No. 785,254. PATENTED MAR. 21, 1905.

C. O. DEUTSCHMANN.

MOTOR.

APPLICATION FILED DEC. 9, 1901.

2 SHEETS—SHEET 1.

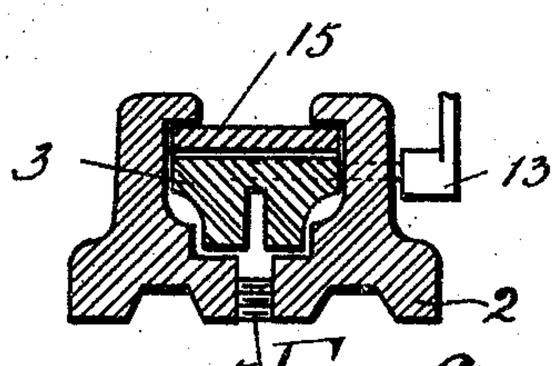


Fig: 6

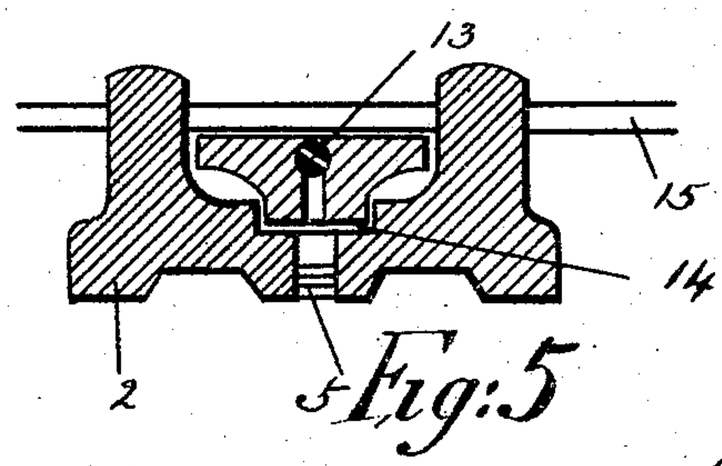


Fig: 5

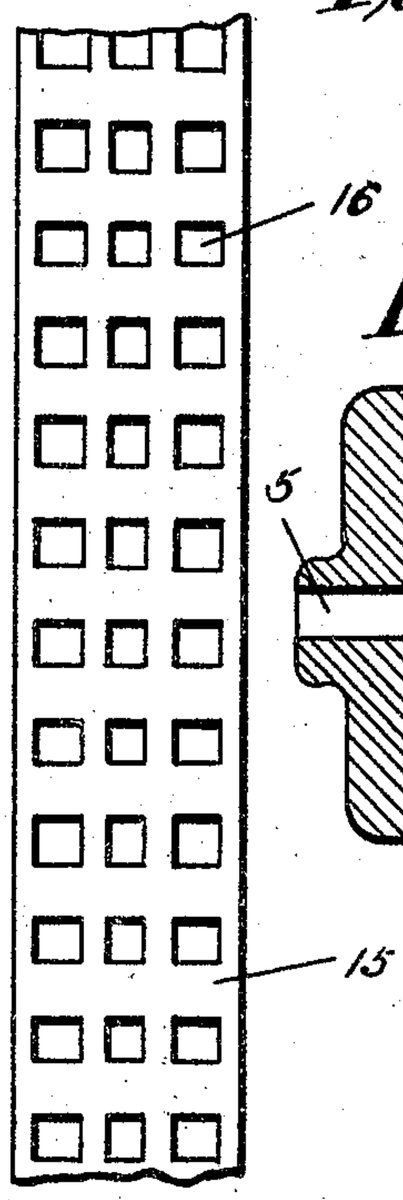


Fig: 3

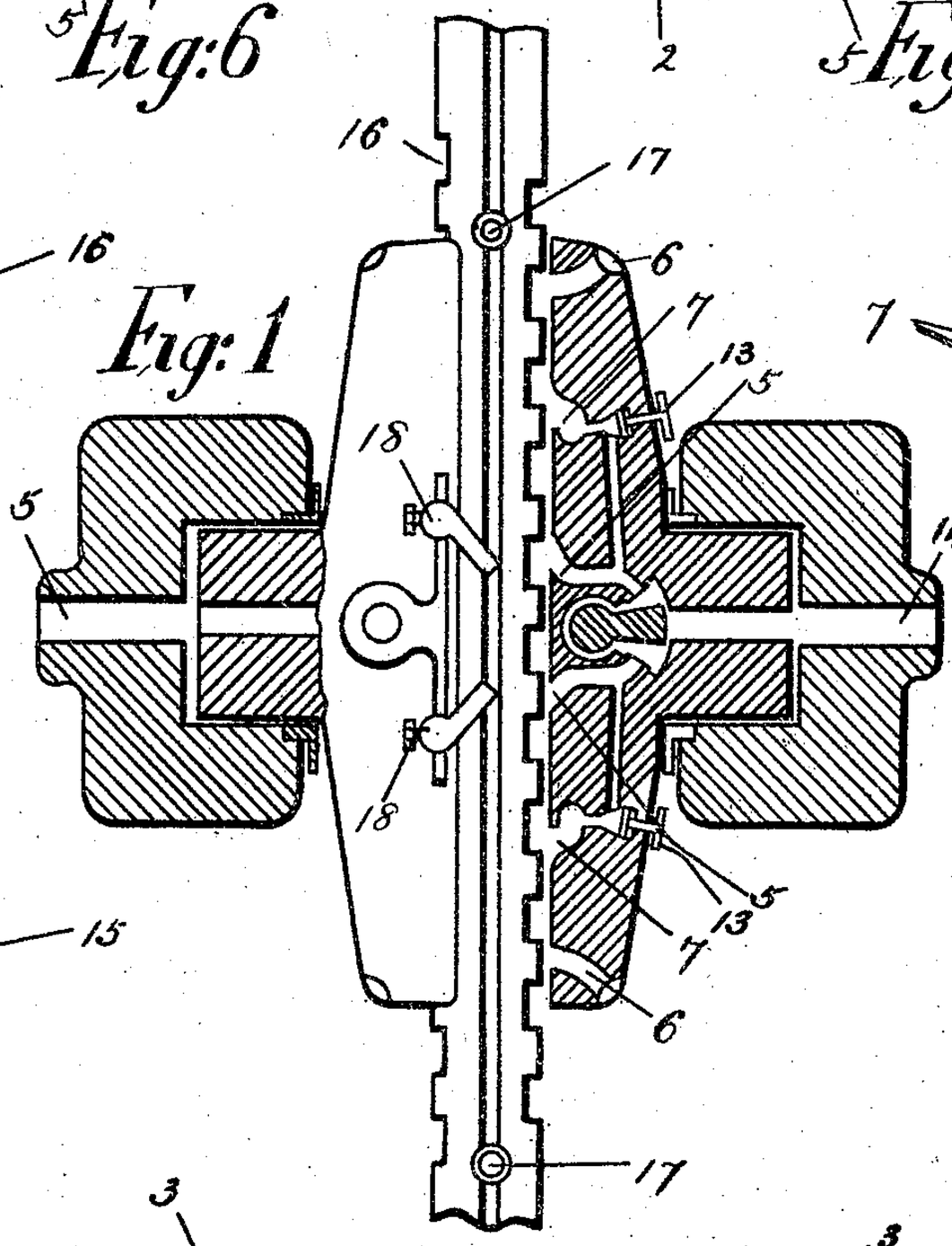
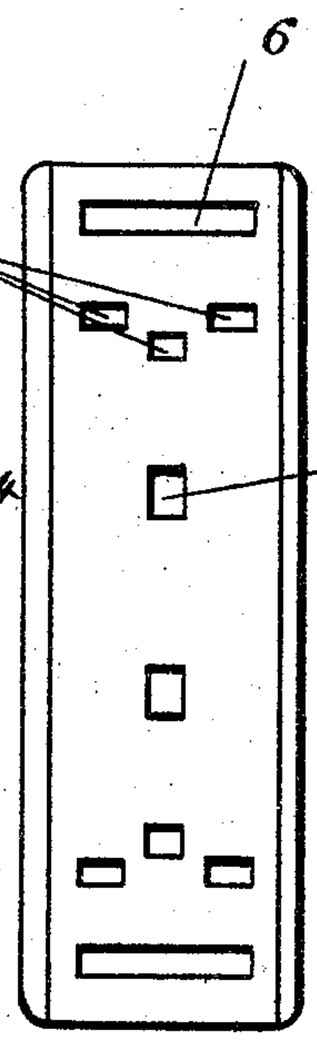


