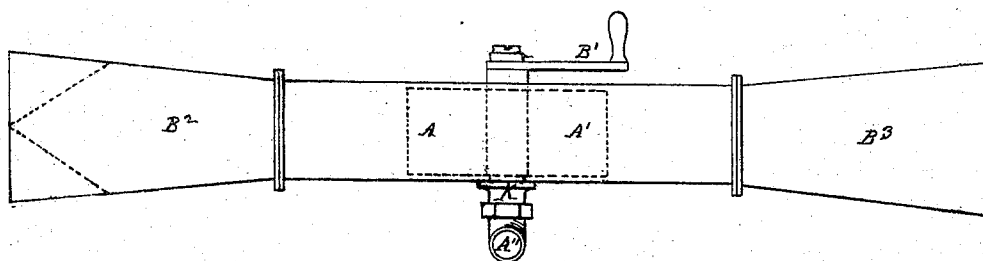
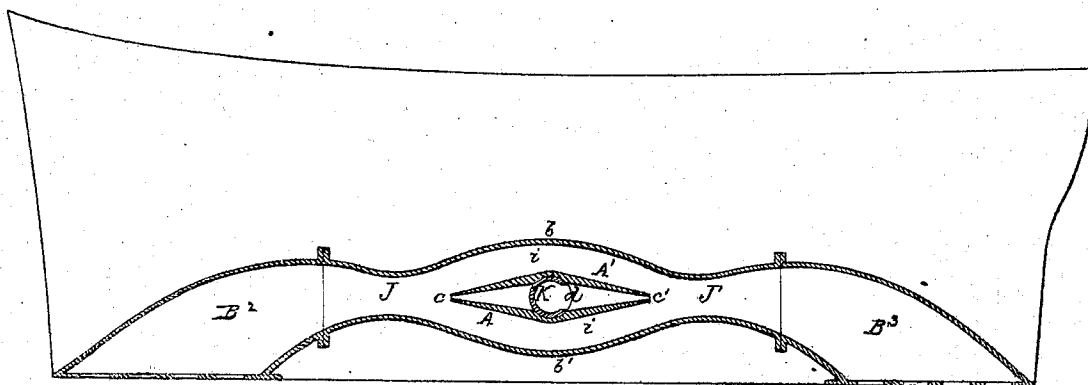
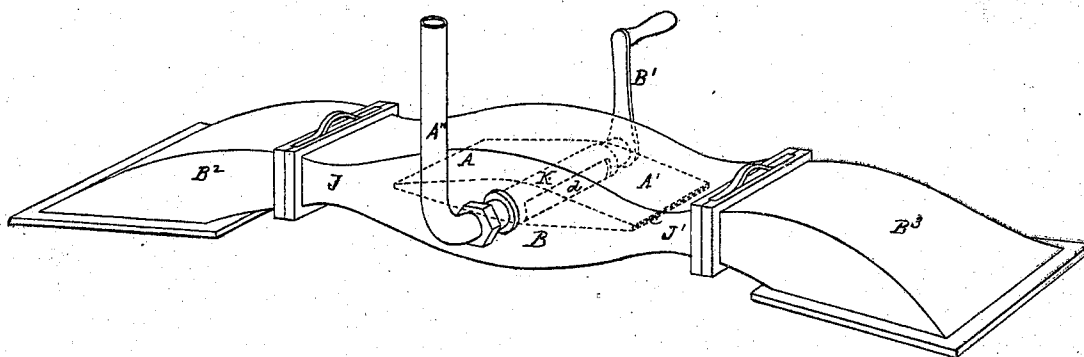


Arthur Barbarin and Joseph Albrecht
Hydraulic Motor.

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PATENTED AUG 1 1871



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UNITED STATES PATENT OFFICE.

ARTHUR BARBARIN AND JOSEPH ALBRECHT, OF NEW ORLEANS, LOUISIANA.

IMPROVEMENT IN HYDRAULIC MOTORS.

Specification forming part of Letters Patent No. 117,505, dated August 1, 1871.

