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HYDRAULIC FIXTURE CLAMP FOR SEALING CYLINDER HEAD
OPENINGS WHILE THE HEAD IS BEING COATED

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2 Sheets-Sheet 1

FIG. 1

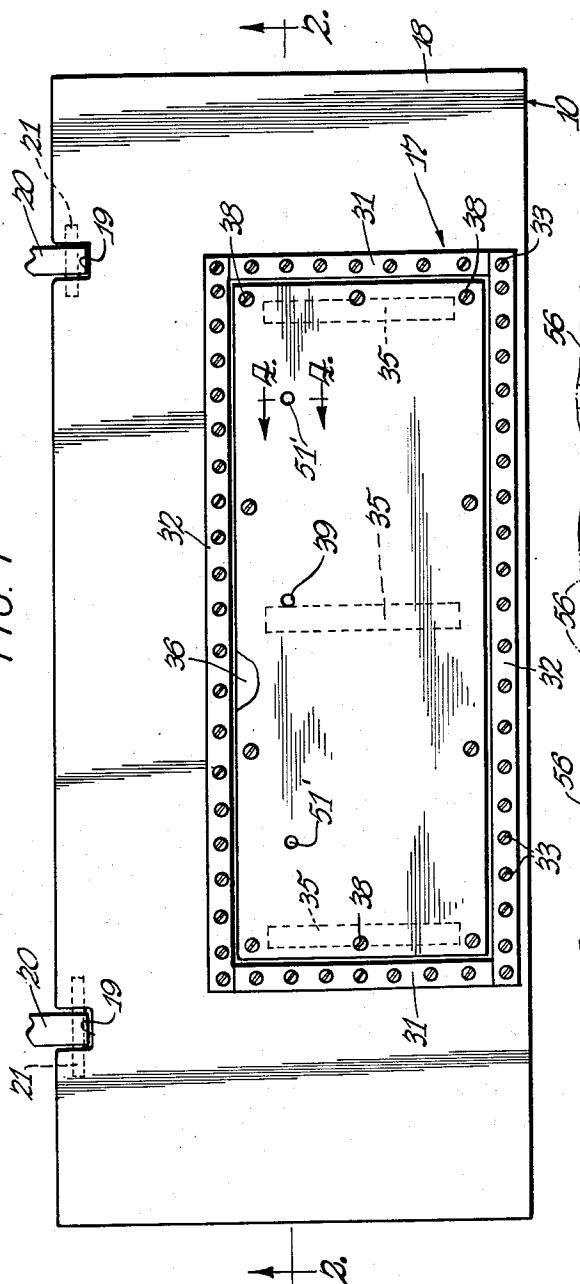
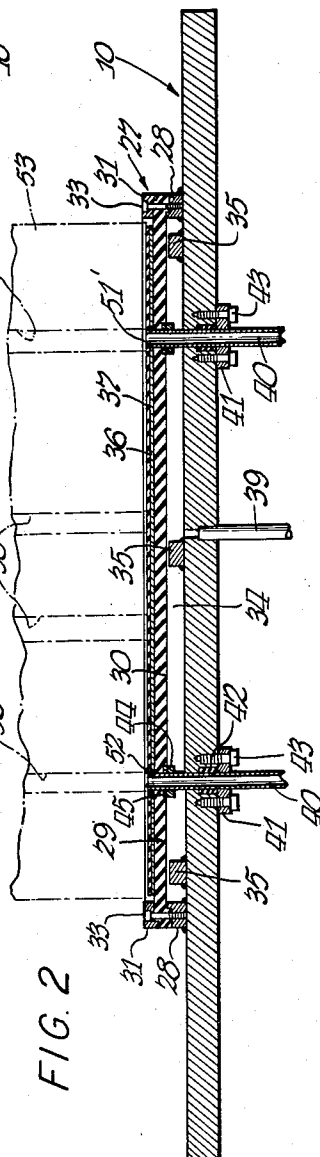


FIG. 2



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HYDRAULIC FIXTURE CLAMP FOR SEALING
CYLINDER HEAD OPENINGS WHILE THE
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9 Claims. (Cl. 118—408)

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This application relates to an improved device for supplying liquid sealer to the bores of a cast-iron member. More specifically, the device relates to an improvement for supplying liquid sealer to the cored passages of a cast-iron cylinder block of a type used in internal combustion engines.

