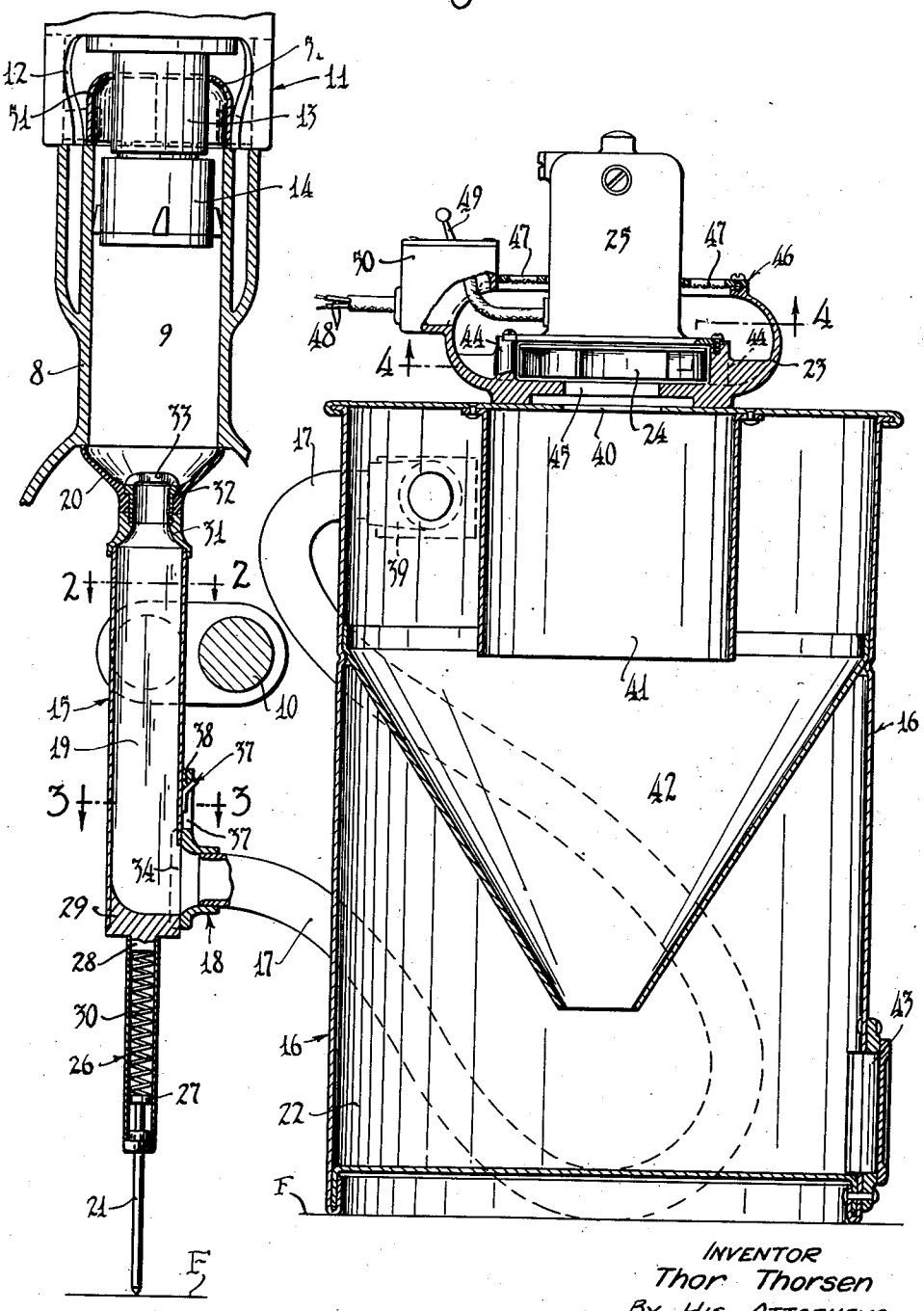
Sept. 14, 1937. T. THORSEN 2,093,257

GRIT REMOVER

Original Filed June 19, 1935 2 Sheets-Sheet 1

Fig. 1



INVENTOR
Thor Thorsen
BY HIS ATTORNEYS
Merchant & Gilgore

Sept. 14, 1937. T. THORSEN 2,093,257

GRIT REMOVER

Original Filed June 19, 1935 2 Sheets-Sheet 2

