E. J. MOLERA & J. C. CEBRIAN.

Motor.

No. 212,038. Patented Feb. 4, 1879.

Fig. 1.

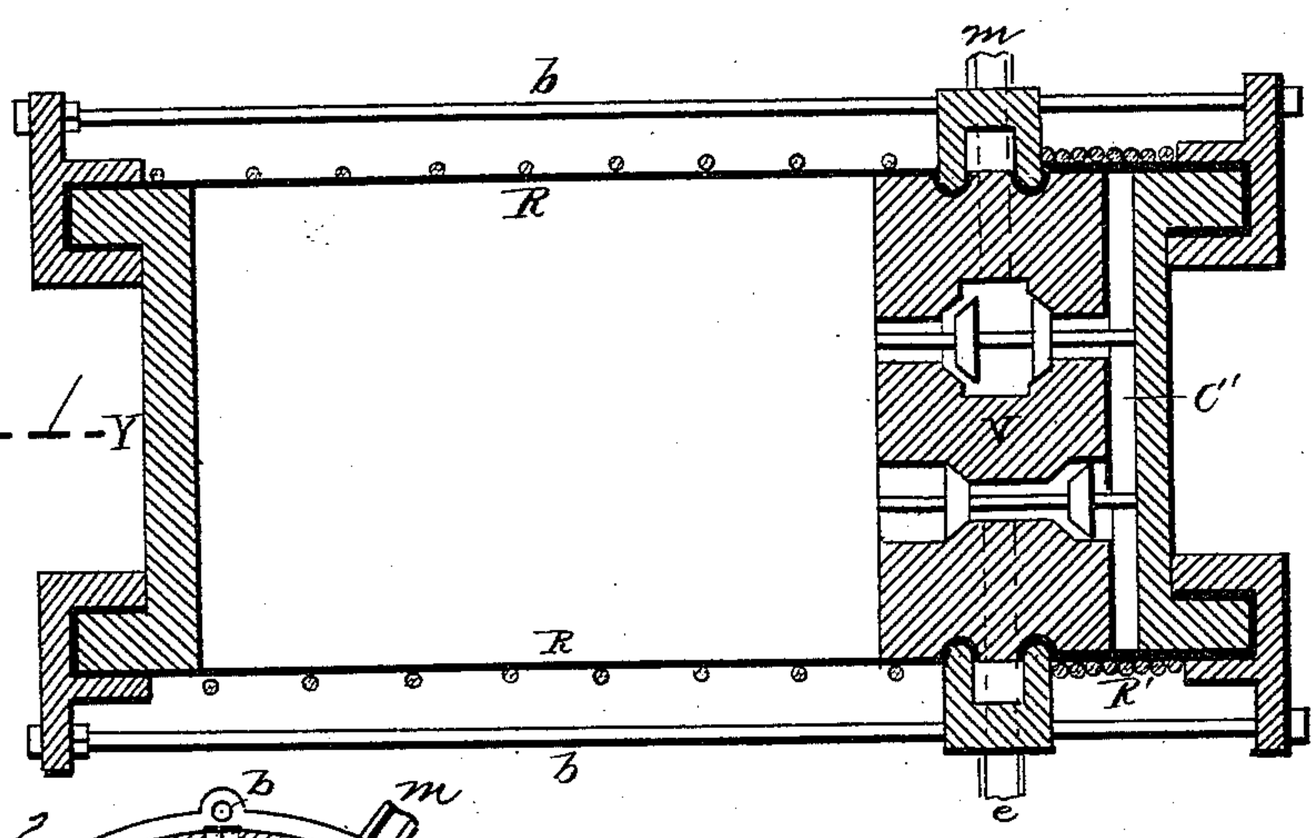


Fig. 2.

