Aug. 25, 1959 G. I. EKSTRÖM ET AL 2,900,959

PNEUMATIC PERCUSSION TOOLS

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Fig. 1

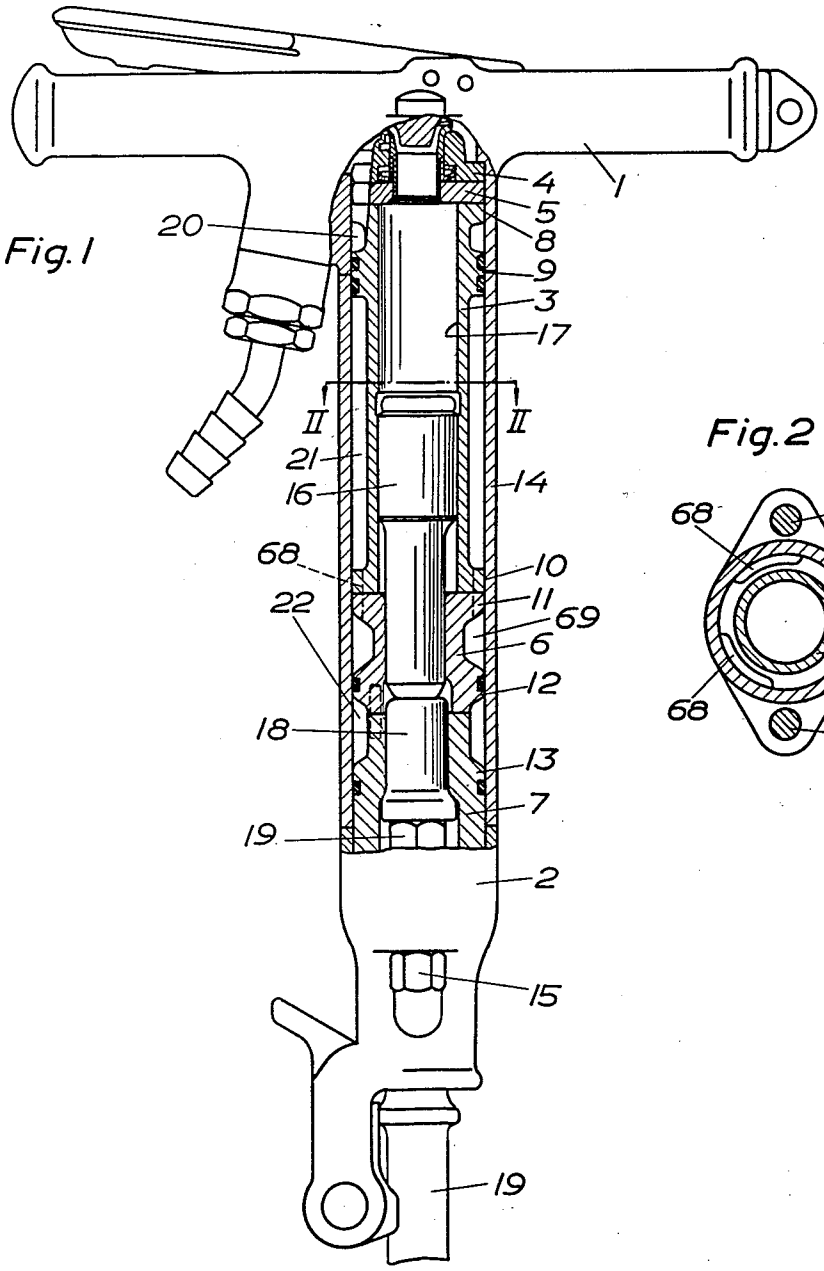

Fig. 2