Fig. 6

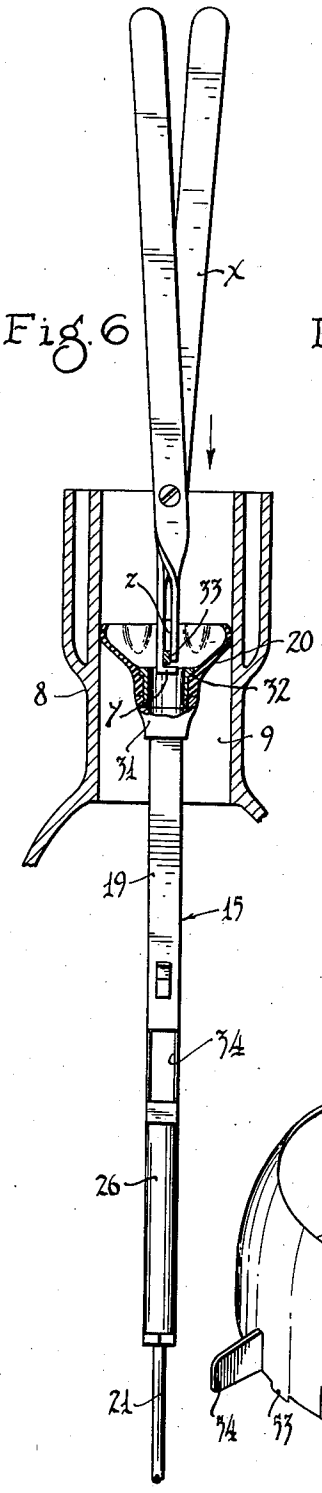


Fig. 7

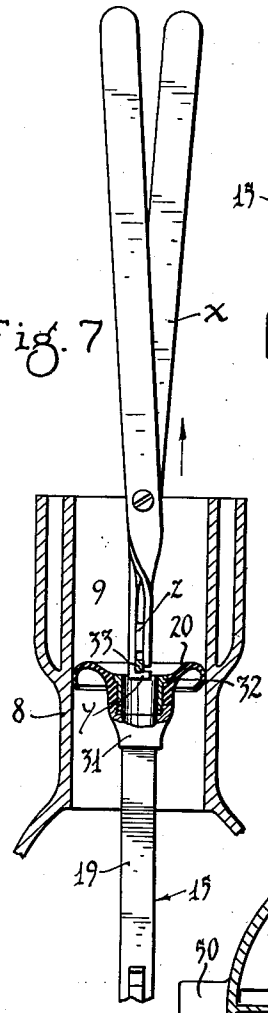


Fig. 2

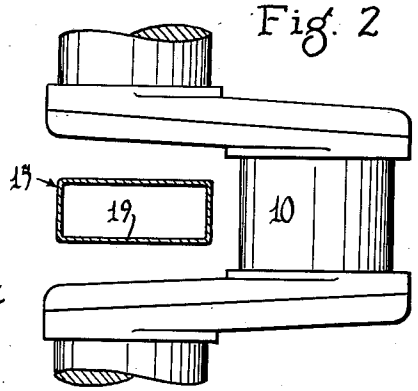


Fig. 3

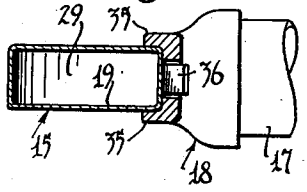


Fig. 4

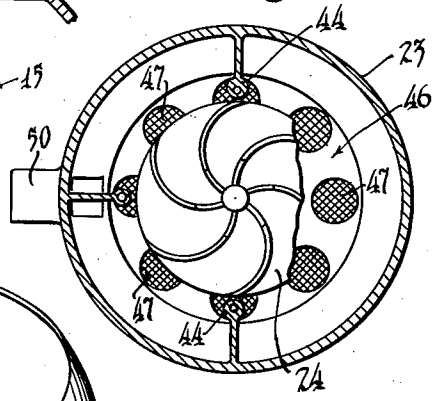
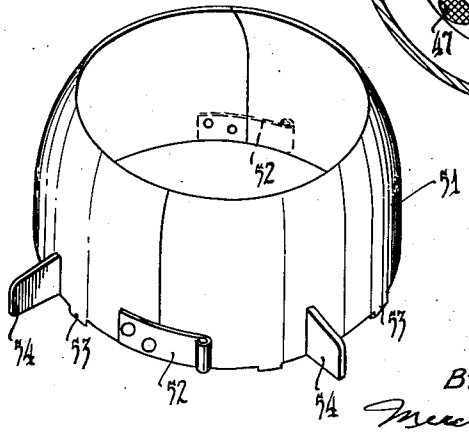


