

May 13, 1947.

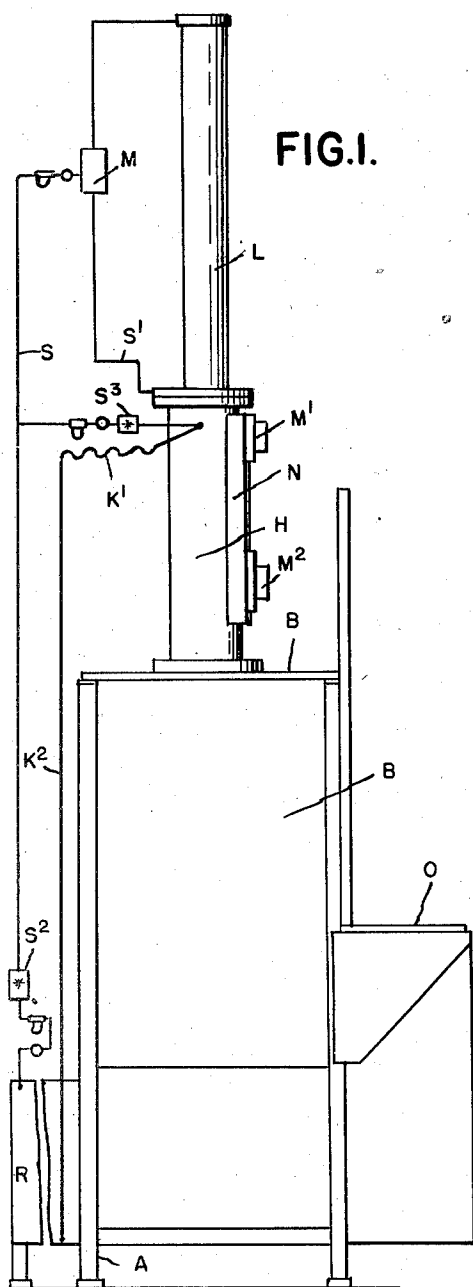
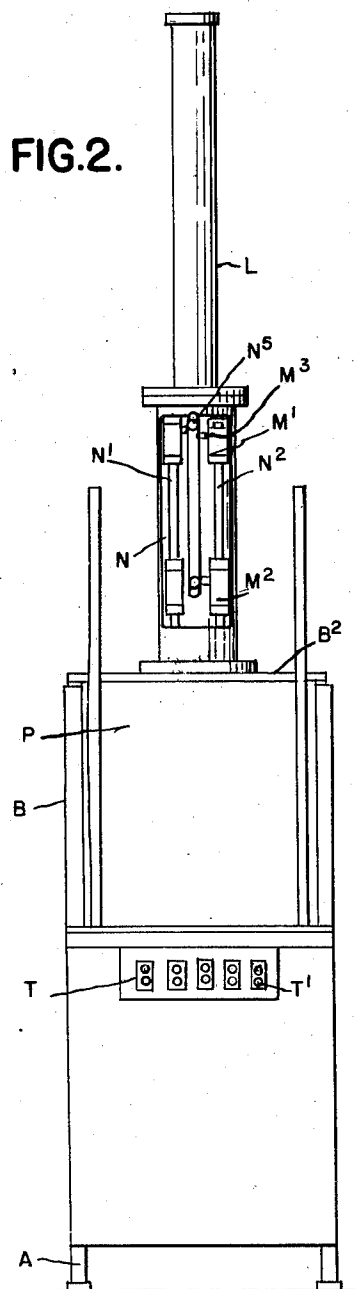
A. F. CASSIN

2,420,463

APPARATUS FOR WASHING CYLINDERS

Filed Dec. 10, 1945

3 Sheets-Sheet 1



INVENTOR.

ANTHONY F. CASSIN

BY

Whittemore Hulbert & Bellows

ATTORNEYS

May 13, 1947.