Fig: 1



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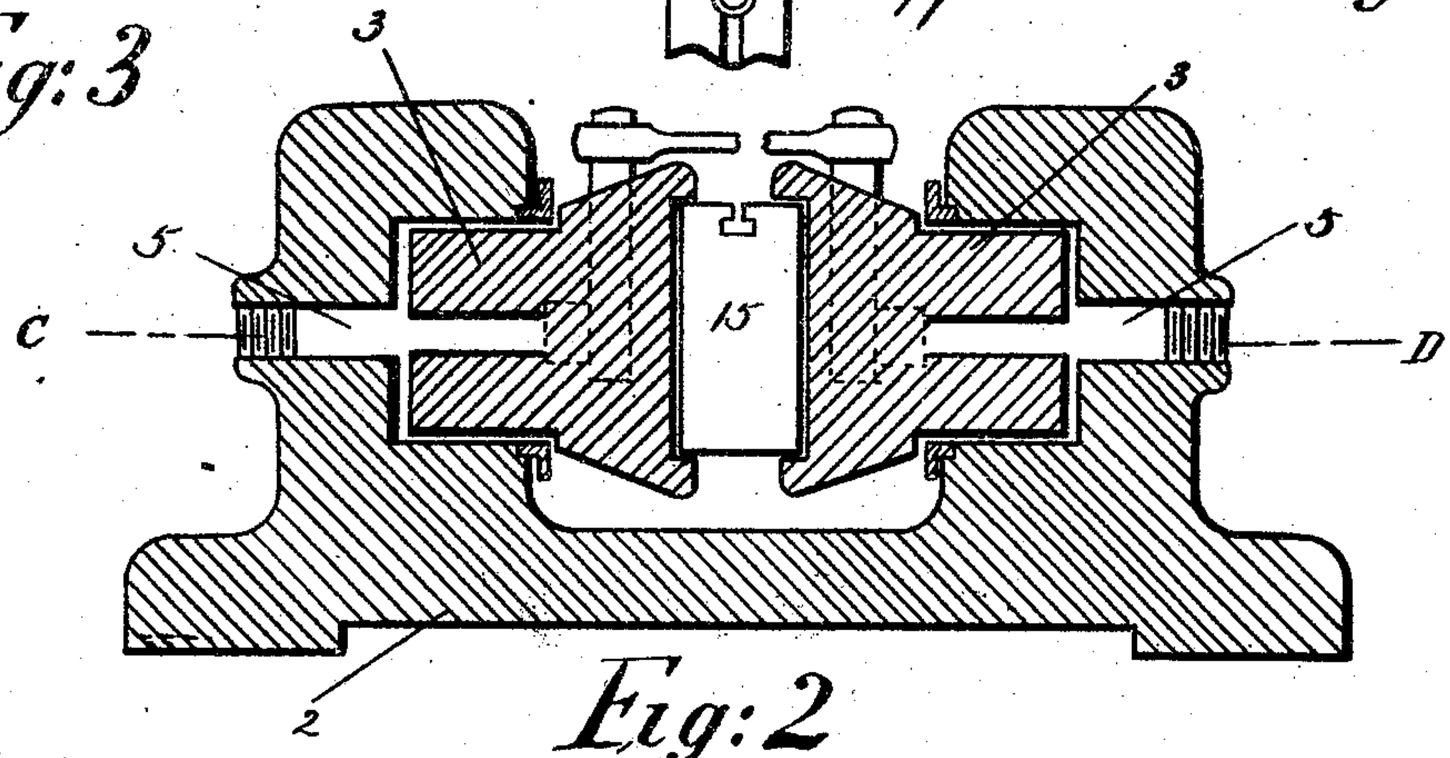

