F. H. REAGAN & A. G. PHILLIPS.

MOTOR GRINDING MACHINE.

APPLICATION FILED AUG. 21, 1913.

1,094,811.

Patented Apr. 28, 1914.

2 SHEETS—SHEET 1.

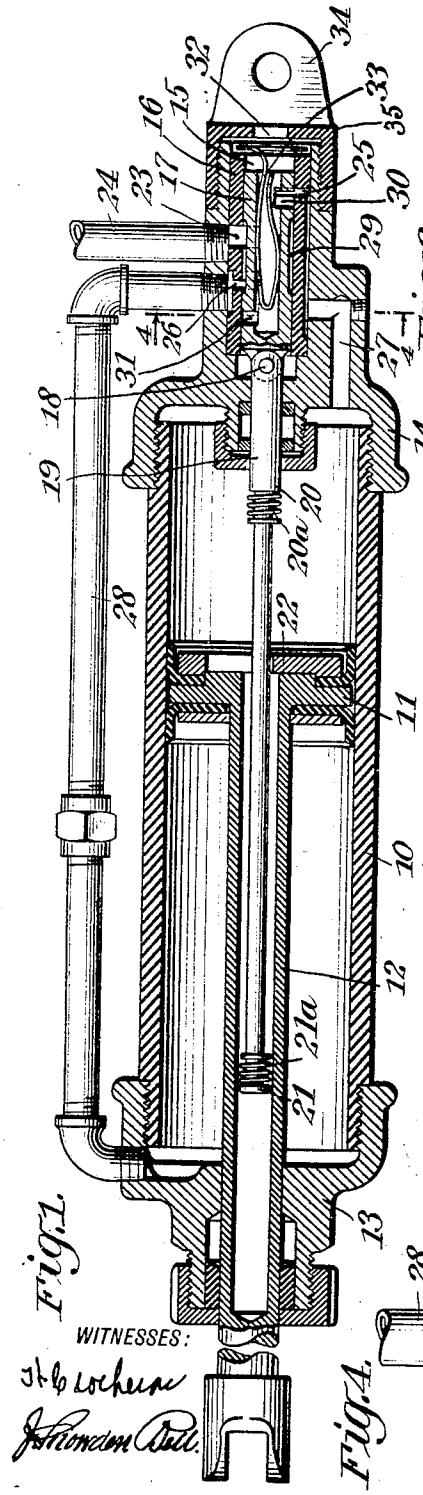


Fig. 1.

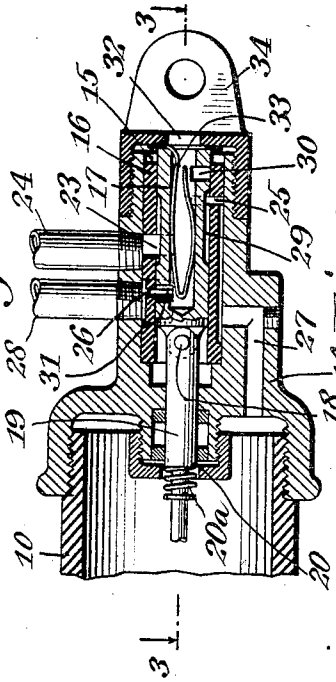


Fig. 2.

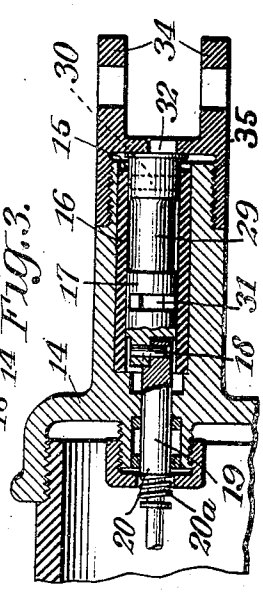


Fig. 3.

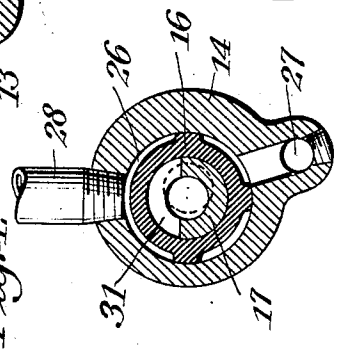


Fig. 4.

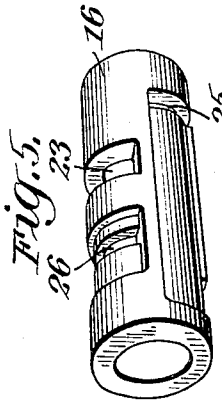


Fig. 5.

