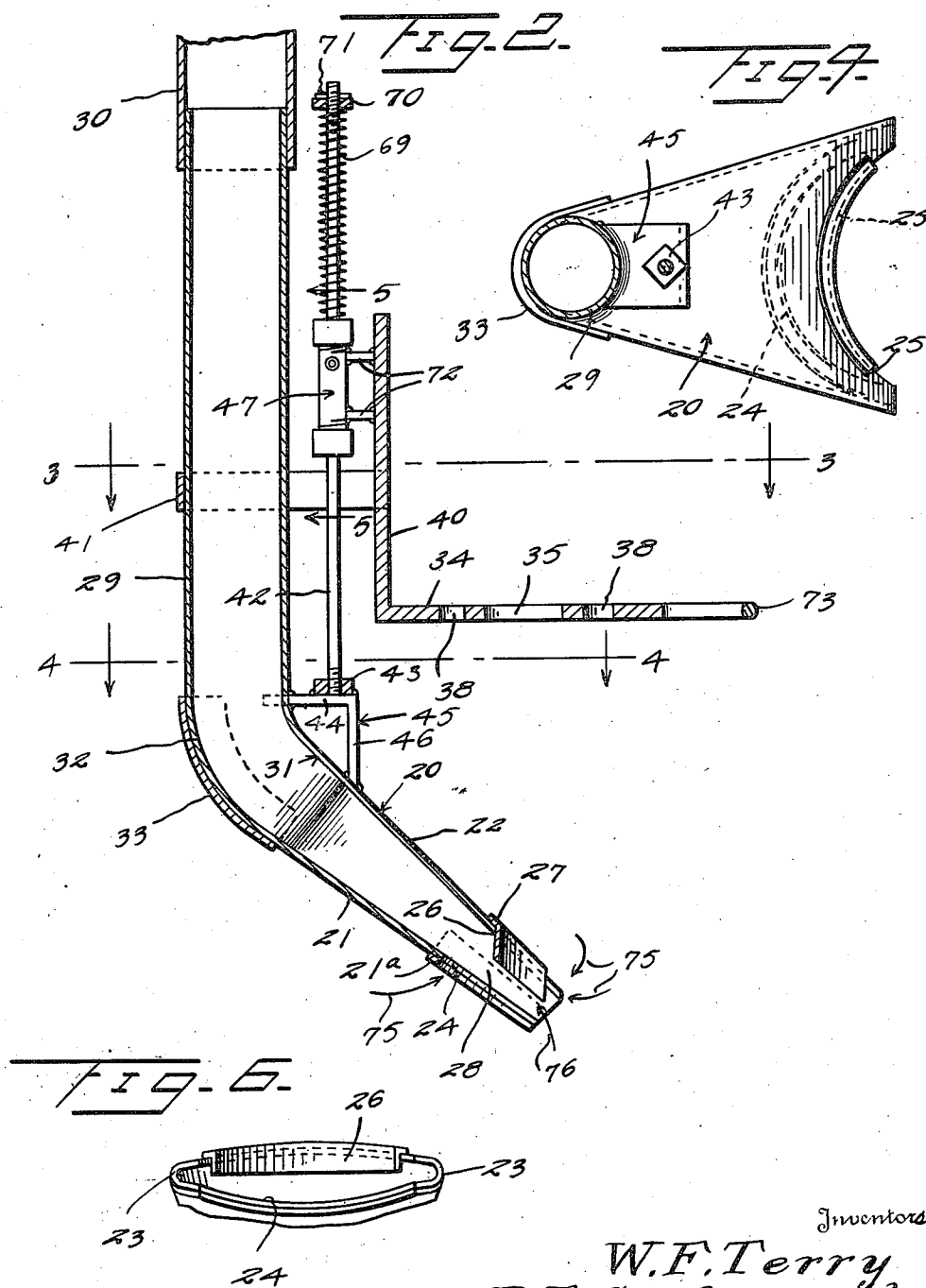
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COMBINATION EXHAUST HOOD AND
CLAMPING DEVICEWarren Franklin Terry, Somerville, Mass., and
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9 Claims. (Cl. 125-1)

This invention relates to stone surfacing machines and more particularly to a suction means for removing dust, fumes or the like during the surfacing of the work.