A. F. CASSIN

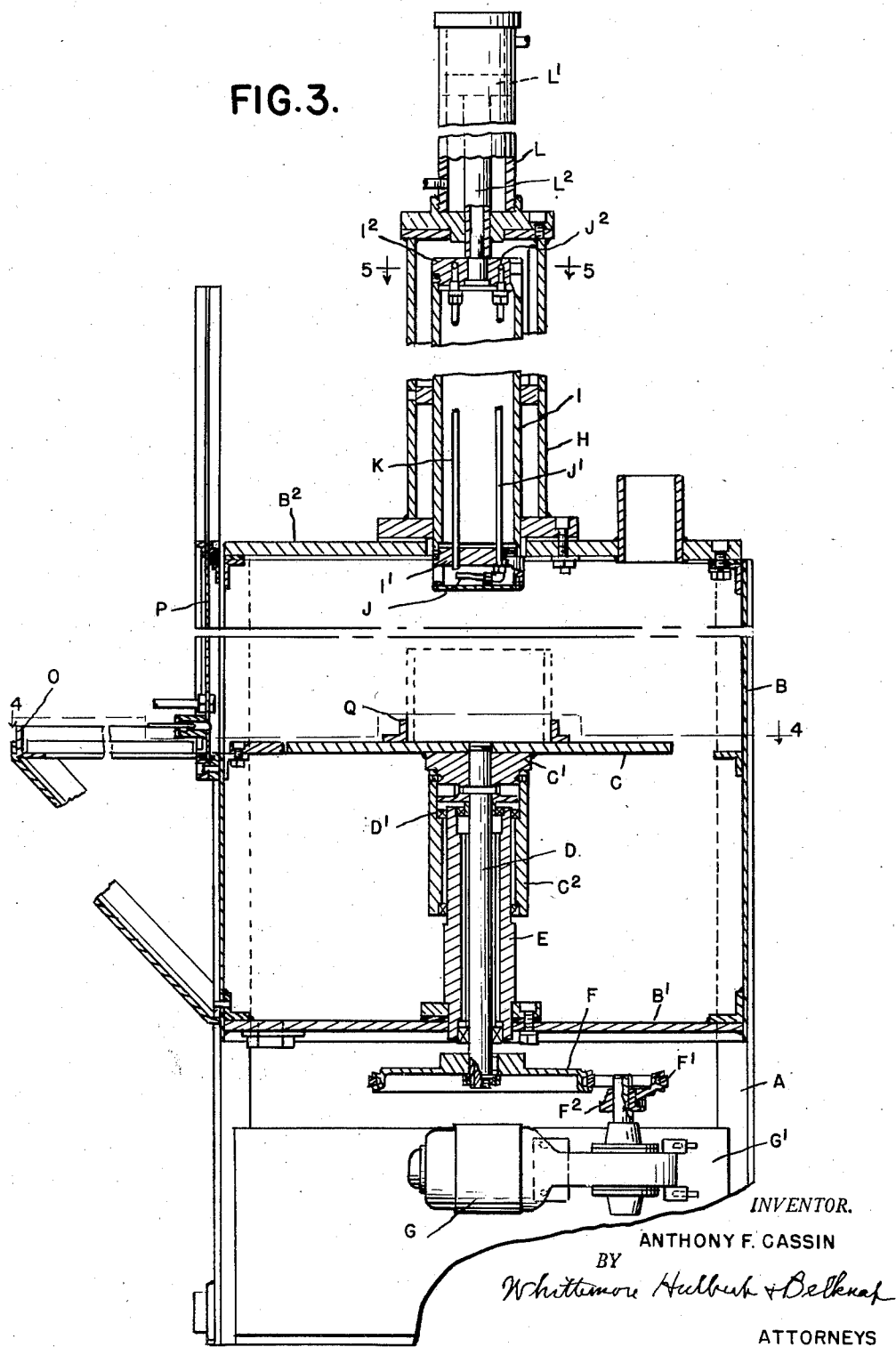
2,420,463

APPARATUS FOR WASHING CYLINDERS

Filed Dec. 10, 1945

3 Sheets-Sheet 2

FIG. 3.



May 13, 1947.