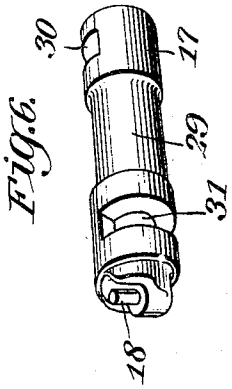


Fig. 6.

WITNESSES:

J. H. Lochner

J. Howard Bell.

INVENTORS.

Frank H. Reagan.

Arthur G. Phillips.

By Edward A. Wright.

ATTORNEY

F. H. REAGAN & A. G. PHILLIPS.

MOTOR GRINDING MACHINE.

APPLICATION FILED AUG. 21, 1913.

1,094,811.

Patented Apr. 28, 1914.

2 SHEETS—SHEET 2.

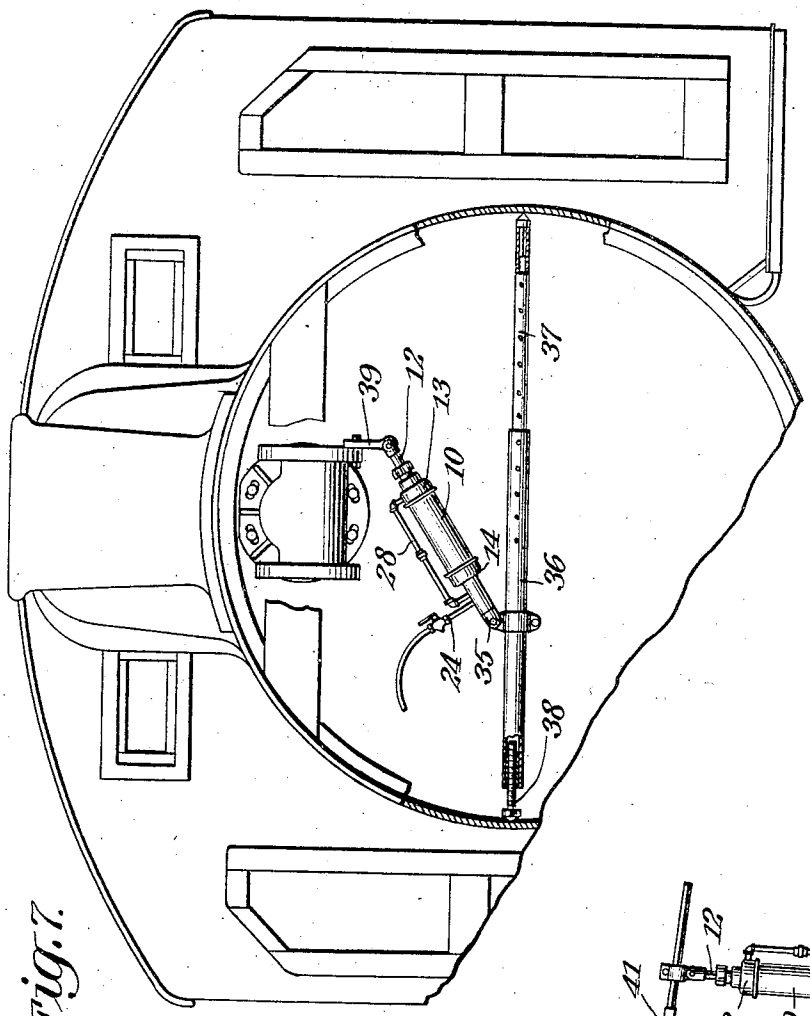


Fig. 7.

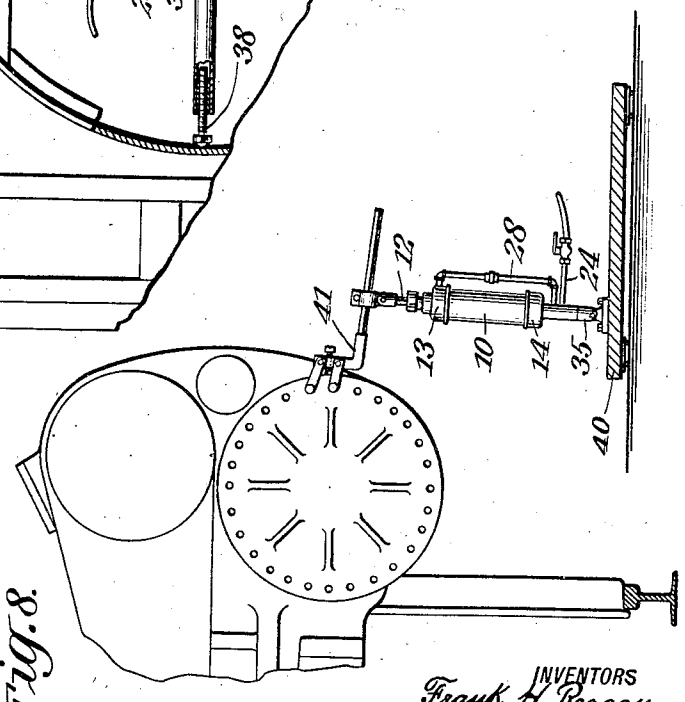


Fig. 8.