An object of this invention is to provide an attachment in the form of a suction hood which may be combined with a surfacing machine, particularly a machine which is supported on a pair of horizontal rails or tracks, the suction hood being so constructed that it may be extended between the rails or tracks and secured to the surfacing machine head.

Another object of this invention is to provide an attachment of this kind which is adapted to remove the dust, flying particles, or fumes from the work, and which is so constructed that the vibration of the tool will not affect the position or adjustment of the suction hood.

A further object of this invention is to provide in a suction hood of this kind a quick and improved means for adjusting and supporting the suction hood in a selected position relative to the surface of the work and the tool.

A further object of this invention is to provide a holding or supporting means for the suction hood which is adapted to lock the hood in adjusted position, the locking means receiving its force from the air operating the pneumatic tool.

A further object of this invention is to provide in a suction hood of this kind a fluid pressure locking means for locking the hood in its adjusted position relative to the tool and the work, and a resilient means for constantly urging the suction hood away from the work so that in the event the fluid pressure locking or holding means becomes released the suction hood will be automatically moved away from the work.

A further object of this invention is to provide in a suction hood of this kind an improved suction hood and means for reinforcing the hood at the points where the chips or particles drawn into the hood strike the bend at the rear of the hood.

A further object of this invention is to provide a suction hood formed with an undercut lower portion to form an air lift for lifting dust and particles into the hood.

A further object of this invention is to provide in a suction hood of this kind a deflector for knocking down chips and also providing an increased velocity of air for sweeping the dust and particles along the work surface into the hood.

To the foregoing objects and others which may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts as will be more specifically referred

to and illustrated in the accompanying drawings, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

5 Figure 1 is a detail side elevation of a suction device combined with a pneumatic surfacing machine which is mounted on a pair of horizontally disposed tracks.

10 Figure 2 is a vertical section taken substantially through the center of the attachment, Figure 3 is a sectional view taken on the line 3-3 of Figure 2,

Figure 4 is a sectional view taken on the line 4-4 of Figure 2,

15 Figure 5 is a sectional view taken on the line 5-5 of Figure 2, and

Figure 6 is a fragmentary front elevation of the suction nozzle.

Referring to the drawings, the numeral 10 designates generally a pneumatic drill or surfacing tool operator which is mounted on a carriage 11 having pairs of flanged wheels 12 which engage a pair of spaced apart horizontally disposed tracks 13 and 14. The tracks 13 and 14 are supported by a standard (not shown) so that the tracks 13 and 14 with the operator 10 may be swung in a horizontal plane about a pivot or fulcrum or raised vertically and the carriage 11 may be freely moved lengthwise of the tracks 13 and 14.

The operator 10 has a bit or tool 15 connected therewith, and a fluid pressure supply pipe 16 is connected with the operator 10 and is provided with a valve 17 whereby the fluid pressure may be regulated in order to provide for the desired operation of the operator 10.

In order to provide a means whereby the dust, fumes, chips, or other particles generated by the tool 15 of the upper surface 18 of the work 19 may be withdrawn or removed at the time of generation from the surface of the work, we have provided an exhaust hood generally designated as 20 which is adapted to be connected to a suitable source of suction, such as a suction fan or the like. The hood 20 includes a lower substantially truncated triangular-shaped wall 21, an upper truncated triangular-shaped wall 22, and a pair of arcuate side walls 23 which connect the lower and upper walls 21 and 22, respectively, together.

The forward end of the lower wall 21 is formed with a rearwardly extending cutout 24 which terminates at its forward end at a point inwardly from the opposite marginal edges or sides of the bottom wall 21, as shown in Figure 6. The upper

top wall 22 is also formed with an arcuate cutout 25 which is formed on a radius substantially greater than the radius of the cutout 24 so that the depth of the cutout 25 will be substantially less than the depth of the cutout 24. A reinforcing plate 21a is welded or otherwise fixedly secured to the lower side of the bottom wall 21 about the marginal edges of the cutout 24.