In the manufacture of cast-iron cylinder blocks or similar cast-iron members having a plurality of internal passages, it is necessary to supply a sealer to the internal surfaces of all the passages which subsequently must be used as liquid channels. The porosity of the cast metal requires the application of a liquid sealer which hardens and seals the internal passages of the cored members. It is a prime object of this invention, therefore, to provide an improved device or sealer unit for supplying a sealing fluid under pressure to the cored or internal surfaces of a cylinder block or like cast member.

Still another object is to provide an improved liquid sealer applying device adapted to clamp a cylinder block or similar cast member in position wherein a sealing device may be applied to a surface of the cylinder block, the sealing device including a diaphragm structure which is adapted to seal certain openings and passages in the block, the device also including inlet and exhaust ports or conduits which are adapted to communicate with other passages of the block for injecting a liquid sealing fluid and exhausting the residue from the passages of the block.

A specific object of the invention is to provide an improved sealing unit including a support on which a table is movably mounted, the table including a sealing unit having a pressure chamber including a diaphragm, the diaphragm being adapted to engage a surface of a cored cast-iron member whereby certain passages within the member are sealed, and where simultaneously the inlet and outlet or exhaust connections of the unit may be placed into registry with certain passages of the cored block so that a liquid sealing unit may be directed under pressure throughout the passages in the block and exhausted therefrom.

These and further objects will become more readily apparent from a reading of the specification when examined in connection with the accompanying sheets of drawings.

In the drawings:

Figure 1 is a plan view of a sealer applying unit supported on a table which may be hingedly connected to a supporting structure of a liquid sealer applying device;

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Figure 2 is a cross-sectional view through the sealer unit and table taken substantially along the line 2—2 of Figure 1;

Figure 3 is a cross-sectional view through a liquid sealer applying device showing a sealer applying unit in a non-operating and in an operating position; and

Figure 4 is an enlarged view taken substantially along the line 4—4 of Figure 1.

A liquid sealer applying device is generally designated by the reference character 10. The applying device 10 comprises a supporting structure 11 having a transversely extending platform 12. The platform 12 supports a pair of vertical plates 13 which are securely held in an upright position on the platform 12 by means of gussets 14 which are suitably connected to the plates 13. A sealing plate 15 is connected to the vertical plates 13 and a sealing pad of rubber-like material 16 is connected to the sealing plate 15.

A liquid sealer applying unit is generally designated by the reference character 17. The unit 17 includes a table 18. As indicated in Figure 1, the table 18 is of rectangular shape having substantial length. The pressure plate 15 and sealing pad 16 shown in Figure 3 are substantially coextensive with said table 18 and are positioned above said table 18 as indicated. As best shown in Figure 1, the table 18 is provided with spaced cutouts 19 which receive hinge arms 20 projecting outwardly from the supporting structure 11. Hinge pins 21 suitably connect the arms 20 to the table 18. The table 18 may be hinged vertically relative to the supporting structure 11 by means of a fluid extensible device including a cylinder 22. The cylinder 22 comprises a piston rod 23 which is connected to the table 18 as indicated at 24. The rod 23 may include a conventional piston 25 and the cylinder 22 may be suitably connected to a stationary support 26.

The liquid sealer applying unit 17 includes a rectangular frame 27 consisting of a plurality of rectangularly disposed upright members 28 which may be connected to the table 18 by means of welding. A diaphragm structure 29 is supported on the frame 27. The diaphragm structure 29 includes a diaphragm 30 consisting of a suitable flexible material such as rubber or the like. The diaphragm 30 is securely clamped to the upright members 28 of the frame 27 by means of clamping strips 31 and 32. The clamping strips 31 and 32 are clamped to the upright members 28 by means of screws 33. The diaphragm 30 is suitably spaced from the table 18 and defines with the clamping strips 31 and 32 a pressure

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chamber 34. A plurality of slat-like supports 35, laterally spaced with respect to each other, are supported on the table 18 within the pressure chamber 34, these supports serving to support a heavy object which may be disposed on the sealer applying unit 17.