A. F. CASSIN

2,420,463

APPARATUS FOR WASHING CYLINDERS

Filed Dec. 10, 1945

3 Sheets-Sheet 3

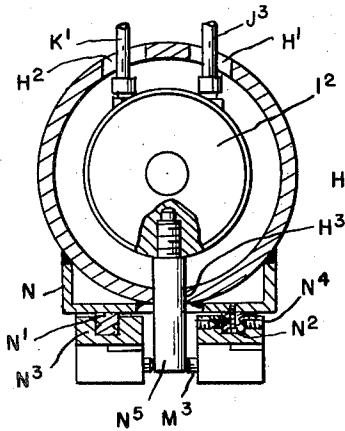
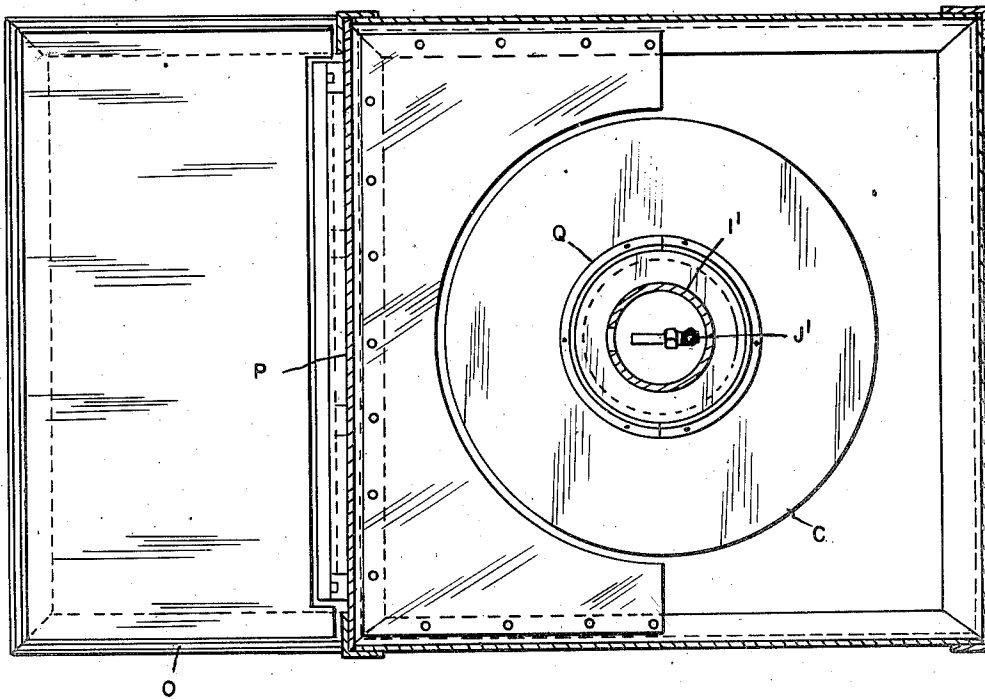


FIG. 5.

FIG. 4.



INVENTOR.

ANTHONY F. CASSIN

BY

Whittemore Hulbert & Belknap

ATTORNEYS

UNITED STATES PATENT OFFICE

2,420,463

APPARATUS FOR WASHING CYLINDERS

Anthony F. Cassin, Detroit, Mich., assignor to
Auto City Plating Co., Detroit, Mich., a cor-
poration of Michigan

Application December 10, 1945, Serial No. 633,924

3 Claims. (Cl. 51—15)

1

This invention relates to the washing of cylinders and more particularly to cylinders for chromium plated bores to remove therefrom any adhering abrasive particles. In the manufacture of engine cylinders more particularly for use in aircraft, it has been customary to plate the bores with chromium. The chromium deposit does not form an absolutely continuous surface but has microscopic channels or a so-called "spider web" extending over the area. The subsequent honing operation for finishing the surface results in the deposit of microscopic hone particles in these channels which if not removed will produce rapid wear when the engine is in operation. Furthermore, these channels are not completely open but have jagged feather edges which tend to hold any particles once deposited therein.

It is the object of the invention to obtain means for completely removing these abrasive particles and to this end the invention consists in the method and apparatus as hereinafter described.

Fig. 1 is a side elevation of the machine;

Fig. 2 is a front elevation thereof;

Fig. 3 is a vertical central section;

Fig. 4 is a horizontal section on line 4—4, Fig. 3;

Fig. 5 is an enlarged horizontal section on line 5—5, Fig. 3.