To all whom it may concern:

Be it known that we, ARTHUR BARBARIN and JOSEPH ALBRECHT, M. D., of New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Hydraulic Motors, of which the following is a specification:

Our present invention consists of certain improvements upon the apparatus described in our application for Letters Patent recently filed in the United States Patent Office, which apparatus operated upon the principle of the tromp or steam-injector, and was designed to produce, by the action of steam, air, or gas upon a liquid, force sufficient to propel a boat, or power that might be used for other purposes. The improvements herein described enable us to greatly simplify the details of construction, and to dispense with many parts of the apparatus described in our previous application, thus reducing the apparatus to the greatest simplicity and cheapness.

We will now proceed to describe the manner in which our invention is or may be carried into effect by reference to the accompanying drawing, in which—

Figure 1 is a perspective view of an apparatus made in accordance with our invention. Fig. 2 is a longitudinal vertical central section of the same, representing the position it occupies when arranged in a boat. Fig. 3 is a top or plan view of the apparatus.

A A', Fig. 1, is a broad hollow elongated double-action or compound steam-injector, terminating in two distinct, broad, wedge-formed or tapering ends, each being provided with a longitudinal slit, *c* and *c'*, corresponding with the size of the injector, and extending to nearly the whole breadth of the same. This injector, as will be seen, is secured in such a manner to the side walls of the channel B within the center of the swelling *b b'* of said channel that a free space, *i*, Fig. 2, of sufficient capacity, is left open between the upper and lower walls of the swelled portion of the channel and the corresponding walls or sides of the injector for the free passage or circulation of water through the whole length of said channel and its adjuncts B² B³, when the same are connected thereto by means of ordinary water-tight flanges. The area of such elongated slits should be determined by the size of the injector, and should be at least the one hundred

and fiftieth part of that designed for the discharge of a certain volume of water. Within the center of this compound or twin injector an air-tight stop-cock, K, provided with a longitudinal slit, *d*, corresponding with the longitudinal openings or slits of the chambers of the injector, is placed, so as to traverse the entire breadth or width of said chambers and to project outside of the walls of the channel B on both sides, as shown at Figs. 2 and 3, to be connected, by means of a coupling or other movable joint, with a steam feed-pipe, A'', Fig. 1, at one end, while at the other it is connected with an ordinary lever and crank, B¹, for the purpose of throwing the current of steam through either of the longitudinal slits *c* and *c'* of the injector, as the vessel may be required to run backward or forward. As will be seen at Figs. 1 and 2, the respective ends or slits of the injector are placed within the swelling *b* and *b'* of the channel B, inside of the narrow throats or passages J and J', which throats or passages are so contracted or narrowed at that particular point as to prevent the return or back action of the water within the swelled portion of the channel, which would otherwise take place during the expulsion of the same through the openings of the gradually-expanding sectional channels B² and B³. For vessels of great length and in open water, instead of extending the sections B² and B³ through the whole length of the same, it is preferable to extend them a shorter distance from the narrow throats J and J', with their gradually-expanding open and grated ends penetrating through the bottom of the vessel into the water underneath the vessel, so as to take in and discharge the same from the bottom of the vessel, whereby a diminution of resistance in front and an accumulation of water in the rear takes place, which gives the vessel a dip in front and a lift in the rear, as if it were sliding on an inclined plane. This arrangement economizes room and material, and avoids unnecessary friction through long channels; but we can extend or shorten the channels in any manner that we may desire or as may be required by the character of the vessel upon which our apparatus may be placed. For canal-boats, however, we prefer to extend the front part of the channel B² to the bow of the vessel, while the channel B³ should be shortened in the rear so as to extend but a short distance from the narrow throat J', with its gradually-expanding opening penetrating

through the bottom of the boat into the water, thus preventing a serious accumulation and resistance of water in front of the boat by the rapid absorption in front and powerful discharge of the same in the rear. To facilitate the inspection of the injector, by withdrawing the channel B from its position upon the interior bottom of the vessel without admitting water into the vessel, water-tight gates may be secured into grooves properly cut into the flanges of the sectional channels B² and B³; and to enable the easy repair of the injector the upper part of the swelled portion of the channel B may be made independent of the same, so as to be secured thereto water-tight by means of packing and bolts through suitable flanges.