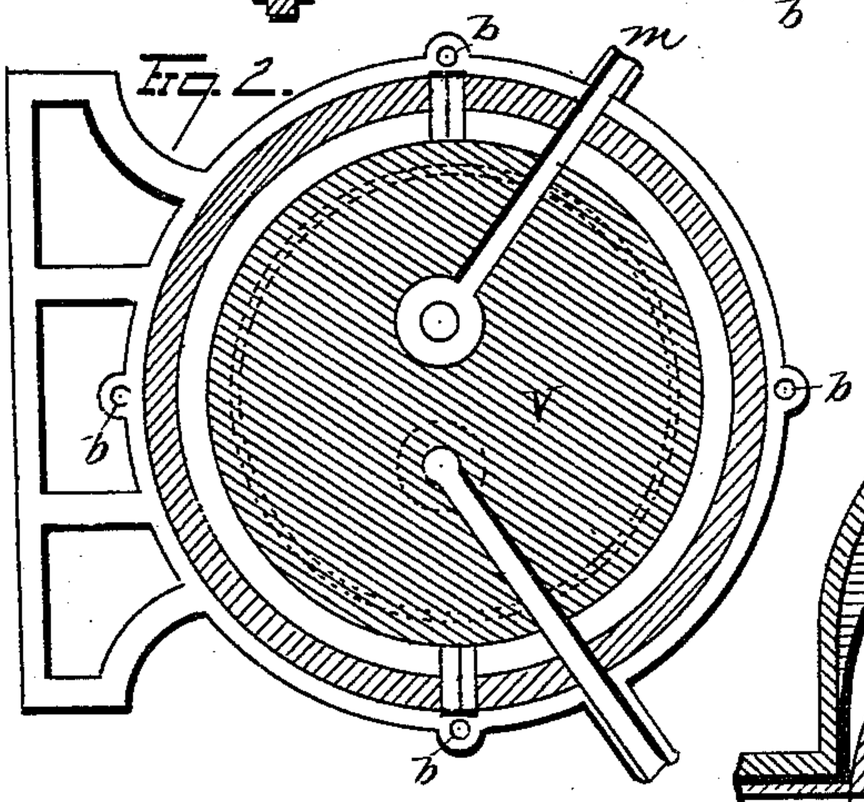


Fig. 3.

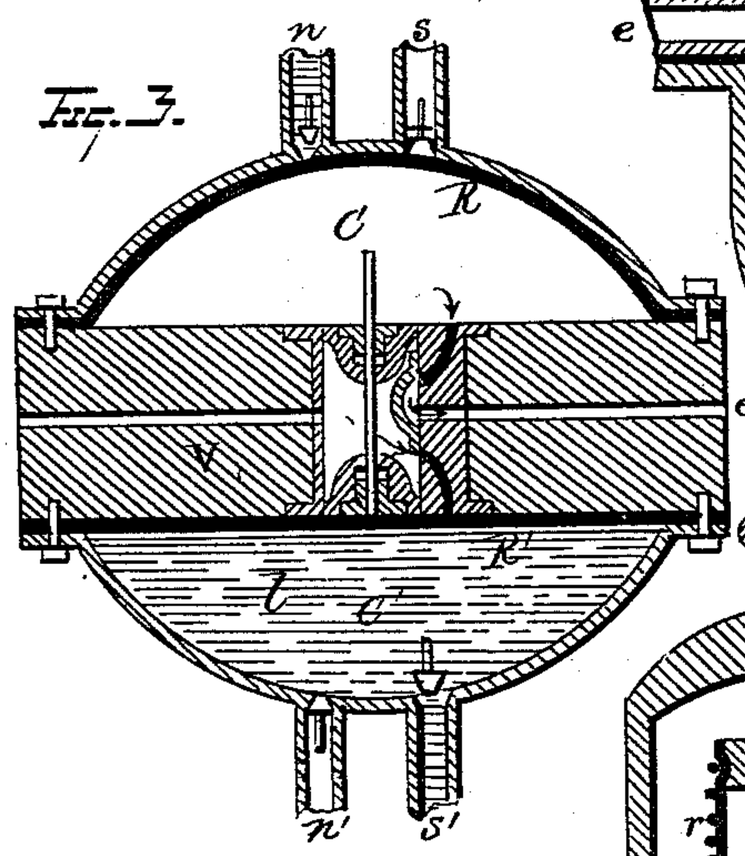


Fig. 4.