Fig. 5



INVENTOR
Thor Thorsen
BY HIS ATTORNEYS
Merchant & Kilgore

Patented Sept. 14, 1937 2,093,257

UNITED STATES PATENT OFFICE

2,093,257

GRIT REMOVER

Thor Thorsen, Plymouth Township, Hennepin County, Minn., assignor to Storm Manufacturing Co. Inc., Minneapolis, Minn., a corporation of Minnesota

Application June 19, 1935, Serial No. 27,368
Renewed August 31, 1936

17 Claims. (Cl. 51—273)

My present invention provides a highly efficient apparatus for removing grit, shavings and other waste from the cylinder of an internal combustion engine in an automotive vehicle during the reboring or refinishing of the same by any of the well-known methods.

It is common knowledge that the cylinders of an engine are refinished without removing the cylinder block from the chassis and that a mechanic, at the completion of the refinishing process, spends a great deal of time and effort in removing waste produced by said process from the cylinders, crank-pins, crank-casing and other parts of the engine. Even at the best this hand cleaning of the engine parts, aside from the time and effort required, is far from satisfactory for the reason that a certain amount of the waste, particularly the finer particles, adhere to the engine parts and get into the oil with a result that the cylinders and crank-pins are often scored and excessive wear takes place.

One of the objects of this invention is the provision of a grit remover having two assemblies separably connected by a coupling, one of which assemblies can be moved bodily through a cylinder to either apply the same in working position below the cylinder or removed from this position by manipulations performed above the engine and the two assemblies either coupled or uncoupled at the side of the chassis without having to crawl under the same.

A further object is to provide a grit remover adapted to be passed through a cylinder in a block from either end thereof and which grit remover will include a cup-like member having a flexible self-expanding rim portion the normal diameter of which will be greater than the diameter of the cylinder, downward movement of the grit remover through the cylinder being adapted to contract the rim portion of the cup-like member by its engagement with the top of the block to the diameter of the cylinder for movement downwardly therethrough, the rim portion of the cup-like member being adapted to self-expand for engagement with the underside of the block surrounding the cylinder and to form a tight joint with the block when the cup-like member is moved out of the lower end of the cylinder and slightly upward into engagement with the block, and upward movement of the cup-like member through the cylinder being adapted to progressively turn the rim portion of the cup-like member inside out until it reaches the diameter of the cylinder by its engagement with the bottom of the block.

A further object is to provide a novel and improved grit remover which will consist of two assemblies as stated, one of which assemblies will include a cup-like member adapted to be moved bodily through a cylinder from either end thereof, and the other of which assemblies will include mechanism for removing particles, etc., from the cylinder and the cup-like member.

To the above end, generally stated, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a fragmentary view showing in side elevation a section of the improved grit remover applied to the cylinder block of an internal combustion engine on which block is mounted a cylinder reboring machine;

Figs. 2 and 3 are detail views partly in plan and partly in section taken on the lines 2—2 and 3—3 of Fig. 1, respectively, on an enlarged scale;

Fig. 4 is a view partly in bottom plan and partly in section taken on the irregular line 4—4 of Fig. 1;

Fig. 5 is a perspective view of the cap removed from the boring bar and the cylinder block;

Fig. 6 is a view showing the intake assembly of the grit remover being moved downwardly through the cylinder in the cylinder block from the top thereof by a hand tool to working position below said block; and

Fig. 7 is a view corresponding to Fig. 6 but showing the intake assembly being moved upwardly through the cylinder from working position.

Of the parts of the internal combustion engine illustrated, the numeral 8 indicates a cylinder block, the numeral 9 one of the cylinders in said block, and the numeral 10 indicates one of the cranks of the engine crank-shaft. As heretofore stated, cylinders in the block of an internal combustion engine for automotive vehicles are refinished without removing the block from the chassis.

Mounted on the block 9 is a cylinder reboring machine indicated as an entirety by the numeral 11, with the exception of its work opening 12, boring bar 13 and boring head 14.

The parts thus far described are of standard and well-known construction.