A substantially vertically disposed longitudinally arcuate baffle or flange 26, which is formed with a longitudinally arcuate angularly disposed base 27, is welded or otherwise secured to the top wall 22 along the marginal portion of the cutout 25. The depth of the baffle or deflector 26 is substantially less than the distance or space between the top wall 22 and the bottom wall 21, as shown in Figure 2, so as to provide a restricted open end or mouth 28. The deflector 26 not only provides for the restriction of the mouth or open end of the nozzle 20, but also provides a means whereby the chips or larger particles generated by the bit or tool 15 will be deflected in a manner whereby these chips or large particles may be readily drawn into the mouth or open end 28 of the nozzle. The length of the deflector 26 is substantially less than the length of the cutout 25, as shown in Figure 4, so that the opposite end portions of the deflector 26 will not unduly restrict the open end of the hood 20.

A vertically disposed suction pipe 29 is adapted to be mounted between the two rails 13 and 14 rearwardly of the operator 10 and the upper end of the pipe 29 is adapted to be connected by means of a suction pipe 30 with a suitable source of suction supply. The lower end of the suction pipe 29 is adapted to be connected to the hood 20 by means of an arcuate connecting pipe 31. Preferably, the suction hood 20 is disposed on an angle to the vertical as shown in Figures 1 and 2. In order to provide a means whereby the joint 31 may be reinforced at the outer side 32 thereof, we have provided an arcuate reinforcing plate 33 which is adapted to be welded or otherwise fixedly secured to the joint 31. In this manner, in the event the outer wall or side 32 of the joint 31 is pierced or worn unduly thin by the impact of the stone particles therewith, the reinforcing plate 33 will prevent the admission of air through the worn parts. The reinforcing plate 33 may be readily replaced by either applying a second plate thereover or removing the plate 33 and substituting a new plate therefor. In this manner in the event the joint 31 becomes unduly worn, it is unnecessary to replace the entire attachment. A similar plate 21a is used to reinforce the hood 20 for the same purpose.

The hood 20 including the joint 31 and the vertical suction pipe 29 are adapted to be supported from the operator 10 by means of a horizontally disposed base plate 34. The base plate 34, as shown in Figure 3, is substantially of sector shape and is provided with a centrally disposed relatively large opening 35 through which a portion of the operator 10 may project. The operator 10 is provided at its lower end portion with a base flange or opposed ears 36 and fastening devices 37 tightly hold the operator to the base plate 34. Preferably, the base plate 34 is formed with opposed elongated slots or openings 38 through which the fastening devices 37 are adapted to extend. In this manner, the operator 10 may be accurately centered with respect to the opening 35 and the base plate 34 may be used with different types of operators than the type herein disclosed. The base plate 34 is formed

with a forwardly extending ear 39 and an elongated opening or slot 38 is formed in the plate 34 adjacent the ear 39.

A vertically disposed plate 40 is secured to or formed integral with the rear or reduced portion of the base plate 34 and extends vertically from the plate 34 between the two rails 13 and 14. A U-shaped strap 41 has the free legs thereof secured to the opposite edges of the plate 40 and the strap 41 extends about the vertical pipe 29 so as to form a reinforcing means to prevent bending or undue strains being applied to the pipe 29 and to the nozzle 20. A vertically disposed rod or shaft 42 is disposed between the pipe 29 and the plate 40 and is threaded at its lower end in a nut 43 which is welded or otherwise secured to the horizontal side 44 of an angle-shaped supporting and bracing member generally designated as 45. The opposite or vertical side 46 of the angle member 45 is welded or otherwise secured to the top wall 22 of the nozzle 20. The rod 42 is adjustably supported from a nozzle adjusting member generally designated as 47.

The nozzle adjusting and supporting member 47 includes a cylindrical body 48 through which the rod 42 axially extends, and the lower end of the cylindrical body 48 is formed with peripheral threads 49 on which a cap 50 is threaded. The lower wall 51 of the cap 50 is formed with an axial opening 52 through which the rod 42 loosely extends. The opposite or upper end of the body 48 is formed with peripheral threads 53 on which a cap 54 is threaded, and the top wall 55 of the cap 54 is formed with an axial opening 56 through which the rod 42 loosely extends.

In order to provide a means whereby the rod 42 may be adjustably locked or held with respect to the body 48, we have provided a yieldable or resilient tubular lock 57 which is positioned within the body 48 and disposed about the rod 42. The resilient tubular member 57 at its lower end is tightly clamped within the lower end of the body 48 by means of a substantially conical-shaped wedge member 58 engaging about the rod 42. The inner surface of the cylindrical body 48 at the lower end thereof is formed with a taper 59 which is coincident of the taper of the wedge 58 so that when the cap is threaded onto the lower end of the body 48 the wedge 58 will be moved upwardly by contact with the bottom wall 51 and will spread or distort the lower end of the tubular member 57 in order to tightly clamp the lower end of the tubular member 57 against the tapered surface 59 of the body 48.