Fig: 2

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2 SHEETS—SHEET 2.

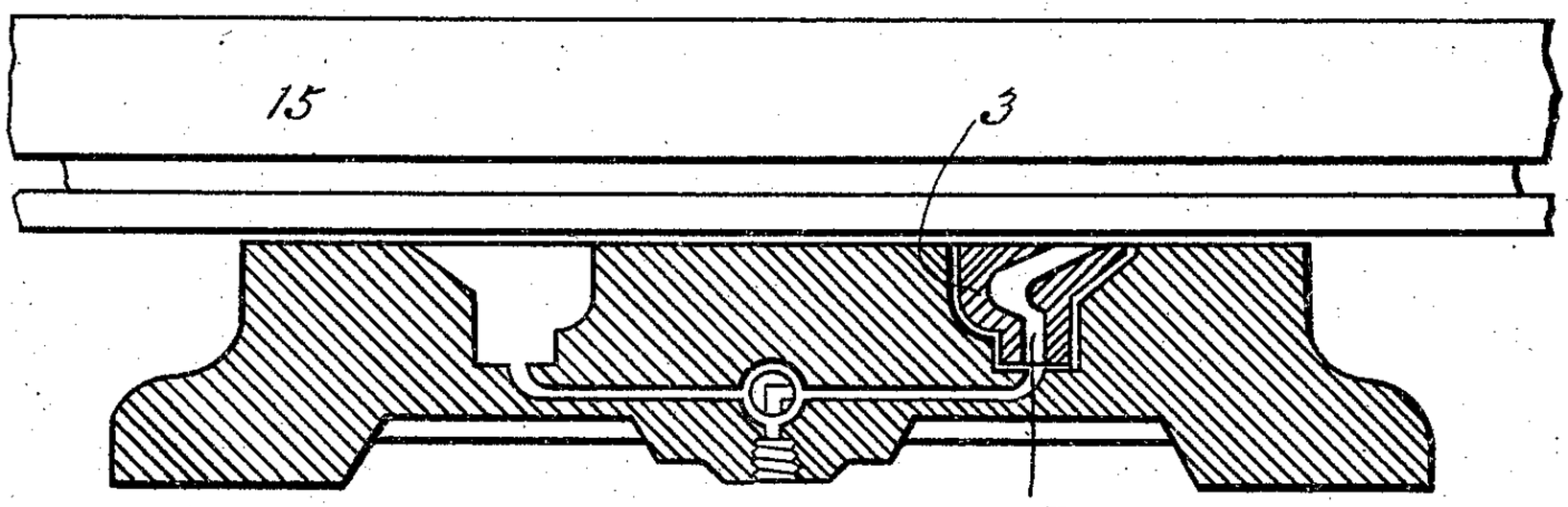

Fig: 7

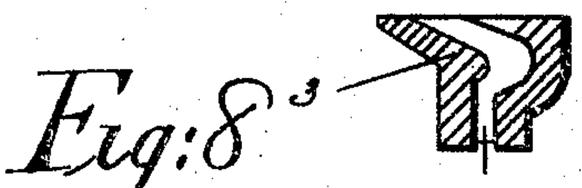

Fig: 8

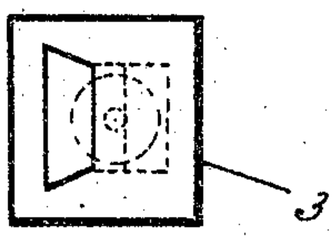

Fig: 9

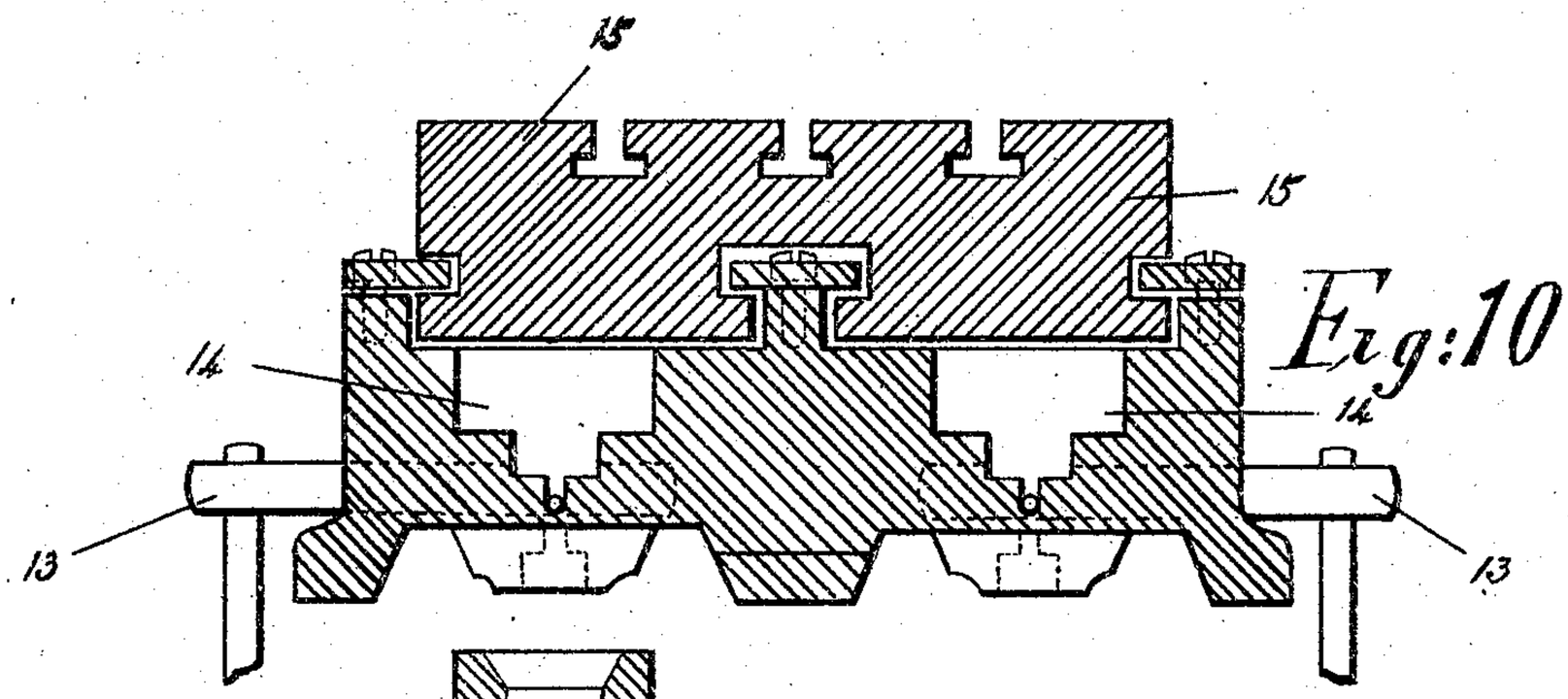

Fig: 10

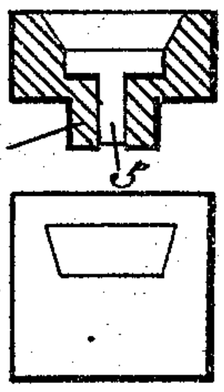

Fig: 11

Fig: 12

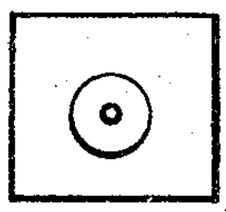

Fig: 13

Witnesses
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PHOTO-LITHOGRAPHED BY SACKETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 785,254. Patented March 21, 1905.

UNITED STATES PATENT OFFICE.

CHARLES OTTO DEUTSCHMANN, OF HAMPSTEAD HEATH, ENGLAND.

MOTOR.

SPECIFICATION forming part of Letters Patent No. 785,254, dated March 21, 1905.

Application filed December 9, 1901. Serial No. 85,303.

To all whom it may concern:

Be it known that I, CHARLES OTTO DEUTSCHMANN, a subject of the King of Prussia, Emperor of Germany, residing at 34 South Hill Park, Hampstead Heath, in the county of London, England, have invented a new and useful Improvement in Reciprocal Motors Actuated by Fluid-Pressure, of which the following is a specification.