The improved grit remover is made up of an

intake assembly 15 and a waste collecting assembly 16 and which assemblies are connected by a flexible hose 17. To facilitate the application of the grit remover in working position relative to the cylinder 9 and the removal of the same therefrom, the hose 17, at its intake end, is separably connected to the intake assembly by a coupling 18.

The assembly 15 includes a body member 19, a connector 20, and a supporting leg 21, and the assembly 16 includes a waste receptacle 22, a fan housing 23, a suction fan 24 and an electric motor 25 for driving said fan. The body member 19, is as shown, a flat tube that is oblong in cross-section and held in an upright position by the leg 21. Said leg 21 is a round rod mounted in the closed lower end of a cylindrical spring casing 26 for endwise sliding movement to vary the operative length of the assembly 15. The lower end of the leg 21 is sharp for contact with the floor F and on the upper end of said leg is a head 27 which slidably engages the internal wall of the spring casing 26 and holds said leg for straight line sliding movement. Said spring casing 26 is secured to the body member 19 by telescoping its open upper end onto a depending lug 28 on a cast bottom member 29, which affords a closure for the lower end of said casing and rigidly securing the same thereto. A coil spring 30, in the casing 26, is compressed between the head 27 and the stud 28 and is under strain to lift the body member 19.

The connector 20 affords a connection between the body member 19 and the block 8, at the lower end of the cylinder 9 and, as shown, is in the form of a cup-like or funnel-like elastic member of rubber or other suitable material. A two-part cast metal head 31 detachably secures the connector 20 to the body member 19 and includes a fixed lower member, rigidly secured to the body member 19, and a removable upper member. These two members of the head 31 are separably connected by screw-threads. The connector 20 is securely held clamped between the lower member of the head 31 and the shoulder 32 to form tight joints between the body member 19 and said connector. On the upper member of the head 31 is a transverse bar 33 to which a hand tool X may be attached for use in placing the intake assembly 15 in working position or in removing the same therefrom.

When the intake assembly 15 is in working position the connector 20 is substantially axially aligned with the cylinder 9 with its upper edge engaging the under side of the block 8 surrounding said cylinder 9. The spring 30 yieldingly presses the connector 20 against the block 8 to form a tight joint therewith and also holds the assembly 15 in an upright position. Obviously, the spring 30 will compensate for movement of the block 8, which, of course, is supported by the springs of the vehicle, while working on the same and thus always keep the connector 20 pressed against the block 8. It is also evident that the leg 21 and spring 30 will compensate for varying distance between the floor and the blocks of different makes of automobiles.

In one edge of the body member 19, just above the bottom member 29, is an escape opening 34 and said bottom member is upwardly curved to the other edge of said body member for directing waste to the opening 34. This escape opening 34 is coincident with the opening in the coupling 18 and through which openings waste is drawn from the body member 19 to the hose 17, as will presently appear. The face of the coupling 18 has direct engagement with the respective edge of the body member 19 and on the sides of said coupling are flanges 35 which cap the body member 19 and hold the coupling 18 against lateral shifting movement thereon but with freedom for vertical sliding movement. The coupling 18 is detachably connected to the body member 19 by a wide flat cam pin 36 fixed to the body member 19 that extends through a slot 37 in said coupling, above the hose 17, and is engaged by a cam surface 38 at the upper end of said slot. The cam surface 38, acting on the cam pin 36, tends to force the coupling 18 inwardly toward the body member 19 and form a tight joint therewith. The weight of the hose 17 on the coupling 18 also tends to draw the cam surface 38 downwardly on the cam pin 36 and holds said coupling in place.

It is important to note that while the wall of the lower portion of the connector 20 is relatively thick the upper portion thereof is tapered to increase the flexibility thereof. This arrangement makes provision for easy turning of the cup-like member inside out on occasion.

The intake assembly 15 is applied in working position by inserting the same through the cylinder 9 from the top thereof and at which time the flexible upper portion of the cup-like member or connector 20 is collapsed, see Fig. 6. In removing the intake assembly 15 from working position the same is drawn upwardly through the cylinder 9 and at which time the flexible upper portion of the cup-like member or connector 20 is turned inside out, see Fig. 7.

The tool X is used to force the connector 20 downwardly through the cylinder 9 and also to draw said connector upwardly through the cylinder 9. This tool X is in the form of a pair of pliers having on their jaws an outer lug Y and an inner lug Z. In attaching the tool X to the connector 20, the jaws of said tool are closed onto the bar 33 and with said bar between the lugs Y and Z. When the assembly 15 is being moved downwardly through the cylinder 9 by the tool X the bar 33 is engaged by the lug Z and when said assembly is being moved upwardly through the cylinder 9 by said tool, the bar 33 is engaged by the lug Y.