The upper end of the resilient tubular clamp or locking member 57 is adapted to be tightly secured within the cylindrical body 48 by means of a substantially conical-shaped wedge member 60 which engages loosely about the rod 42. The inner surface of the cylindrical body 48 at the upper end thereof is tapered as at 61 on an angle coincident with the peripheral surface of the wedge member 60 so that when the cap 54 is threaded onto the upper end of the cylindrical body 48 the wedge member 60 will be moved inwardly and the upper end of the resilient locking member 57 will be spread or distorted and clamped between the periphery of the wedge member 60 and the tapered surface 61 of the cylindrical member 48.

The outer diameter of the resilient tubular locking member 57 is substantially less than the inner diameter of the cylindrical member 48 so as to thereby form an air space or chamber 62 between the cylindrical member 48 and the ex-

terior of the resilient locking member 57. A fluid pressure pipe 63 is threaded through or welded to the cylindrical member 48 between the ends thereof and communicates with the air chamber 62 so that fluid pressure may be applied in the chamber 62 in order to contract the resilient locking member 57 against the peripheral surface of the rod 42.

The pipe 63 is adapted to be connected by means of a flexible hose 64 to the fluid pressure pipe line 16 at a point outwardly from the valve 17 so that the fluid pressure applied to the interior of the cylindrical body 48 will be independent of any pressure which is used in the operation of the machine operator 10. The hose or flexible duct 64 is adapted to be connected to a T or coupling 65 which is interposed in the air pipe 16. A three-way valve 66 is interposed in the duct or hose 64 being provided with an operating handle 67 and the three-way valve 66 includes a bleed or exhaust branch 68 which communicates with the atmosphere so that when the handle 67 is turned to cut off the cylinder 48 from the fluid line 16, the fluid pressure in the chamber 62 may be exhausted through the outlet 68. In this manner, when it is desired to vertically adjust the hood 20, it is only necessary that the valve member 66 be turned to cut off the fluid pressure from the pipe line 16 to the cylinder 48.

The nozzle or hood structure hereinbefore described is held against free downward movement with respect to the locking structure 47 when the valve 66 is turned to a released position by means of a spring 69 which is loosely disposed about the rod 42 above the upper cap 54. The lower end of the spring 69 bears against the upper side of the top wall 55 of the cap 54, and the upper end of the spring 69 bears against a nut 70 threaded on the upper end portion of the rod 42 and held against upward movement with respect to the rod 42 by means of a cotter pin 71 which is extended through the upper end portion of the rod 42. The cylinder 48 is supported from the vertically disposed plate 40 by means of a pair of rearwardly extending vertically spaced apart parallel lugs or ears 72 which are welded to the rear side of the plate 40. The base plate 34 has fixedly secured thereto an arcuate handle 73 which is disposed in forwardly spaced relation to the forward edge of the base 34 and the handle 73 has formed integral therewith a pair of rearwardly convergent supporting arms 74 which engage on opposite sides of the base plate 34 and which are adapted to be welded or otherwise fixedly secured thereto. The handle 73 is adapted to be grasped by one hand of the user of the device in order to move the entire structure including the operator 10 and the nozzle structure lengthwise of the supporting tracks 13 and 14.

In the use and operation of this device, the suction structure is adapted to be secured to the operator 10 by securing the base 36 of the operator 10 to the upper side of the base member 34. The pipe 29 is positioned between the two supporting rails 13 and 14 and the fluid pressure pipe 63 is adapted to be connected to the fluid pressure pipe 16 at a point rearwardly from the valve member 17 which controls the flow of fluid to the operator 10. The hood 20 may be accurately adjusted so that the lower end thereof will be positioned closely adjacent the surface 18 of the work 19 by downward pressure on the rod 42 or the pipe 29. When the hood 20 is moved

to a lowered position the spring 69 will be compressed, thereby cushioning the downward movement of the hood 20, and when the desired position of the hood 20 has been obtained the valve 66 may be moved to a position communicating fluid pressure from pipe 16 to cylinder 48. The valve 66 is left in the open position during the operation of the bit operator 10. The fluid pressure in the cylinder 48 compresses the resilient tubular locking member 57 about the periphery of the rod 42 so that the rod will be firmly locked against endwise movement with respect to the cylinder 48.