Broadly described my improved method consists in blasting every portion of the inner surface of the cylinder and in carrying by the blast a small amount of fine abrasive particles which assist in dislodging previous deposits in the channels or interstices. Thus, the jagged feather edges will to some extent be cut away so that the deposits in the channels are not retained thereby.

To insure that all portions of the inner surface will be subjected to the blast, the blast nozzle extends centrally within the cylinder and relative axial reciprocatory and simultaneous relative rotary movements are imparted to said nozzle and cylinder. This is preferably accomplished by apparatus of the following construction.

A is a frame. B is a casing within said frame forming a wash chamber and C is a revoluble table within the chamber B for supporting the work. The table C is mounted on a vertical shaft D passing downward through a hollow post E rising from the bottom of the casing. A hub C' connects the table to the shaft and a cylindrical skirt C² depending from the hub surrounds the upper portion of the post and is revolvably supported thereon by antifriction bearings D'. Beneath the bottom B' of the casing a pulley F is secured to the shaft D which is connected by a belt F' with a small diameter pulley F² on the shaft of a motor G. The latter is mounted on a panel G' at one side of the frame A. Centrally mounted on the top B² of the casing B is a tubular extension H which forms a housing en-

2

closing a hollow cylindrical plunger I. The latter passes through an aperture in the top B² and carries at its lower end a blast head I'. This is chambered to receive a radially directed air nozzle J which is connected to an air conduit J' extending to the upper end of the hollow plunger I and connected with a laterally extending port J² in the upper head I² thereof. A liquid conduit K also extends from the head I² downward through the hollow plunger I and blast head I' to direct a liquid stream in front of the air nozzle J. Air and liquid are supplied to the conduits J' and K through flexible conduits J³ and K' which pass through vertical slots H', H² in the housing H so as to permit of vertical movement of the plunger I therein. Above the housing H is an air cylinder L containing a piston L' connected by a piston rod L² with a head I² of the plunger I. Thus, by supplying air alternately to the upper and lower ends of the cylinder L, the piston therein will be reciprocated communicating a corresponding movement to the plunger I and the blast head I' at the lower end thereof. Consequently, a cylinder placed on the revoluble table C will have its inner surface subjected to the radially directed blast and the revolution of the cylinder together with the vertical reciprocation of the plunger will move the blast over all portions of said surface.

To adapt the device for washing cylinders of various sizes, the dimensions of the casing B and the maximum stroke of the plunger I are suitable for the largest cylinder. It is, however, desirable to limit the stroke of the plunger to correspond to the actual length of the cylinder being washed, which is accomplished by an air valve and controlling means therefor. As diagrammatically shown in Fig. 1, the air valve M is operated by electric switches M' and M² vertically adjustably mounted on the housing H. Preferably the housing H has a pair of angle bars N welded or otherwise secured to one side thereof and rails N' and N² are mounted on these angle bars to extend parallel to each other in a vertical direction. Heads N³ are adjustably mounted on the rails N' and N² and are held in different positions of adjustment by set screws N⁴. These heads N³ support the switches M' and M² which are arranged in pairs on corresponding pairs of heads. A pin or finger N⁵ secured to the plunger I extends radially outward through a vertical slot H³ in the housing H which is between the angle bars N. This pin during the movement of the plunger I will contact the operating members M³ of the switches M' and M² and through suitable electrical connections (not shown) will operate the valve M. The arrangement is such that when the upper switch members M' are operated by the pin or finger N⁵, the valve M will be shifted to supply air to the upper end of the cylinder L,

while the lower end of said cylinder is connected to the exhaust. On the other hand, when the finger N⁵ operates the lower switches M², the valve will be reversed to supply air to the lower end of the cylinder L and to connect the upper end of said cylinder to the exhaust. It is, therefore, apparent that by shifting the heads N³ on the rails N' and N², the switches M' and M² may be positioned to give any desired length of stroke to the piston L' within the cylinder L. For convenience in introducing the work into the casing B and onto the revoluble table C and also for removing the work therefrom, a shelf O is mounted outside of the casing at the level of the table. The casing is also provided with a sliding door P on the side adjacent to the shelf O so that by raising this door a cylinder placed on the shelf may be transferred therefrom to the table C. Exchangeable adapters Q are secured to the table each forming centering device for a cylinder of given size thereby holding said cylinder with its axis coincident with that of the table.