The hose 17, at its discharge end, is attached to the waste receptacle 22 by an inlet connection 39 arranged to direct waste being drawn therethrough tangentially into said receptacle just below the top thereof.

The waste receptacle 22 is completely closed, except for the intake opening leading from the hose 17 and an air outlet opening 40 in the top of said receptacle at the axis thereof. A tubular member 41 is attached to the top of the waste receptacle 22, at the axis thereof, and depends therefrom to a point considerably below the inlet connection 39. This member 41 completely surrounds the air escape opening 40 and is spaced from the wall of the waste receptacle 22.

A hopper 42, in the waste receptacle 22, is attached thereto, at its upper end, substantially at the lower end of the tubular member 41, and the open lower end of the hopper 42 is spaced above the bottom of said receptacle. In the side of the waste receptacle 22, just above the bottom of said receptacle, is a normally closed clean-out opening 43.

The electric motor 25 is mounted with its armature shaft in an upright position on a plurality of upstanding bosses 44 on the bottom of

the fan housing 23 and circumferentially spaced equi-distances apart about the axis of said housing. In the bottom of the fan housing 23 is an air intake opening 45 that is coincident with the opening 40. The fan housing 23 has a displaceable cover 46 having an axial opening through which the motor 25 loosely projects. Formed in the cover 46 is a plurality of screened air escape openings 47 circumferentially spaced about the motor 25.

The circuit wires 48 for the motor 25 have a control switch 49 interposed therein and which switch is mounted in a switch box 50 formed with the fan casing 23 at one side thereof.

The exhaust fan 24, which is fixed to the lower end of the shaft of the motor 25, includes a flat disk on the bottom of which the blades of said fan are formed and arranged to rotate within the bosses 44 just above the air intake opening 45. The blades of the fan 24 are arranged to draw air into the cylinder 9, at the top thereof, through the intake assembly 15, the hose 17, the receptacle and into said fan through the openings 40 and 45. From the fan 24 air is discharged against the upwardly and inwardly curved internal wall of the fan housing 23 toward the motor 25 where the same escapes through the openings 47.

To prevent shavings and other waste from being thrown out of the cylinder 9, at the top thereof, by the cutter head 14 during the initial cutting action thereof, the upper end of the cylinder 9 is closed by a cap 51. This cap 51 is in the form of an inverted cup, the rim of which loosely rests on the block 8 outwardly of the cylinder 9 and has an axial opening in which the boring bar is free to rotate and move axially.

To permit the cap 51 to be applied circumferentially around the boring bar 13, after the cutter head 14 is centered in the cylinder 9, said cap is made in two duplicate semi-circular sections separably connected by spring clips 52. The cap 51 is applied in working position by separating the sections thereof and inserting the same, one at a time, through the work opening 12 and moved into the body of the boring mechanism circumferentially around the boring bar 13 and thereafter connected by the spring clips 52. On the lower edge of the cap 51 are short lugs 53 that support said cap above the block 8 for the intake of air thereunder into the cylinder 9.

To hold the cap 51 centered, relative to the boring bar 14 and the cylinder 9, each section thereof is provided with a pair of radial arms 54 which engage the internal wall of the body of the boring machine 11. Caps like the cap 51 will, in actual usage of the improved grit remover, be made in different sizes to fit over cylinders of different diameters, and hence, the arms 54 will be of different lengths. However, the distance from the center of the caps to the outer ends of their arms will always be the same. In the largest size cap the arms will be dispensed with and said body have a working fit with the internal wall of the boring machine.

Operation

To apply the improved grit remover in working position the coupling 18 is released and the assembly 15 inserted endwise through the cylinder 9 and between the side members of the crank 10, which must be set in a horizontal position, as shown in Fig. 1, until the connector 20 rests on the top of the block 8. The tool X is then applied to the bar 33 and pressure applied to contract or collapse the relatively thin wall of the upper portion of the connector 20, by its engagement with the wall of the cylinder 9, to a diameter at which said connector will pass through said cylinder.