A relatively stiff pressure plate 36 is disposed on top of the diaphragm 30. On top of the pressure plate a sealing pad 37 is provided. Screws 38 suitably connect the pressure plate 36, sealing pad 37, and diaphragm 30 in assembly. A fluid pressure inlet 39 extends through the table 18 to communicate with the chamber 34 so that fluid under pressure may be supplied to said chamber from a suitable source.

A sealer inlet conduit is indicated at 40. The sealer inlet conduit 40, as best shown in Figure 2, includes a bracket 41 which supports a seal 42 in position by means of screws 43. The seal 42 may be of a conventional type so that the conduit 40 extends through the table 18 while the pressure chamber 34 may remain suitably sealed. A collar 44 encircles the conduit 40 and is suitably disposed to bear against a washer 45 embedded within the diaphragm 30. Thus, the inlet conduit 40 extends through the table 18, through the chamber 34, the diaphragm 30, the pressure plate 36, and opens outwardly with respect to the sealer applying unit 17.

A sealer exhaust conduit is indicated at 46. This exhaust conduit 46, is best shown in Figures 3 and 4, and is identical to the sealer inlet conduit 40, previously described. The sealer exhaust conduit 46 includes a bracket 47 which is adapted to retain a seal 48 within the table 18 by means of screws 49. The conduit 46 includes a collar 50 which is adapted to bear against a washer 51 embedded within the diaphragm 30. As indicated at 51', both the inlet conduit 40 and the exhaust conduit 46 are in communication with suitable openings provided in the sealing pad 37.

Both the inlet conduit 40 and the exhaust conduit 46 are provided at their upper ends with a flange 52 which, as indicated in Figures 2 and 4, is recessed within the pressure plate 36. The collars 44 and 50 are suitably threaded to the conduits 40 and 46 so that the said conduits may be securely connected in assembly with the pressure plate 36 and the diaphragm 30. Flexing movement of the diaphragm 30 in an upward direction away from the pressure plate 18 will cause a slight amount of vertical movement of the conduits 40 and 46 relative to the table 18.

A cylinder block is shown in position on the sealer applying unit 17, the cylinder block being designated at 53. The block 53 has a lower face 54 and an upper face 55. A plurality of passages 56 extend through the block 53, opening outwardly on the sides 54 and 55 which are disposed opposite to each other. It must be understood, of course, that for the purpose of the illustration a cylinder block has been provided and that any cast or similarly cored member can be utilized where it is desired to apply a sealing fluid to the interior passages of the member.

During operation, the block 53 is placed on the sealer unit 17 so that the face 54 is seated on the sealing pad 37. The block 53 includes the interconnected passages 56, these passages possibly extending in laterally spaced fashion throughout the length of the block. The passages, as indicated, extend through the block and one of the passages 56 is placed into communication with the inlet conduit 40. Another passage may be placed into registry and communication, as indi-

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cated in Figure 3, with the exhaust conduit 56. All of the other passages normally opening outwardly of the face 54 are now closed by virtue of the sealing pad 37. The cylinder 22 now may be operated in a conventional manner whereupon the table 18 is pivoted in such a manner that the face or surface 55 of the block 53 is placed into engagement with the sealing pad 16 supported on the ceiling plate 15. This is best shown schematically in Figure 3. The extensible cylinder 22 firmly clamps the cylinder block 53 between the sealer unit 17 and the ceiling pad 16. At this point the passages 56 are, however, not yet effectively sealed and in order to properly seal these passages during the application of sealer liquid, hydraulic or pneumatic pressure is applied to the pressure chamber 34 by means of the pressure inlet 39. This causes the diaphragm 30 to effectively push the pressure plate 36 and the sealing pad 37 against the face 54 of the block and the block in turn has its face 55 firmly pressed against the ceiling pad 16 so that all but two of the passages and their respective openings are sealed. The passages which remain unsealed are those which are in communication with the inlet conduit 40 and the exhaust conduit 46. Sealer liquid under pressure now is delivered through the inlet conduit 40, the liquid being directed through the interconnected passages 56 and the residue escaping through the exhaust conduit 46. The liquid sealer is now effectively disposed over the porous surfaces of the passages and upon hardening seals the same so that these passages may be effectively utilized to transport liquids.