The liquid ingredient of the blast is placed in a tank or container R preferably arranged in rear of the casing B. For this ingredient various materials may be used such, for instance, as an alkaline water solution, but a certain amount of fine abrasive material is carried by this solution into the blast. The liquid is raised from the tank and delivered to the jet by the ejector action of the air jet nozzle J blowing across the lower end of the conduit K. A conduit K² extends upward from the lower portion of the tank R and connects with the flexible conduit or hose K' which latter connects with the upper end of the conduit K. Air is supplied to the valve M and also to the flexible conduit or hose J³ from any suitable source and through conduits S and S' controlled by electromagnetic valves S² and S³. The latter are operated by control switches T and these and other control switches as, for instance, one for the operation of the motor G, are mounted on a panel T' at the front of the casing and below the shelf O.

Operation

The cylinder to be washed is first placed on the shelf O after which the sliding door P is raised and the cylinder transfers from the shelf to the adapter Q on the table C. During this operation the plunger I is in its raised position so as to clear the cylinder. The door P is then closed and the machine is set in operation. This imparts rotary movement to the table C from the motor G through the pulleys F², F, belt F' and shaft D. Also, air is supplied through the conduits S and S' to the valve M and conduit J. Assuming that the switches M', M² have been adjusted to control the length of stroke of the plunger the blast nozzle will be moved first downward and then upward during the continuous rotation of the cylinder. This operation is continued for a sufficient period of time to insure the removal of all material lodged in the crevices or interstices and such removal is expedited by the action of the abrasive in the blast which cuts away the jagged feather edges. The operating machine may then be stopped, the door opened, and the clean cylinder removed from the table to the shelf O.

What I claim as my invention is:

1. A machine for cleaning cylinders comprising a casing provided with a door on one side thereof,

a revoluble table within said casing, a shelf outside said casing at substantially the level of said table adapted to support a cylinder to be cleaned and to facilitate the transfer of the same to and from said table when said door is open, a laterally directed blast nozzle centrally above said table and cylinder, means for vertically reciprocating said nozzle within said cylinder, means for supplying air and liquid to said nozzle during its reciprocation, and means for simultaneously revolving the table whereby the blast is successively directed against all portions of the inner surface of said cylinder.

2. A machine for cleaning cylinders comprising a casing provided with a door on one side thereof, a revoluble table within said casing for supporting a cylinder to be cleaned placed thereon when said door is open, a longitudinally slotted tubular upward extension to said casing coaxial with said table and cylinder, a plunger within said tubular extension having a laterally directed blast nozzle at its lower end within said casing, means for reciprocating said plunger, flexible conduits for supplying air and liquid to said nozzle having connection with the upper end of said plunger through said slotted tubular extension, means for revolving said table, and control means for simultaneously supplying liquid and air to said nozzle reciprocating said plunger and revolving said table and cylinder to direct the blast successively against all portions of the inner surface of the cylinder.

3. A machine for cleaning cylinders comprising a casing having a door for access to the interior thereof, a revoluble table within said casing for supporting a cylinder to be cleaned in coaxial relation thereto, a longitudinally slotted tubular upward extension to said casing, a plunger within said tubular extension having a laterally directed blast nozzle at its lower end within said casing, an air cylinder mounted on said tubular extension, a piston within said cylinder connected to said plunger for reciprocation of the same, flexible conduits for supplying air and liquid to said nozzle having connection with the upper end of said plunger through said slotted tubular extension, a motor for rotating said table, and control means for simultaneously rotating said table and reciprocating said plunger to direct the blast of said nozzle successively against all portions of the inner surface of said cylinder.

ANTHONY F. CASSIN.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,029,424	Hill	Feb. 4, 1936
2,307,816	Zimmerman	Jan. 12, 1943
1,644,385	Kendall	Oct. 4, 1927
955,471	Motz	Apr. 19, 1910
1,317,869	Motz	Oct. 7, 1919
2,248,530	Granger et al.	July 8, 1941

FOREIGN PATENTS

Number	Country	Date
222,038	Germany	May 17, 1910
389,343	Germany	Jan. 29, 1924
686,751	Germany	Jan. 15, 1940
789,684	France	Nov. 4, 1935