Although the ends and slits of our injector and throats J J', as shown upon the drawing, are represented in a straight line, we wish it well understood that we do not confine ourselves to that particular line or plane, as we may, in some instances, find it advantageous to give those ends, slits, and throats more of a downward curve to better correspond with the curve of the sectional channels B² and B³, especially when the water is to be absorbed and discharged directly under the bottom of the vessel, within a short distance from the throats J J'. In lieu of making the longitudinal slits of the injectors continuous throughout their whole length, there may be two or more short slits formed in lieu of each long slit, or a series of perforations or other suitable openings for the escape and discharge of the steam; but we much prefer the continuous slits.

In order that the apparatus may be easily controlled by the pilot of the boat which it propels, without necessitating his absence from the pilot-house, it is only necessary that an ordinary cog-wheel and a pinion, secured to that projecting end of the stop-cock K upon which is attached the lever and crank B¹, shall, with proper ropes leading to a drum and gauge into the pilot-house, be substituted for that lever and crank, so that when said drum is revolved by the pilot, as when steering the vessel, the gauge shall indicate the exact position of the opening or longitudinal slit of the stop-cock K in relation to those of either slits of the injector, that the pilot may know precisely how to act. To prevent the condensation of the steam within the injector before its escape from either of the longitudinal slits, where the condensation should take place only, we envelop or surround said injector with a proper casing of wood, rubber, or other equivalent good and durable non-conducting substance or substances.

The operation of our apparatus is as follows: To start the boat forward the crank and lever B¹, Fig. 1, being in a vertical position, are thrown into the horizontal position shown at Fig. 3. This at once throws the longitudinal slit *d* of the cock K, Fig. 2, in line or immediate connection with the corresponding opening of the chamber of the injector, as shown in the drawing, so that the steam can escape through the longitudinal slit *e'* of the injector, there to be condensed by the water as it escapes from the slit after having first imparted its momentum or excess of force to the water,

which excess of force may be said to be continuous, (as long as steam is on,) from the fact that the fluid obstacle (water) to the steam, which continuously presents itself to the flow of the same to condense the same, is as rapidly replaced as it is removed by the successive momentums or successive excesses of force. To back the boat the reverse action of the lever and crank takes place; and to stop the same the crank and lever are placed vertically, as shown at Fig. 1. This places the slit of the cock between the slits of the injector, and completely shuts the escape of steam both ways. To go ahead slow the stop-cock K must be turned open in proportion to the force required, and the same cock may be so graduated as to show at once the exact relation of its slit with the feed-pipe A'', that the escape of steam may be regulated with rapidity and certainty by the engineer.

As a precautionary step an extra stop-cock may also be placed upon the feed-pipe, between the boiler and the stop-cock K, so that steam can always be cut off from the injector in case of necessity.

Although our invention, as described, is intended for the propulsion of vessels it, may also be applied for draining purposes and to steam fire-engines, &c., in lieu of the heavy and costly machinery now employed for such purposes. In such cases there need be but one steam-injector or chamber, A, instead of two, as when employed for propelling purposes, one being for going ahead and the other to back.

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

1. The compound or double-acting steam-injector, provided with the elongated steam-discharge slits, and otherwise constructed and arranged to operate as herein described, for the purposes set forth.

2. The combination, with the compound or double-acting steam-injector, of the channel surrounding the same, provided with narrow throats J J', and arranged to operate as herein stated, for the purposes described.

3. The combination, with the double-acting injector and narrow-throated channel surrounding the same, of the gradually-expanding sectional channels B² B³, with or without water-tight gates, when the same are constructed and applied as herein described, for the purposes set forth.

4. The combination of the stop-cock for regulating the supply of steam with the compound injector and the steam feed-pipe, as and for the purposes herein mentioned.

5. The hydraulic motor, as a whole, constructed and applied to operate as herein stated.

In testimony whereof we have signed our names to this specification before two subscribing witnesses.

ARTHUR BARBARIN.
JOSEPH ALBRECHT, M. D.

Witnesses:

JOHN A. CASBERGUE,
A. DUCATEL, Jr.