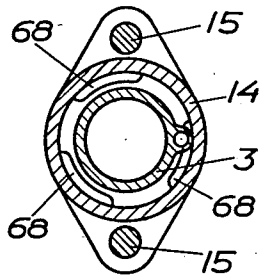

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Fig. 3

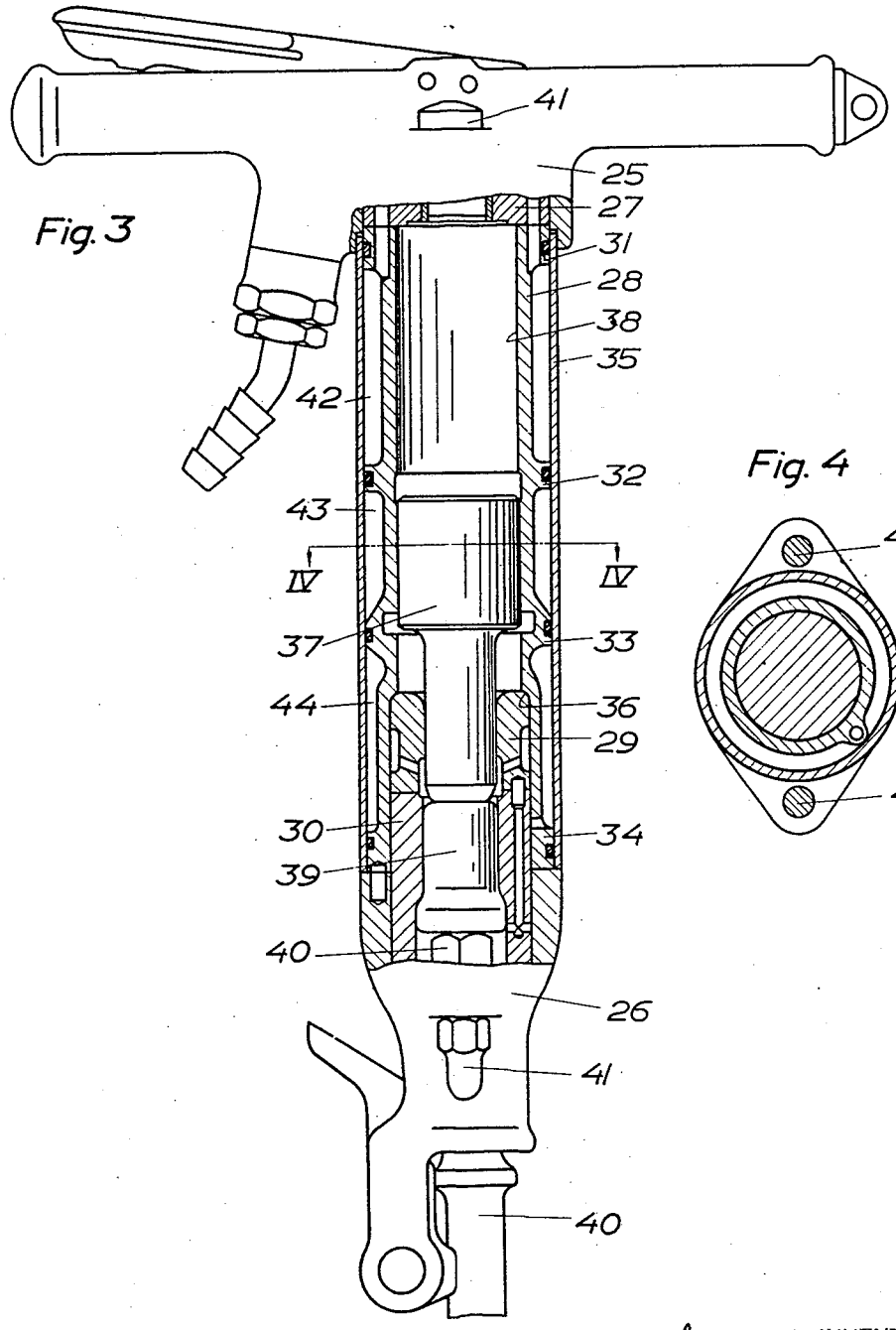
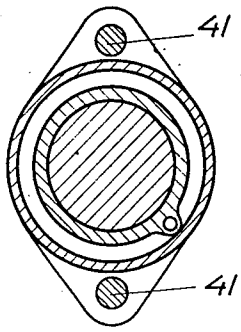