It can now be seen that an improved and effective liquid sealer applying device has been shown and described, this device fully achieving the objects of the invention. It must be understood that changes and modifications may be made which do not depart from the spirit of the invention as disclosed nor the scope thereof as defined in the appended claims.

What is claimed is:

1. A device for supplying a sealer material to the internal passages of a member having a plurality of openings on at least one outer surface, the openings communicating with said passages, comprising; a support, a table hingedly carried on said support, a sealer unit supported on said table, said unit including a rectangular frame rigidly mounted on said table, a diaphragm structure including a diaphragm secured to said frame in spaced relation to said table to provide a pressure chamber, a fluid pressure connection in communication with said chamber, a relatively stiff pressure plate connected to said diaphragm and adapted to move vertically with said diaphragm relative to said frame, a first rubber-like sealing pad connected to said pressure plate and to said diaphragm, said first sealing pad being adapted to engage a surface of said member during fluid pressure in said chamber for sealing certain openings in the member, inlet conduit means extending through said table, chamber, and diaphragm structure for communicating with an inlet opening in said member, an exhaust conduit means extending through said table, chamber and diaphragm structure for communicating with an exhaust opening in said member, a sealing plate supported on said support above said table, a second rubber-like sealing pad connected to said support, and means for hingedly moving said table whereby the outer opposite surfaces of said member are clamped between said sealer unit and said sealing plate whereby

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certain openings are sealed and sealer may be directed to the inlet opening and exhausted through the exhaust opening.

2. A device for supplying a sealer material to the internal passages of a member having a plurality of passages extending through said member and opening outwardly on opposite sides of said member, comprising; a support, a table movably carried on said support, a sealer unit supported on said table, said unit including a frame rigidly mounted on said table, a diaphragm structure including a diaphragm secured to said frame in spaced relation to said table to provide a pressure chamber, a fluid pressure connection in communication with said chamber, a relatively stiff pressure plate connected to said diaphragm and adapted to move vertically with said diaphragm relative to said frame, a first rubber-like sealing pad connected to said pressure plate and to said diaphragm, inlet conduit means for communicating with an inlet opening in said member, an exhaust conduit means for communicating with an exhaust opening in said member, a sealing plate supported on said support above said table, a second rubber-like sealing pad connected to said support, and means for moving said table whereby the outer opposite surfaces of said member are clamped between said sealer unit and said sealing plate whereby the openings of the passages are sealed and sealer may be directed to the inlet opening and exhausted through the exhaust opening.

3. A device for supplying a sealer material to the internal passages of a member having a plurality of openings on at least one outer surface, the openings communicating with said passages, comprising; a support, a table movably carried on said support, a sealer unit supported on said table, said unit including a frame rigidly mounted on said table, a diaphragm structure including a diaphragm secured to said frame in spaced relation to said table to provide a pressure chamber, a fluid pressure connection in communication with said chamber, a pressure plate connected to said diaphragm and adapted to move with said diaphragm relative to said frame, a rubber-like sealing pad connected to said pressure plate, inlet conduit means communicating with an inlet opening in said member, an exhaust conduit means communicating with an exhaust opening in said member, a plate supported on said support above said table, and means for moving said table whereby the outer opposite surfaces of said member are clamped between said sealer unit and said plate whereby certain openings are sealed and sealer may be directed to the inlet opening and exhausted through the exhaust opening.

4. A device for supplying a sealer material to the internal passages of a member having a plurality of openings on at least one outer surface, the openings communicating with said passages, comprising; a support, a table movably carried on said support, a sealer unit supported on said table, said unit including a frame rigidly mounted on said table, a diaphragm structure including a diaphragm secured to said frame in spaced relation to said table to provide a pressure chamber, a fluid pressure connection in communication with said chamber, a sealing pad connected to said diaphragm, inlet conduit means communicating with an inlet opening in said member, an exhaust conduit means communicating with an exhaust opening in said chamber, a plate supported on said support above said table, and

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means for moving said table toward said plate, whereby the outer opposite surfaces of said member are clamped between said sealer unit and said plate whereby certain openings are sealed and sealer may be directed to the inlet opening and exhausted through the exhaust opening.