My invention applies to motor propulsion of the reciprocal type and is capable of a very wide range of adaptation for the actuation of planers, shaping-machines, pneumatic hammers, riveting-machines, rock-drills, and reciprocal power machinery generally. It may be used to practically every purpose for which ordinary reciprocal motors are now employed working with pistons and plungers.

I dispense entirely with the use of a piston in a cylinder and piston-rod for reciprocating motion. In its place I cause the steam on entering to raise up a channeled block of substantial dimensions against a slide provided with cavities. I shall hereinafter call this block mounted with all its fittings and channelings the "movable power-chest."

The essential characteristics of my reciprocal motor are the construction of one or several movable pressure-chests and their application under pressure against a sliding surface provided with suitable cavities. Each movable pressure-chest has interior channelings, chambers, and valves. A portion of the power-chest's body opposite to its sliding surface is turned to fit a stuffing-box through which the power passes. I am showing some pressure-chests embedded without a stuffing-box. The respective areas of pressure at the base of pressure-chest and on the front face of it are so proportioned as to hold the chest in contact with the sliding surface and with the small amount of friction necessary to insure sufficient tightness of the contact-surfaces to prevent leakage of the motor fluid.

In order to fully set forth my invention I have illustrated it in the accompanying drawings.

Figure 1 is a plan, partly sectional, of my reciprocal motor. Fig. 2 is a section of Fig. 1. Fig. 3 a face view of the reciprocating member, showing the fluid-pressure cavities in series of three rows. Fig. 4 is a face view of the distributing power-chest, showing channelings and outlets of expansion-chambers of the same. Figs. 5 and 6 are sections at right angles to one another, showing a simple method of applying the fluid-pressure to one face only of the reciprocating member. Fig. 7 is partly a longitudinal section of a machine provided with four power-chests. Fig. 8 is a section, and Fig. 9 a plan, of one of the power-chests removed; Fig. 10, a transverse section of Fig. 7; and Figs. 11, 12, 13, are respectively section, top plan, and under side plan of the power-chest removed.

The general construction of my invention as applied to a reciprocal motor is well illustrated, by way of example, in the motoric parts of a large shaper or planing machine.