During the movement of the connector 20 through the cylinder 9 the leg 21 will engage the floor F and thereafter the spring 30 will be compressed to permit further movement of the assembly through the cylinder 9. As soon as the connector 20 passes through the lower end of the cylinder 9 it will expand to its normal diameter and when pressure by the tool on the bar 33 is released the compressed spring 30 will lift the body member 19 and carry the connector 20 into engagement with the block 8 in which its upper edges engage the bottom of said block and be thus held by said spring. Before the pressure by the tool X on the head 31 is finally released to carry the connector 20 into contact with the block 8, said tool may be manipulated to center the connector 20 relative to the axis of the cylinder 9.

It may be here stated that the object in making the body member 19 oblong in cross-section is to permit the mounting of the body member 19 between the side members of the crank 10 which are usually quite close together due to the short crank pins now commonly used.

After the assembly 15 is in working position the assembly 16 is placed at one side of the vehicle and the two assemblies connected by reaching under the chassis and applying the coupling 18 to the body member 19.

The construction of the coupling 18 is such that the same can be applied very easily to the body member 19 or removed therefrom. A bodily movement of the coupling 18 toward the body member 19 will project the cam pin 36 through the slot 37 and position capping flanges 35 at the sides of said body member and a bodily downward movement of the body member 19 will cause the cam pin 36 and the co-operating cam surface 38 to force the coupling 18 into flat engagement with the body member 19 and form a tight joint therewith. As previously stated, the weight of the hose 17 on the coupling 18 will materially assist in holding said coupling in an operative position.

After the grid remover is in working position the boring machine is mounted on the block 8 and its cutter head 14 centered relative to the cylinder 9 and thereafter the cap 51 is applied around the boring bar 13, as previously described. Preferably, but not necessarily, the cap 51 will be made from a transparent material so that the operator may watch the initial cutting action of the cutter head 14 through the work opening 12.

Just before the boring operation is started the switch 49 is closed to start the motor 25 and operate the suction fan 24 to draw all waste, produced by the cutter head 14, downwardly through the cylinder 9 and into the body member 19. From the body member 19 the waste is drawn through the hose 17 and is directed thereby tangentially into the receptacle 22 where the shaving and other heavy particles will be thrown outwardly against the shell of said receptacle and be precipitated into the hopper 42 and from thence onto the bottom of the receptacle 22. Lighter particles of waste, such as grit and dust, will be carried in the air stream around the cylindrical member 41 and into the open lower end thereof

where the same will be carried upwardly through the air escape openings **40** and **45** and into the fan **24**. Heavy particles of waste in this air stream will be precipitated onto the bottom of the receptacle **22** through the hopper **42**. Air from the fan **24** carrying dust and other fine particles of waste will be discharged against the upwardly and inwardly curved wall of the fan housing **23** where the same will escape through the screened opening **47**.

At the completion of the boring of a cylinder the boring machine is removed from over the cylinder and the coupling **18** released to detach the assembly **15** from the assembly **16**. Next, the tool X is inserted into the cylinder **9** from the top thereof and applied to the bar **33** and the assembly **15** pulled upwardly through the cylinder **9**. The initial upward movement of the assembly **15** through the cylinder **9** will turn the upper portion of the connector **20** inside out, or in other words, the connector **20** will be outwardly and downwardly collapsed, by its engagement with the block **8**, until said connector is of such diameter as to pass through the cylinder **9**. It will thus be seen that substantially all work performed in placing of the grit remover in working position and the removal of the same therefrom is done entirely above the top of the block **8**, thus avoiding the necessity of having to work under the chassis.

What I claim is:

1. An assembly of the class described movable through a cylinder in a block from either end thereof and including an upright tubular body member and a cup-like connector having a flexible self-expanding rim portion the normal diameter of which is greater than the diameter of the cylinder, whereby downward movement of the assembly through the cylinder will contract the rim portion of the connector, by its engagement with the top of the block, to the diameter of the cylinder for movement downwardly therethrough, the rim portion of the connector, when the connector is moved out of the lower end of the cylinder, will self-expand for engagement with the under side of the block surrounding the cylinder to form a tight joint therewith, and upward movement of the assembly through the cylinder will outwardly and downwardly collapse the rim portion of the connector, by its engagement with the bottom of the block, to the diameter of the cylinder for movement upwardly therethrough, and a floor-engaging leg for holding the body member with the connector pressed against the block.