Heretofore, suction devices have been provided for surfacing machines similar to the machine herein disclosed, but such devices have not been entirely satisfactory due in part to the manner in which the suction devices were supported with respect to the surfacing machine and with respect to the surface of the work. When the surfacing machine 10 is in operation, the suction at the open or lower end of the hood 20 will draw the air in as shown by the arrows in Figure 2. A portion of this air will be drawn in from the rear side of the hood 20 as shown by the arrow 75, while other streams of air will be drawn in as shown by the arrows 76 and 77.

The forwardly moving stream of air which flows from the rear side of the hood 20 into the cutout 24 will provide a dust or particle lifting stream for lifting the dust, fumes, or particles into the interior or mouth 28 of the hood and permit the operator to see the progress of his work without causing his working lines to become obliterated. The chips or other heavier particles which are thrown upwardly from the bit 15 are adapted to strike the deflector 26 and these particles will then be drawn into the interior of the hood 20 by the suction force of the inwardly moving air. In addition, the deflector plate 26 reduces that portion of the amount of air which would ordinarily be drawn into the hood around the top surface 75 and causes this air to be drawn more from the front of the opening. It also increases the velocity of the air past the point of the tool or bit due to the partial constriction of the opening of the hood. This tends to sweep dust and chip particles along the work surface into the hood. The area of high velocity of air created at the two ends of the hood opening by the omission of the deflector at these points catches those dust particles which would otherwise escape the hood at its end boundaries.

The suction attachment hereinbefore described can be manufactured at a relatively small cost, and due to the elimination of bolts or rivets the suction hood will not become loosened by the vibrations to which it is subjected in the operation of the surfacing machine 10 or the cutting action of the abrasive on the projecting rivet heads. By providing the air lock structure 47 for adjusting the hood structure with respect to the work, the user of this device can accurately adjust the lower end of the hood 20 with respect to the surface of the work and the resilient character of the lock will prevent any loosening thereof by reason of the vibrations in the operation of the surfacing machine.

Furthermore, the provision of the air lock will permit the user of the device to adjust the hood for the different bits or tools used with machine 10, whereas heretofore it has been the practice of users to tightly lock the exhaust hood in one position for one tool by means of various clamping devices consisting of bolts and wing nuts which re-

quire the use of wrenches for adjustment, and fail to readjust the nozzle structure for a different tool with the result that the hood structure does not operate at its full efficiency.

However, with a readily releasable and readily locked fluid locking means as hereinbefore described, the user of the device can easily and quickly adjust and lock the hood structure for different kinds of surfacing bits.

The terms "suction hood," "suction nozzle," "suction devices," and "exhaust hood" are alternative terms used in the description and claims for the device shown in the drawings.

What we claim is:

1. In combination a horizontally disposed and horizontally swingable track structure including a pair of spaced apart parallel tracks, an abrading machine disposed in a vertical position between said tracks, a carriage fixed to said machine and movable on said tracks, a substantially V-shaped suction nozzle having an open mouth at its wide end, a vertically disposed suction pipe positioned between said tracks, an arcuate connecting pipe connecting the lower end of said pipe with the small end of said nozzle, an L-shaped supporting member having one side thereof horizontal and the other side vertical, means securing said machine to said horizontal side of said supporting member, a vertically disposed nozzle adjusting and supporting rod fixed relative to said nozzle and positioned between said vertical pipe and said vertical side of said supporting member, and a fluid locking means fixed to said vertical side and engaging about said rod for locking said rod in vertically adjusted position.

2. In combination a horizontally disposed and horizontally swingable track structure including a pair of spaced apart parallel tracks, an abrading machine disposed in a vertical position between said tracks, a carriage fixed to said machine and movable on said tracks, a substantially V-shaped suction nozzle having an open mouth at its wide end, a vertically disposed suction pipe positioned between said tracks, an arcuate connecting pipe connecting the lower end of said pipe with the small end of said nozzle, an L-shaped supporting member having one side thereof horizontal and the other side vertical, means securing said machine to said horizontal side of said supporting member, a vertically disposed nozzle adjusting and supporting rod fixed relative to said nozzle and positioned between said vertical pipe and said vertical side of said supporting member, and a locking means fixed to said vertical side and engaging said rod for locking said rod in vertically adjusted position.