5. A device for supplying a sealer material to the internal passages of a member having a plurality of openings on at least one outer surface, the openings communicating with said passages, comprising; a support, a table movably carried on said support, a sealer unit supported on said table, said unit including a frame rigidly mounted on said table, a diaphragm structure including a diaphragm secured to said frame in spaced relation to said table to provide a pressure chamber, a fluid pressure connection in communication with said chamber, a rubber-like sealing pad on said diaphragm, inlet conduit means communicating with an inlet opening in said member, an exhaust conduit means communicating with an exhaust opening in said member, and means for moving said table into engagement with the member whereby the sealer unit is moved into engagement with one surface thereof whereby certain openings are sealed and sealer may be directed into the inlet opening and exhausted through the exhaust opening.

6. A device for supplying fluid under pressure to the internal passages of a member having a plurality of openings on at least one outer surface, the openings communicating with said passages, comprising; a sealer unit having a frame, a diaphragm structure on said frame, said diaphragm structure including a diaphragm providing with said frame a pressure chamber, a fluid pressure connection in communication with said chamber, a relatively stiff pressure plate connected to said diaphragm, a sealing pad connected to said pressure plate, a fluid inlet conduit extending through said diaphragm, pressure plate and pad for communicating with an opening in communication with one of said passages, a fluid outlet conduit extending through said diaphragm, pressure plate and pad for communicating with a second opening communication with a second passage, and means for clamping said diaphragm structure against an outer surface of said member whereby certain openings are sealed from the atmosphere and fluid under pressure may be applied to the passages through the inlet conduit and exhausted through the outlet conduit.

7. A device for supplying fluid under pressure to the internal passages of a member having a plurality of openings on at least one outer surface, the openings communicating with said passages, comprising; a sealer unit having a frame, a diaphragm connected to said frame to provide a pressure chamber, a fluid pressure connection in communication with said chamber, a pressure plate connected to said diaphragm, a sealing pad connected to said pressure plate, a fluid inlet conduit extending through said diaphragm, pressure plate and pad for communicating with an opening in communication with one of said passages, a fluid outlet conduit extending through said diaphragm, pressure plate and pad for communicating with a second opening in communication with a second passage, and means for clamping said diaphragm structure against an outer surface of said member whereby certain openings are sealed from the atmosphere and fluid under pressure may be applied to the passages through the

inlet conduit and exhausted through the outlet conduit.

8. A device for supplying fluid under pressure to the internal passages of a member having a plurality of openings on at least one outer surface, the openings communicating with said passages, comprising; a sealer unit having a frame, a diaphragm connected to said frame to provide a pressure chamber, a fluid pressure connection in communication with said chamber, a sealing pad connected to said diaphragm, a fluid inlet conduit extending through said diaphragm, and pad for communicating with an opening in communication with one of said passages, a fluid outlet conduit extending through said diaphragm and said pad for communicating with a second opening in communication with a second passage, and means for clamping said diaphragm structure against an outer surface of said member whereby certain openings are sealed from the atmosphere and fluid under pressure may be applied to the passages through the inlet conduit and exhausted through the outlet conduit.

9. A device for supplying fluid under pressure to the internal passages of a member having a plurality of openings on at least one outer surface, the openings communicating with said passages, comprising; a sealer unit having a frame, a diaphragm structure on said frame,

said diaphragm structure including a diaphragm providing with said frame a pressure chamber, a fluid pressure connection in communication with said chamber, a sealing pad connected to said diaphragm, a fluid inlet conduit adapted to communicate with an opening in communication with one of said passages, a fluid outlet conduit adapted to communicate with a second opening in communication with a second passage, and means for clamping said diaphragm structure against an outer surface of said member whereby certain openings are sealed from the atmosphere and fluid under pressure may be applied to the passages through the inlet conduit and exhausted through the outlet conduit.

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