WITNESSES:

H. Bercherer

J. Howden Bell.

INVENTORS

Frank H. Reagan

Arthur G. Phillips

BY Edward Wright

ATTORNEY

UNITED STATES PATENT OFFICE.

FRANK H. REAGAN AND ARTHUR G. PHILLIPS, OF SCRANTON, PENNSYLVANIA.

MOTOR GRINDING-MACHINE.

1,094,811. Specification of Letters Patent. Patented Apr. 28, 1914.

Application filed August 21, 1913. Serial No. 785,886.

To all whom it may concern:

Be it known that we, FRANK H. REAGAN and ARTHUR G. PHILLIPS, both citizens of the United States, and residents of Scranton, in the county of Lackawanna and State of Pennsylvania, have jointly invented a certain new and useful Improvement in Motor Grinding-Machines, of which improvement the following is a specification.

This invention relates to machines for oscillating or rotating joint flanges, cylinder heads, and the like, where it is desired to make a ground joint between the contacting metal surfaces, and it has for one of its objects to provide an improved reciprocating motor for this purpose, which shall be of simple, compact and durable construction, and adapted to be operated by fluid pressure to produce the desired oscillating movement.

Another object is to provide improved means for pivotally supporting the motor and for coupling the same to the parts to be ground.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings: Figure 1 is a central longitudinal section of a reciprocating motor embodying our improvement; Fig. 2, a similar fragmentary section of the cylinder head, valve chamber and valve, but showing the valve in a different position; Fig. 3, a sectional view taken on the line 3—3 of Fig. 2; Fig. 4, a transverse section taken on the line 4—4 of Fig. 1; Fig. 5, a perspective view of the valve bushing; Fig. 6, a perspective view of the valve; Fig. 7, a view in elevation, illustrating an application of our improvement for grinding the flange joints of a locomotive dry pipe; and Fig. 8, a similar view, illustrating an application of our improvement for grinding cylder head joints of locomotives.

As shown on Sheet 1 of the drawings, our improved reciprocating motor comprises a cylinder, 10, containing a piston, 11, having a hollow piston rod, 12, extending out through a stuffing box in the cylinder head, 13, while the other cylinder head, 14, contains the valve chamber, 15, having a cylindrical bushing, 16, in which the hollow cylindrical valve, 17, is mounted to slide. The valve is preferably open at one end and provided at the other end, with a projection, having a pin, 18, to which the valve rod or stem, 19, is pivotally connected, the valve rod extending through a stuffing box into the cylinder and into the hollow piston rod, and provided with a shoulder, 20, and a head, 21, adapted to be actuated by the striking plate, 22, of the piston to shift the valve at each end of the stroke of the piston. If desired, springs, 20^a, and 21^a, may be mounted on the valve rod in order to cushion the blows of the striking plate.

The valve bushing is provided with an inlet port, 23, communicating with supply pipe, 24, and cylinder ports, 25 and 26, communicating with the opposite ends of the cylinder through passage, 27, and the passage or pipe, 28, respectively. The intermediate portion of the valve is provided with an annular groove or cavity, 29, for controlling the admission of fluid to the cylinder ports, while the exhaust ports, 30 and 31, near opposite ends of the valve, communicate with the space within the valve which is exposed to the atmosphere through an opening, 32, at the end of the valve chamber.

For the purpose of maintaining the proper relation of ports in the valve and bushing, and preventing the valve from rotating, the valve rod may be slightly eccentric to the valve, the axis of the valve chamber being out of line with the axis of the cylinder and the valve rod, as shown more clearly in Fig. 3 of the drawing. In order to retard the movement of the valve, a friction device, such as the bent spring, 33, may be employed, extending within the hollow valve and engaging the interior surface thereof. This serves to hold the valve in the positions to which it is moved by the piston, and prevents it from being displaced by the vibrations of the machine.