3. In combination a horizontally disposed and horizontally swingable track structure including a pair of spaced apart parallel tracks, an abrading machine disposed in a vertical position between said tracks, a carriage fixed to said machine and movable on said tracks, a substantially V-shaped suction nozzle having an open mouth at its wide end, a vertically disposed suction pipe positioned between said tracks, an arcuate connecting pipe connecting the lower end of said pipe with the small end of said nozzle, an L-shaped supporting member having one side thereof horizontal and the other side vertical, means securing said machine to said horizontal side of said supporting member, a vertically disposed nozzle adjusting and supporting rod fixed relative to said nozzle and positioned between said vertical pipe and said vertical side of said supporting member, and a pneumatic locking means fixed to said vertical

side and engaging about said rod for locking said rod in vertically adjusted position, and a spring about said rod for constantly urging said rod upwardly.

4. A suction attachment comprising a suction nozzle having a concave intake portion within which the bit of the machine is adapted to engage, a suction pipe connected with said nozzle, a horizontally disposed plate above said nozzle forwardly of said pipe and attachable to said machine, a vertical plate fixed to the rear portion of said first plate, a vertically disposed supporting rod between said pipe and said vertical plate, and means carried by said vertical plate engageable with said rod for holding said rod in vertically adjusted position to thereby position said nozzle in adjusted position with respect to the bit.

5. A suction attachment comprising a suction nozzle having a concave intake portion within which the bit of the machine is adapted to engage, a suction pipe connected with said nozzle, a horizontally disposed plate above said nozzle forwardly of said pipe and attachable to said machine, a vertical plate fixed to the rear portion of said first plate, a vertically disposed supporting rod between said pipe and said vertical plate, and fluid locking means carried by said vertical plate engageable with said rod for holding said rod in vertically adjusted position.

6. A suction attachment comprising a suction nozzle positionable adjacent the bit of the machine, a suction pipe connected with said nozzle, a horizontally disposed plate above said nozzle forwardly of said pipe and attachable to said machine, a vertical plate fixed to the rear portion of said first plate, a vertically disposed supporting rod between said pipe and said vertical plate, and a fluid actuated locking means carried about said vertical plate engageable with said rod for holding said rod in vertically adjusted position.

7. A suction attachment comprising a suction nozzle positionable adjacent the bit of the machine, a suction pipe connected with said nozzle, a horizontally disposed plate above said nozzle forwardly of said pipe and attachable to said machine, a vertical plate fixed to the rear portion of said first plate, a vertically disposed supporting rod between said pipe and said vertical plate, a fluid actuated locking means carried by said vertical plate engageable with said rod for holding said rod in vertically adjusted position, and yieldable means constantly urging said rod upwardly.

8. A suction attachment comprising a suction nozzle positionable adjacent the bit of the machine, said nozzle having a curved upper wall and a substantially flat lower wall each formed with an inwardly extending cutout, a depending deflector fixed to said upper wall along a portion of the edge of the cutout in said upper wall, a suction pipe connected with said nozzle, a horizontally disposed plate above said nozzle forwardly of said pipe and attachable to said machine, a vertical plate fixed to the rear portion of said first plate, a vertically disposed supporting rod between said pipe and said vertical plate, and means carried by said vertical plate engageable with said rod for holding said rod in vertically adjusted position.

9. A suction attachment for a travelling abrading machine comprising a suction nozzle positionable adjacent the bit of the machine, said nozzle having a curved upper wall and a substantially flat lower wall each formed with an inwardly extending cutout, a depending deflector fixed to said upper wall along a portion of the

edge of the cutout in said upper wall, the cutout in said lower wall being substantially deeper than the cutout in said upper wall, a suction pipe connected with said nozzle, a horizontally disposed plate above said nozzle forwardly of said pipe and attachable to said machine, a vertical plate fixed to the rear portion of said first plate, a vertically

disposed supporting rod between said pipe and said vertical plate, and means carried by said vertical plate engageable with said rod for holding said rod in vertically adjusted position.

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