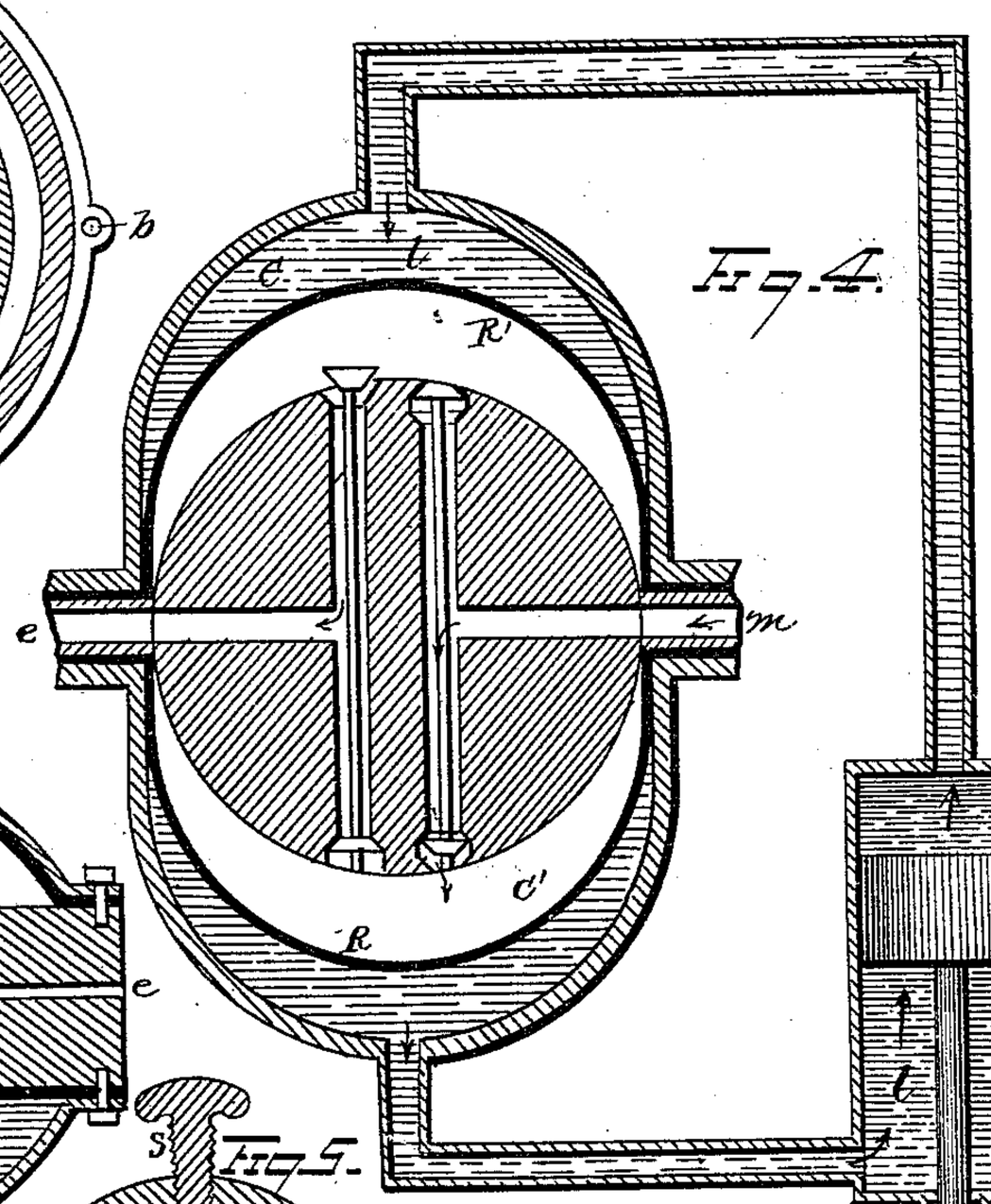
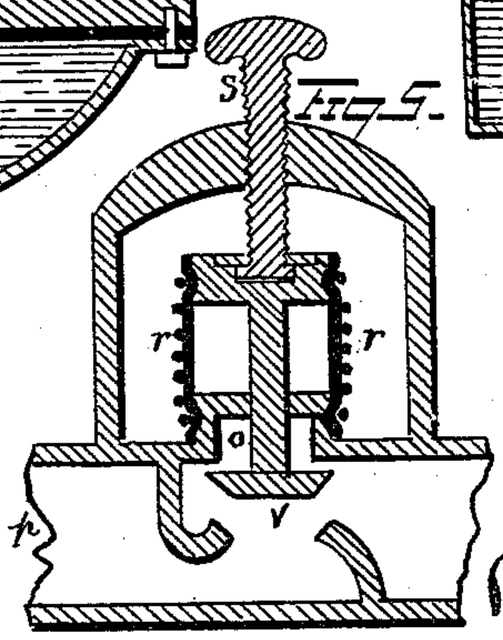