2. The structure defined in claim 1 which further includes an exhaust hose, and a coupling connecting the hose to the body member, said body member and hose having coincident openings, said coupling having flat engagement with the body member, a cam pin on the body member, said coupling having a slot, through which the cam pin projects, a cam surface, at the upper end of the slot, resting on the cam pin, said cam pin and cam surface being arranged to move the coupling downwardly and inwardly against the body member, the coupling being spaced above the lower end of the leg, whereby the weight of the hose on the coupling will tend to move the coupling downwardly on the cam pin.

3. The structure defined in claim 1 which further includes an exhaust hose, and a coupling connecting the hose to the body member, said body member and hose having coincident openings, said coupling having flat engagement with the body member, a cam pin on the body member, said coupling having a slot, through which the cam pin projects, a cam surface, at the upper end of the slot, resting on the cam pin, said cam pin and cam surface being arranged to move the coupling downwardly and inwardly against the body member, the coupling being spaced above the lower end of the leg, whereby the weight of the hose on the coupling will tend to move the coupling downwardly on the cam pin, said coupling having at its sides flanges arranged to engage the sides of the body member and hold the coupling against lateral shifting movement thereon.

4. An assembly of the class described movable through a cylinder in a block from either end thereof and including an upright tubular body member having on its lower end a spring projected supporting leg, a cup-like connector on the upper end of the body member and having a flexible self-expanding rim portion the normal diameter of which is slightly greater than the diameter of the cylinder, whereby downward movement of the assembly through the cylinder will contract the rim portion of the connector, by its engagement with the top of the block, to the diameter of the cylinder for movement downwardly therethrough, the rim portion of the connector, when the connector is moved out of the lower end of the cylinder, will self-expand for engagement with the under side of the block surrounding the cylinder to form a tight joint therewith, and upward movement of the assembly through the cylinder will outwardly and downwardly collapse the rim portion of the connector, by its engagement with the bottom of the block, to the diameter of the cylinder for movement upwardly therethrough, a waste receptacle having a hose leading thereto, a coupling detachably connecting the hose to the body member, and a motor-driven suction fan for producing a suction in the receptacle to draw waste from the cylinder to the receptacle.

5. The structure defined in claim 1 in which the assembly is provided with an internal tool-engaging member by which the assembly may be lifted upwardly through the cylinder.

6. The structure defined in claim 1 in which the body member is oblong in cross-section for endwise movement between the side members of a crank on a shaft under the block when turned into substantially a horizontal position.

7. The structure defined in claim 1 which further includes a spring casing on the body member in which the leg is mounted for endwise sliding movement, and a spring engaging the leg as a base of resistance and under strain to lift the body member and hold the connector pressed against the block.

8. The structure defined in claim 1 which further includes a two-part head detachably securing the connector to the body member, and an internal tool-engaging member on the head by which the assembly may be shifted upwardly through the cylinder.

9. The structure defined in claim 1 which further includes an exhaust hose, and a coupling connecting the hose to the body member at one side thereof and separable therefrom by an upward movement thereof, said coupling being above the lower end of the leg, whereby the weight of the hose will tend to hold the coupling in an operative position.

10. An assembly of the class described movable through a cylinder in a block from either end

thereof and including a cup-like connector having a flexible self-expanding rim portion, the normal diameter of which is greater than the diameter of the cylinder, whereby downward movement of the assembly through the cylinder will contract the rim portion of the connector, by its engagement with the top of the block, to the diameter of the cylinder for movement downwardly therethrough, the rim portion of the connector, when the connector is moved out of the lower end of the cylinder, will self-expand for engagement with the under-side of the block surrounding the cylinder to form a tight joint therewith, and upward movement of the assembly through the cylinder will progressively turn the rim portion of the connector inside out, until it reaches the diameter of the cylinder, by its engagement with the bottom of the block, said connector having an internal tool-engaging member by which the assembly may be lifted upwardly through the cylinder.

11. An assembly of the class described movable through a cylinder in a block from either end thereof and including a rigid upright tubular body member, and a cup-like connector on the upper end of the body member, having a flexible self-expanding rim portion, the normal diameter of which is slightly greater than the diameter of the cylinder, whereby downward movement of the assembly through the cylinder will contract the rim portion of the connector, by its engagement with the top of the block, to the diameter of the cylinder for movement downwardly therethrough, the rim portion of the connector, when the connector is moved out of the lower end of the cylinder, will self-expand for engagement with the underside of the block surrounding the cylinder to form a tight joint therewith, and upward movement of the assembly through the cylinder will progressively turn the rim portion of the connector inside out, until it reaches the diameter of the cylinder, by its engagement with the bottom of the block, said connector having an internal tool-engaging member by which the assembly may be lifted upwardly through the cylinder.