The flat bar 15 in Fig. 1 substitutes the rack of a shaper. It has the usual stops 17 in a T-slot, acting on a reversing-lever at 18. Both flat surfaces of the bar have suitable cavities 16, divided into high and low pressure sections. Both pressure-chests, of which Fig. 4 is a view of the contact-face, inclose the bar and hold it secure. The fluid-pressure passes through the channels 5 of the chest according to the position of the reversing-valve. It enters the middle series of cavities and fills them in propelling the slide. The middle cavities of the slide traveling along empty some of their pressure into the expansion-chamber 7. The expansion-chamber propels the bar additionally in pressing upon and filling up new cavities in the outer series. They finally empty out through the opening 6. Fig. 2 illustrates best the entrance of the pressure at the two opposite inlets of the frame-socket at 5 directly acting upon the turned part of the power-chest at 3 of this figure. The length of stroke is determined by two adjustable stops 17 in T-slots in the bar. They actuate an oscillating valve in striking upon the two adjustable dogs 18. A direct passage is provided and having valves at 13 to pass direct the power to the expansion-chamber for emergency. Several of such expansion-chambers may be used in one power-chest for the higher grades of pressure.

The small tools and machinery driven on my principle of reciprocal motion are provided with power-chests without expansion, as shown in Figs. 5 and 6. With the smaller reciprocal appliances the fluid-pressure enters the frame-socket 2 at the screwed opening 5. (See Fig. 6.) It raises the pressure-chest and actuates the slide according to the position of the valve 13.

The small power-chest 3 of Fig. 6 is partially but securely embedded in the frame 2. The valve 13 within the power-chest may be of any suitable construction. The small slide 15 has a single line of cavities; but in all slides a potent margin of surface is left between the cavities to form a polished wearing-face for the power-chests.

Figs. 7 and 10 show four small independent power-chests wholly embedded in the saddle of a milling-machine table without stuffing-boxes. They actuate the table 15 to and fro according to the position of the valve 13. Outlets for the pressure are not provided, the power being compressed air. The shape of these small and totally-embedded power-chests may be perfectly cubic or an embedded square plate or disk. It is obvious that with such smaller reciprocal tools and machinery now and again the power-chest will have to be embedded into the slide and the saddle provided with a line of cavities or flutings. In such a case the valve will have to be on the side on which the power-chest is placed and from this side the pressure has to enter. The cavities of the sliding member may be quantities of small, shallow, round holes put some distance apart into the sliding surface. By filling up a portion of these holes the power consumed may be regulated.

I have illustrated these applications by way of example only because my invention is capable of an almost infinite number of adaptations to reciprocal machinery of nearly all kinds; but the underlying principle governing all of these is one and the same. It is the formation and construction of a movable pressure-chest held under pressure against a slide provided with cavities. The wear and tear on the faces of contact between chest and slide is automatically compensated, the chest being movable and under pressure. In all cases the basal pressure upon the chest has to exceed to some extent the face pressure to keep the chest in touch with the slide. It is obvious that these chests can be placed upon one slide in series of three, four, and more. Again, two chests may operate between them two or four bars or slides, each bar having a groove of its own. Bars of triangular or half-round section require a power-chest grooved to take their shape.

I construct and employ power-chests which are entirely movable in their mountings. I attain thereby many novel and economical features with them. The contact-faces of the power-chests are not inlaid with minor blocks and packings, and the substantial merits of one sound and solid casting are retained.

What I claim as my invention is—

1. The combination of one or several valved peripherical power-chests, provided internally with channelings, valves, expansion-chambers, and valved by-pass; said power-chests mounted movably in stuffing-boxes, and actuating between them a sliding bar provided with cavities all as set forth and described.

2. In a reciprocating motor the combination of a slide provided with cavities; one or several movable blocks with interior channelings, valves and expansion-chambers, closing up with the sides of the slide and actuating same by fluid-pressure striking into the cavities of said slide; a reversing-valve inside each power-chest and adjustable stops fitted to slide to limit motion of same all as set forth and described.

3. In a reciprocating motor the combination of a slide with cavities pressed upon by one or several channeled pressure-chests; said pressure-chests partially or entirely recessed and embedded into the frame supporting said slide; valved channels within the frame alternately guiding the pressure fluid through the pressure-chests upon the slide in opposite directions, all substantially as set forth and described.

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