Fig. 5.



WITNESSES

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EUSEBIOUS J. MOLERA AND JOHN C. CEBRIAN, OF SAN FRANCISCO, CAL.

IMPROVEMENT IN MOTORS.

Specification forming part of Letters Patent No. **212,038**, dated February 4, 1879; application filed October 4, 1878.

To all whom it may concern:

Be it known that we, EUSEBIOUS J. MOLERA and JOHN C. CEBRIAN, of San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Fluid Motors or Motor-Engines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

Our invention relates to fluid motors or motor-engines.

Figure 1 is an axial section of a motor constructed in accordance with our improvements, one of the elastic cylinders or chambers being extended and the other compressed or closed. Fig. 2 is a section and elevation upon a plane through the valve-chest and at right angles to the axis of device shown in Fig. 1. Fig. 3 is an axial section of a modified form of motor, wherein the piston is made of solid elastic material, (in contradistinction to liquid yielding,) and wherein a slide-valve is employed. Fig. 4 is a similar view of still another modification, showing one method of transmitting the power to the operating machinery and the application of conical valves to govern the inflow and outflow of the motive fluid. Fig. 5 is an axial section of an ordinary conical valve, illustrating one method by which our improvements may be applied to valve-stems in order to prevent leakages along the line of piping or elsewhere.

Like letters in all the figures indicate corresponding parts.

As more fully explained in a separate application for patent filed herewith, the motors heretofore used are subject to some one or all of the following defects: The boring of perfectly-true cylinders is difficult and expensive; the construction and maintenance of ordinary steam-packed pistons is likewise difficult and expensive; the stuffing-boxes necessarily employed are insufficient, permitting leakages and waste of the motive fluid; the connections between the piston-rod and the rest of the machinery are bulky, complicated, and require very perfect construction of parts.

Some of these defects or disadvantages are obviated by use of water-wheels, especially the more improved designs; but these require a considerable quantity of water and a certain head of water, limiting them to strictly local uses.

The object of our present invention is to avoid nearly all of the above-mentioned defects, or any one of them, and to produce a motor or engine within which we may employ gases or vapors which acquire great tensional force at very low temperatures, and in which we may employ an elastic medium capable of operating as a piston, and at the same time prevent the disadvantageous leakages and other difficulties; to accomplish all of which the invention consists in certain methods of transmitting the power from the motive fluid to the operating mechanism, and in certain new and useful arrangements or combinations of parts, all of which will be hereinafter first fully described, and then pointed out in the claims.