Fig. 4



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PNEUMATIC PERCUSSION TOOLS

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Fig. 5

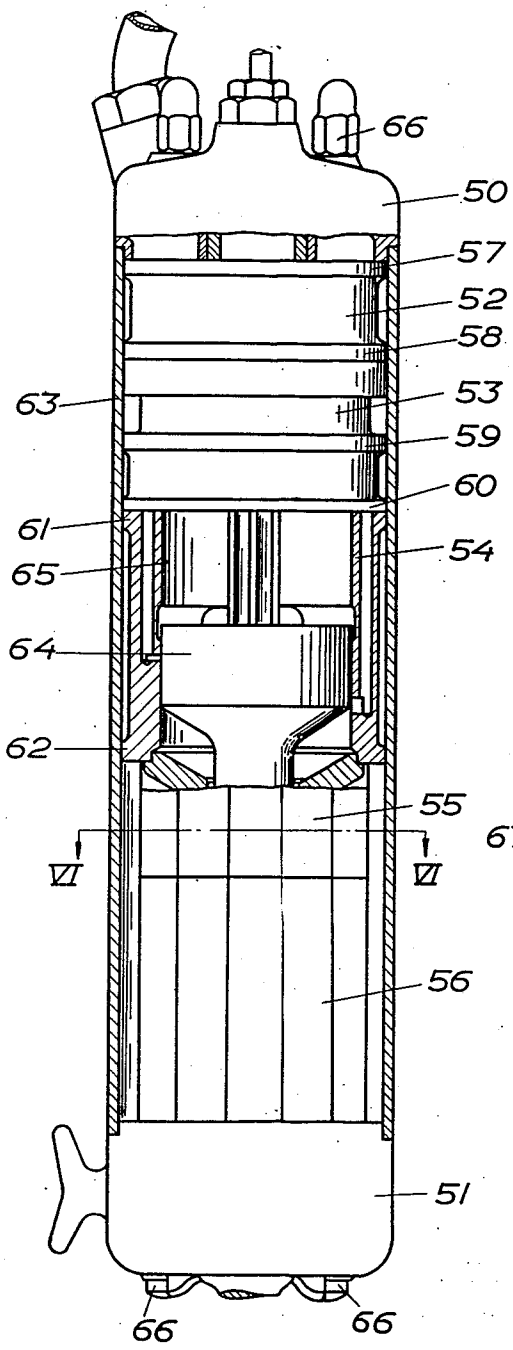
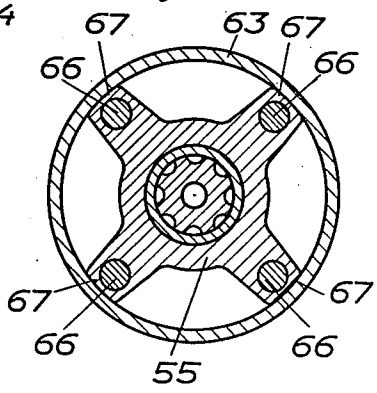


Fig. 6



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PNEUMATIC PERCUSSION TOOLS

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Application June 4, 1957, Serial No. 663,378

6 Claims. (Cl. 121—13)

This invention relates to the general design of pneumatic percussion tools comprising a cylinder casing forming a working cylinder for a differential hammer piston reciprocable within said cylinder under the influence of compressed air. Such tools, which may be concrete breakers, rock drills or other hammer tools, usually comprise a back head, a front head and one or more intermediate casings which together with the cylinder casing are stapled one upon the other between said heads and held together by two or more bolts. For various purposes passages extend longitudinally of one or more of said casings and openings are provided for the exhaust of air from the working cylinder and for other purposes. The provision of such passages and openings results in a complicated external shape of the various casings which are usually forgings. In order to avoid unnecessary weight of the casings the external shape of the casings usually shows many projections for accommodating the passages or openings which projections are liable to be exposed to damage in the rough handling to which tools of this kind are often exposed. It is also difficult to keep such tools clean and also the projections may cause difficulties for the operator and also transmit vibrations and shocks to the operator. One object of the present invention is to avoid these difficulties and to simplify the shape of the various casings, and to reduce manufacturing costs. A further object of the invention is to provide tools of this character which have a smooth external shape and which may easily be kept clean. A further object of the invention is to provide in a simple manner spaces suitable as air receivers and for accommodating mufflers or lubricating oil magazines.

For these and other purposes we provide a pneumatic percussion tool comprising a cylinder casing, a working cylinder in said cylinder casing, a differential hammer piston reciprocable in said working cylinder, a valve casing at the rear end of the cylinder casing, an intermediate casing forming a guide for the small diameter portion of said hammer piston at the front end of the cylinder casing, a back head, a front head, a tube in which said cylinder casing and said intermediate casing are stapled one upon the other, lands on said cylinder casing cooperating with the inner wall of said tube and having substantially the same outer diameter as the inner diameter of the tube, and bolts connecting said front head and said rear head and pressing said heads and the cylinder casing and intermediate casing axially together within said tube.

In the accompanying drawings three embodiments of pneumatic percussion tools according to the invention are illustrated by way of example. Fig. 1 is a side view and partial longitudinal section of a concrete breaker according to the invention, and Fig. 2 is a section taken on line II—II of Fig. 1. Fig. 3 is a second embodiment of a concrete breaker according to the invention, and Fig. 4 is a section taken on line IV—IV of Fig. 3. Fig. 5 is a side view and partial longitudinal section of a rock drill

according to the invention, and Fig. 6 is a section taken on line VI—VI of Fig. 5.