12. The structure defined in claim 11 which further includes means on the lower end of the body member supporting the same with the connector pressed against the block.

13. A grit remover movable through a cylinder in a block from either end thereof and including a cup-like member having an upstanding wall and a flexible self-expanding rim portion of thickness less than the thickness of and above said wall and of normal diameter greater than the diameter of the cylinder, downward movement of the grit remover through the cylinder being adapted to contract the rim portion of the cup-like member by its engagement with the top of the block to the diameter of the cylinder for movement downwardly therethrough, the rim portion of the cup-like member being adapted to self-expand for engagement with the underside of the block surrounding the cylinder to form a tight joint therewith when the cup-like member is moved out of the lower end of the cylinder, and upward movement of the cup-like member through the cylinder being adapted to progressively turn the rim portion of the cup-like member inside out until it reaches the diameter of the cylinder by its engagement with the bottom of the block.

14. A grit remover movable through a cylinder in a block from either end thereof and including a cup-like member having an upstanding wall and a flexible self-expanding rim portion of thickness less than the thickness of and above said wall and of normal diameter greater than the diameter of the cylinder, downward movement of the grit remover through the cylinder being adapted to contract the rim portion of the cup-like member by its engagement with the top of the block to the diameter of the cylinder for movement downwardly therethrough, the rim portion of the cup-like member being adapted to self-expand for engagement with the underside of the block surrounding the cylinder to form a tight joint therewith when the cup-like member is moved out of the lower end of the cylinder, and upward movement of the cup-like member through the cylinder being adapted to progressively turn the rim portion of the cup-like member inside out until it reaches the diameter of the cylinder by its engagement with the bottom of the block, and an exhaust hose operatively connected to the cup-like member.

15. A grit remover movable through a cylinder in a block from either end thereof and including a cup-like member having a flexible self-expanding rim portion the normal diameter of which is greater than the diameter of the cylinder, downward movement of the grit remover through the cylinder will contract the rim portion of the cup-like member by its engagement with the top of the block to the diameter of the cylinder for movement downwardly therethrough, the rim portion of the cup-like member being adapted to self-expand for engagement with the underside of the block surrounding the cylinder to form a tight joint therewith when the cup-like member is moved out of the lower end of the cylinder, and upward movement of the cup-like member through the cylinder being adapted to progressively turn the rim portion of the cup-like member inside out until it reaches the diameter of the cylinder by its engagement with the bottom of the block, and means rigid with said cup-like member adapted to be engaged by a tool insertable downwardly through said cylinder for pulling said cup-like member upwardly therethrough.

16. A grit remover movable through a cylinder in a block from either end thereof and including a cup-like member having a flexible self-expanding rim portion the normal diameter of which is greater than the diameter of the cylinder, downward movement of the grit remover through the cylinder being adapted to contract the rim portion of the cup-like member by its engagement with the top of the block to the diameter of the cylinder for movement downwardly therethrough, the rim portion of the cup-like member being adapted to self-expand for engagement with the underside of the block surrounding the cylinder to form a tight joint therewith when the cup-like member is moved out of the lower end of the cylinder, and upward movement of the cup-like member through the cylinder being adapted to progressively turn the rim portion of the cup-like member inside out until it reaches the diameter of the cylinder by its engagement with the bottom of the block, and means rigid with said cup-like member adapted to be engaged by a tool for forcing said cup-like member upwardly through said cylinder.

17. A grit remover movable through a cylinder in a block from either end thereof and including a cup-like member having a flexible self-expanding rim portion the normal diameter of which is

greater than the diameter of the cylinder, downward movement of the grit remover through the cylinder being adapted to contract the rim portion of the cup-like member by its engagement with the top of the block to the diameter of the cylinder for movement downwardly therethrough, the rim portion of the cup-like member being adapted to self-expand for engagement with the under side of the block surrounding the cylinder to form a tight joint therewith when the cup-like member is moved out of the lower end of the cylinder, and upward movement of the cup-like member through the cylinder being adapted to progressively turn the rim portion of the cup-like member inside out until it reaches the diameter of the cylinder by its engagement with the bottom of the block, means rigid with said cup-like member adapted to be engaged by a tool for forcing said cup-like member upwardly through said cylinder, and an exhaust hose operatively connected to the cup-like member.

THOR THORSEN.