When the fluid, such as steam or compressed air, is turned on, it passes through supply pipe, 24, and with the valve in the position indicated in Fig. 1, through ports, 23, 29, 26, and pipe, 28, to the left end of the cylinder, thus moving the piston toward the right, the exhaust from that end of the cylinder passing out through passage, 27, and ports, 25, 30, and 32, to the atmosphere. When the piston approaches the end of its stroke, the plate, 22, engages the spring, 20^a, of the shoulder, 20, of the valve rod, and shifts the valve to its opposite position, indicated in Fig. 2. Fluid then flows from the supply port, 23, through the cavity, 29, of the valve port, 25, and passage, 27, to

the left end of the cylinder, the exhaust from the opposite end passing out through pipe, 28, ports, 26, 31 and 32. As the piston reaches the left end of its traverse, the plate, 22, strikes the spring, 21ª, of the head, 21, of the valve rod, and shifts the valve to its other position. The piston continues to reciprocate in this manner as long as the fluid under pressure is supplied to the pipe, 24. The outer end of the valve chamber is provided with a cap, 35, having a pair of perforated lugs, 34, forming a trunnion for supporting the motor, and on which it may oscillate when in use.

As shown in Fig. 7, the device is applied for grinding in the flange joint of a locomotive dry pipe, and for supporting the motor in the smoke box of the locomotive, the trunnion is mounted on a brace formed of two telescoping rod sections, 36 and 37, one of which has an adjustable end piece, 38, and adapted to be extended between the opposite sides of the boiler shell. The piston rod, 12, is coupled by a suitable connecting bar, 39, with the flange of the dry-pipe tee, whereby the reciprocating movement of the piston serves to oscillate the flange upon the joint ring and grind the same to a perfect fit.

In Fig. 8, the device is shown as applied for grinding the joint of a locomotive cylinder head, the trunnion, 35, being mounted on a base, 40, and the piston rod being coupled to the cylinder head by means of a jig, 41. The device requires very little attention, it being merely necessary to turn on the fluid supply to start the operation, which then goes on automatically until the fluid is shut off when the operation is completed. In this manner the cylinder head, flange, or other part to be ground, may be rapidly rotated or oscillated, and a true joint surface produced in the least possible time, thus greatly reducing the cost of the process.

Having now described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a reciprocating motor, the combination of a cylinder, a piston therein having a hollow piston rod, a cylinder head containing a cylindrical valve chamber, a hollow cylindrical valve in said chamber for controlling the supply of fluid to the opposite ends of the cylinder, and a valve rod extending within the hollow piston rod and having projections adapted to be engaged by the piston at the ends of its stroke for operating said valve.

2. In a reciprocating motor, the combination of a cylinder, a piston therein having a hollow piston rod, a cylinder head containing a cylindrical valve chamber having an exhaust opening at one end, a hollow cylindrical valve closed at one end and open at the other and having exhaust ports communicating with said interior space, and a valve rod extending within the hollow piston rod and having projections for engaging said piston.

3. In a reciprocating motor, the combination of a cylinder, a piston therein having a piston rod, a cylinder head containing a cylindrical valve chamber having ports leading to opposite ends of the cylinder, a supply port, and an exhaust opening at one end, a hollow cylindrical valve having a groove for connecting the supply with the cylinder ports, and exhaust ports communicating with the interior space of the valve, and means for actuating said valve.

4. In a reciprocating motor, the combination of a cylinder, a piston therein having a piston rod, a cylinder head containing a cylindrical valve chamber, a cylindrical valve in said chamber for controlling the supply of fluid to the opposite ends of the cylinder, and a valve rod connected to said valve and extending within the piston rod for operating said valve, said valve being disposed eccentrically to the valve rod.

5. In a reciprocating motor, the combination of a cylinder, a piston therein having a hollow piston rod, a cylinder head containing a cylindrical valve chamber, a cylindrical valve in said chamber for controlling the supply of fluid to the opposite ends of the cylinder, and a valve rod pivotally connected eccentrically to the end of the valve and extending within the hollow piston rod.

6. In a reciprocating motor, the combination of a cylinder, a piston therein having a hollow piston rod, a cylinder head containing a cylindrical valve chamber, a hollow cylindrical valve for controlling the supply of fluid to the opposite ends of the cylinder, a friction device extending within the hollow valve, and a valve rod extending within the hollow piston rod and having projections for engaging said piston.

7. The combination of a cylinder, a piston and rod, a support, a cylinder head having a trunnion pivoted to said support and containing a valve chamber, a valve therein controlled by the movement of the piston, and means for attaching the piston rod to a part to be oscillated.

In testimony whereof we have hereunto set our hands.

FRANK H. REAGAN.
ARTHUR G. PHILLIPS.

Witnesses:
SAMUEL S. REIGEL,
GORDON BAXTER.