In Fig. 1, R R′ are two elastic cylinders, forming, with their solid or other heads, the gas-chambers C C′. The heads Y Y′ are joined by rods *b b′*, and the elastic tubes are shown as bound with wire-netting or other material, permitting them to expand in the direction of their length, but maintaining them against expansion in other directions. This outer covering may be elastic, as represented, or rigid, since it may be substituted by an outside cylinder, or by a series of rods, or by some cylindrical segments whose lengths are equal to that of the stroke. These tubes are secured to the central valve-chest, V, in a gas-tight manner by any desirable means, preferably by an encircling band, substantially as shown.

When the parts are properly constructed and arranged, and about in the position indicated in the figure, (1,) their operation is substantially as follows: The gas or vapor under pressure (of whatever character it may be) is admitted through pipe *m* to chamber C, the communication with C′ being closed. When the walls of this chamber are sufficiently extended to draw the opposite head, Y′, down so that it will come in contact with the valve-stems, it causes the valves to move, so as to open the communication from *m* to C′, and

from C to the exhaust-passage *e*, closing the communication between C′ and *e* and between C and *m*. The tube R is then extended, and draws the head Y with it, which, when at the proper point, shifts the valves to their original position, and thus the two tubes are alternately extended.

By any simple or approved mechanical means the movable pistons or heads may be connected with the machinery to be driven.

From this explanation it will be observed that we interpose between the motive fluid and the driven mechanism a movable or elastic solid, which affords nearly all the advantages of the liquid piston described in our separate application, and, equally with said liquid piston, obviates the numerous disadvantages hereinbefore alluded to.

In Fig. 3 we have shown the elastic pistons in the shape of disks, which are united with the valve-chest V, as before, but, instead of being spirally wrapped with metal, are prevented from expanding excessively by a dovetail shaped or other cover. In this instance we have also illustrated how a liquid may be employed to transmit the power which is communicated to R R′ to any desired point.

The valve which governs the inflow and outflow of the motive fluid is moved back and forth by contact of R or R′ with its stem.

The chambers C and C′ are provided with inlet-valves, as *s* s^1, and outlet-valves *n* *n′*.

The transmitting liquid represented by *l* is forced out of chamber C′ through *n′* by the diaphragm or piston R′, and a corresponding quantity is drawn into C through *s*, and the reverse motion of this transmitting liquid takes place through the passages governed by the other valves.

As the transmitting liquid may be conveniently conveyed to any desired point, the reciprocating motion imparted thereto may be communicated to any one of a multitude of hydraulic engines or devices from which the desired motion may be obtained.

In all the forms of our invention any suitable style of valves may be employed, and these may, if desired, be operated from the exterior of the engine—as, for instance, by the shaft of the wheel or other device put in motion.

By employment of such valves as are shown, their stems are made to project into the fluid-chambers, and thus we obviate the necessity of stuffing-boxes. The pistons being made steam-tight and capable of being made in any form desired, they dispense with the expensive boring and fitting and the troublesome steam-packing.

A very simple form of engine is illustrated in Fig. 4, wherein a plunger is moved back and forth within its casing by the transmitting liquid, which enters first at one side and then at the other, causing the plunger to reciprocate in a manner easily understood. Under this simple arrangement the valves *n* *n′* *s* s^1 are dispensed with, and the valve-chest is provided with conical valves, which are shifted by the elastic pistons R R′ in a manner apparent from the foregoing description.

From explanations already made it will appear that the valves may be so arranged as to require no stuffing-boxes, and that the piston proper requires no packing.

The principles of the invention are applicable to nearly all forms of valves, as indicated in Fig. 5, preventing leakage and greatly simplifying the general construction.

The valve *v*, of the conical sort, is provided with a stem, s^2. We surmount this stem with a disk, and unite this disk by a flexible tube, *r*, which is also joined with a portion of pipe, *p*, in such a manner that no steam, gas, or other fluid can escape at the points of union. This flexible tube *r* must be protected by wire-netting or any other elastic covering, or else by any rigid longitudinal covering, so as to prevent undue lateral expansion. Therefore, its longitudinal elasticity will readily permit the necessary upward and downward movements of the valve, and thus the expense and other objectionable features attending the use of stuffing-boxes will be obviated. With slight and immaterial alterations the same principles may be applied to other forms of valves. In fact, this device may be used instead of any kind of stuffing-boxes, whether of valve-stems, piston-rods, or any others.