The concrete breaker illustrated in Fig. 1 consists of a back head 1 forming two handles, a front head 2, a cylinder casing 3, valve casings 4 and 5, an intermediate casing 6, and an anvil block casing 7. The cylinder casing 3 is provided with lands 8, 9, and 10, the intermediate casing with lands 11 and 12, and the casing 7 with a land 13. The lands 8, 9, 10, 11, 12 and 13 all have the same external diameter and fit within a tubular body 14. The casings 4, 5, 3, 6 and 7 are stapled one upon the other within the tubular body 14 between the back head 1 and front head 2 and are pressed together by two bolts 15. A differential hammer piston 16 is reciprocable in a working cylinder 17 formed by the cylinder casing 3, and an anvil block 18 is movable in a bore in the casing 7. The working implement is indicated by the reference numeral 19. An air receiver space 20 is formed between the lands 8 and 9 and an exhaust silencer space 21 is formed between the lands 9 and 10 within the tubular body 14 which space communicates through ports 68 with a further exhaust chamber 69 formed between the lands 11 and 12 and communicating with the atmosphere through ports (not illustrated) in the tube 14. An oil reservoir 22 is formed between the lands 12 and 13. The tubular body 14 has suitable openings (not illustrated) through which air from the working cylinder and the silencer is expelled to the atmosphere.

The tool illustrated in Figs. 3 and 4 is a concrete breaker comprising a back head 25 forming two handles, a front head 26, a valve casing 27, a cylinder casing 28, an intermediate casing 29, and an anvil block casing 30. The cylinder casing 28 is provided with lands 31, 32, 33, and 34 of the same external diameter fitting within a tube 35. The cylinder casing 28 has an internal shoulder 36 by which the casing 28 rests on the intermediate casing 29. A differential hammer piston 37 is reciprocable within a working cylinder 38 formed in the cylinder casing 28. An anvil block 39 is fitted in the casing 30. The working implement is indicated by reference numeral 40. The cylinder casing 28, the intermediate casing 29 and the casing 30 are stapled one upon the other within the tube 35 between the front head 26 and the valve casing 27 and the back head 25. Two bolts 41 are arranged longitudinally of the tool for holding the front head and the back head and the casings between them together. An air reservoir 42 is formed between the lands 31 and 32 and a muffler chamber 43 is formed between the lands 32 and 33. The space 44 between the lands 33 and 34 may be used as an oil reservoir.

It will be appreciated that the external surface of the main portion of the tools shown in Figs. 1 and 3 is completely smooth so that it cannot transmit longitudinal oscillations to the operator when the tube 14 or 35, respectively, during operation rests against the body or legs of the operator.

The rock drill illustrated in Figs. 5 and 6 consists of a back head 50, a front head 51, a pall and ratchet mechanism casing 52, a valve casing 53, a cylinder casing 54, an intermediate casing 55 and a chuck casing 56. The casing 52 is provided with lands 57 and 58, the casing 53 with lands 59 and 60, the casing 54 with lands 61 and 62 and the casing 55 with lands 67. The lands 57, 58, 59, 60, 61, 62, and 67 have the same external diameter and fit within a tube 63. A hammer piston 64 of the differential type is reciprocable within a working cylinder 65 formed in the cylinder casing 54. The front and back heads 50 and 51 and the casings 52, 53, 54, 55, and 56 are held together by means of four bolts 66 which bolts are carried within the tube 63 so that the portion of the rock drill between the back head 50 and

the front head 51 has a completely smooth cylindrical shape.

The tools above described should be considered only as examples and the invention may be varied in different ways within the scope of the claims.

What we claim is:

1. A pneumatic percussion tool comprising a cylinder casing, a working cylinder in said cylinder casing, a differential hammer piston reciprocable in said working cylinder, a valve casing at the rear end of the cylinder casing, an intermediate casing forming a guide for the small diameter portion of said hammer piston at the front end of the cylinder casing, a back head, a front head, a tube in which said cylinder casing and said intermediate casing are stapled one upon the other, lands on said cylinder casing cooperating with the inner wall of said tube and having substantially the same outer diameter as the inner diameter of the tube, and bolts connecting said front head and said rear head and pressing said heads and the cylinder casing and intermediate casing axially together within said tube.

2. A pneumatic percussion tool according to claim 1, in which the valve casing is stapled on the cylinder casing within the tube.

3. A pneumatic percussion tool according to claim 1, in which a sleeve enclosing an anvil block is stapled on the front head within the tube.

4. A pneumatic percussion tool according to claim 1,

in which the intermediate casing has two annular continuous lands forming seals with the inner wall of the tube and providing an exhaust chamber between them, a further exhaust chamber formed around the cylinder casing, passages in one of said lands forming a communication between said chambers, and ports in the tube forming a communication to the atmosphere from the exhaust chamber between the lands of the intermediate casing.

5. A pneumatic percussion tool according to claim 3, in which said sleeve has an annular land cooperating with and of substantially the same outer diameter as the diameter of the inner wall of the tube.

6. A pneumatic percussion tool according to claim 1, in which a first land is provided on the cylinder casing at the rear end thereof, a second annular continuous land on said cylinder casing remote from said first land and confining with said first land and the tube an air accumulation space, and passages through said first land and the valve casing forming a communication between said space and the inlet to the working chamber of the cylinder.

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