Inasmuch as the complete utilization of the motive fluid is a prominent feature of our invention, this method of rendering all the valve-connections perfectly tight is regarded as a valuable and important adjunct.

It has not been deemed necessary to illustrate or describe any of the methods of generating the gas or other motive fluid to be employed by us, or to refer particularly to the style of boiler preferred, or to any of its ordinary appendages. Either one of the chambers or pistons C C′ and its accompanying valves (both for the motive fluid and for the transmitting liquid) may be dispensed with, in which event the motive fluid will act in the remaining piston or chamber as before; but the resulting motion will be intermittent and not continuous. The transmitting liquid, if used, may be disposed of as it is explained in our hereinbefore separate application for patent. Similarly to the same we may employ in this case any number of chambers or of elastic pistons.

In order that the scope of the invention may be clearly understood, we will state that the illustrations herein given are intended to represent the principles of the invention only. The mere form, size, material, or particular arrangement shown may be modified according to desire or convenience so long as the general principles are adhered to.

The particular kinds of motive fluids alluded to may be replaced by any known kind suitable for the purpose.

The style of hydraulic-engine wheel or other device intended to be operated may be selected at pleasure.

The devices described are capable of being operated as pumps for gases, liquids, sands, muds, &c., by simple immaterial changes, as more minutely detailed in our aforementioned separate application for patent, and as is well apparent to any one skilled in such mechanisms.

The same machines may also be employed as fluid-meters. The fluid to be measured is made to follow the way pointed out for the motive fluid above from *m* to *e*. It must therefore fill the piston chamber or chambers before it can escape; and if we know the exact capacity of said chambers we will have the exact measurement of the fluid passed at every stroke of the elastic piston, and the number of these strokes may be conveniently registered, as in the meters now employed.

We desire to add that some of the leading principles governing the operation of devices herein shown are made the subject of claims in our aforementioned separate application for patent.

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

1. The method of operating machinery herein described, consisting in applying the motive fluid alternately to one of a pair of solid elastic pistons through the medium of valves which are operated by said pistons, and then transmitting the power from the pistons through the medium of a liquid, the flow of which is controlled by the movements of the pistons, in the manner explained.

2. In a motor, the combination, with a centrally-disposed valve-chest, the opposite surfaces of which serve as surfaces for confining the motive fluid in one direction, said valve-chest provided with valves, the stems of which are constructed and adapted to project from the opposite surfaces of the valve-chest, of solid elastic pistons attached to the centrally-disposed valve-chest, and movable toward and from the same, substantially as set forth.

3. In a motor, the combination of a centrally-disposed valve-chest, solid elastic pistons attached thereto, substantially as shown, valves for governing the inlet and outlet of motive fluid operated by the pistons, and a transmitting liquid interposed between the pistons and the device to be driven, substantially as and for the purposes set forth.

4. In a motor, the combination of a valve-chest having valves which are moved by the solid elastic pistons, and chambers surrounding said piston, and provided with inlet and outlet ports for the transmitting liquid, which ports are governed by valves adapted to be operated by the piston, substantially as shown and described.

5. In a motor, the combination, with the solid elastic pistons, of liquid-chambers located exteriorly thereto, and adapted to receive and discharge the transmitting liquid, in the manner shown and described.

6. In combination with the solid elastic pistons adapted to receive and transmit motion, a valve-chest located substantially as shown and described, so that the valve-stems shall project only into the chambers formed within said pistons, for the purposes named.

7. In a motor, the combination, with centrally-disposed valve-chest, the opposite surfaces of which serve to confine the motive fluid in one direction, of an unyielding outer covering and intermediate elastic pistons, substantially as set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 7th day of September, 1878.

EUSEBIOUS J. MOLERA.
JOHN C. CEBRIAN.

Witnesses:
F. O. WEGENER,
ANDRES MAURI.