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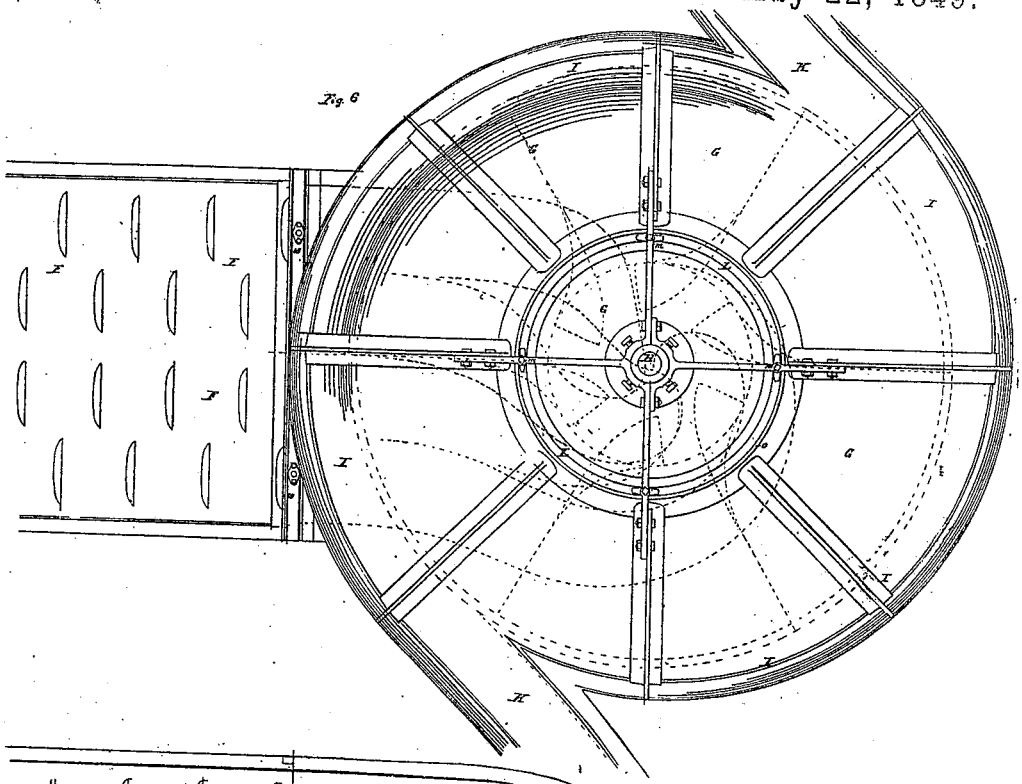
M. W. RUTHVEN.

PROPELLING VESSELS.

No. 6,468.

Patented May 22, 1849.

Fig. 6



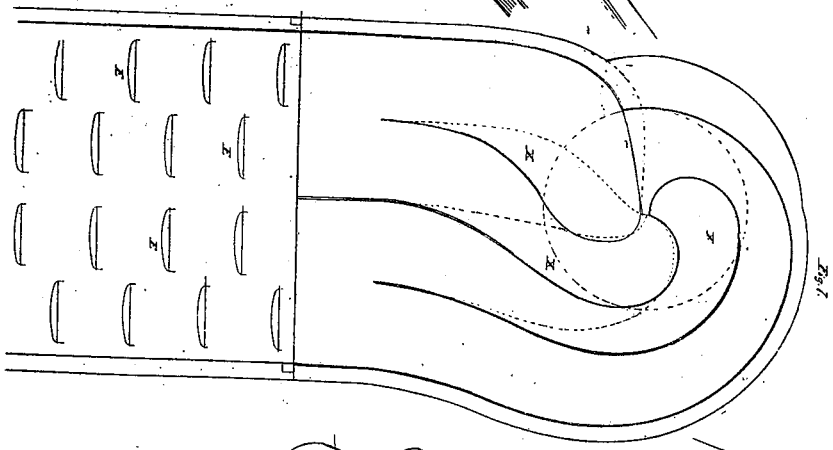
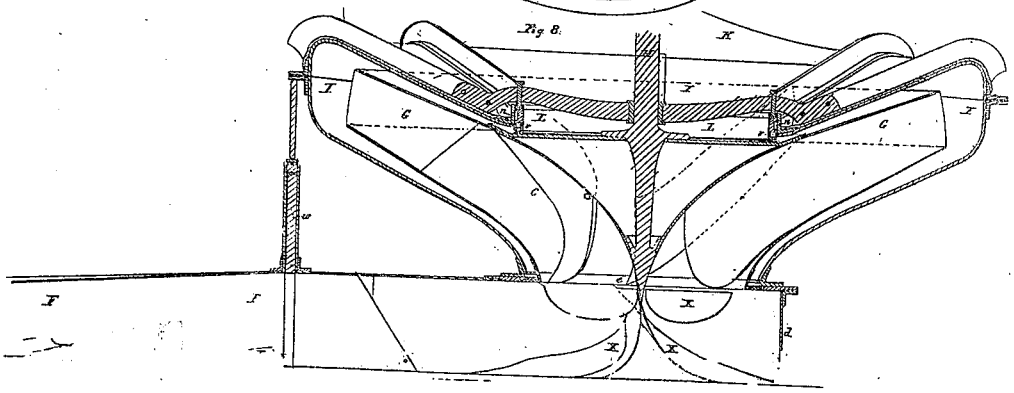


Fig. 8.



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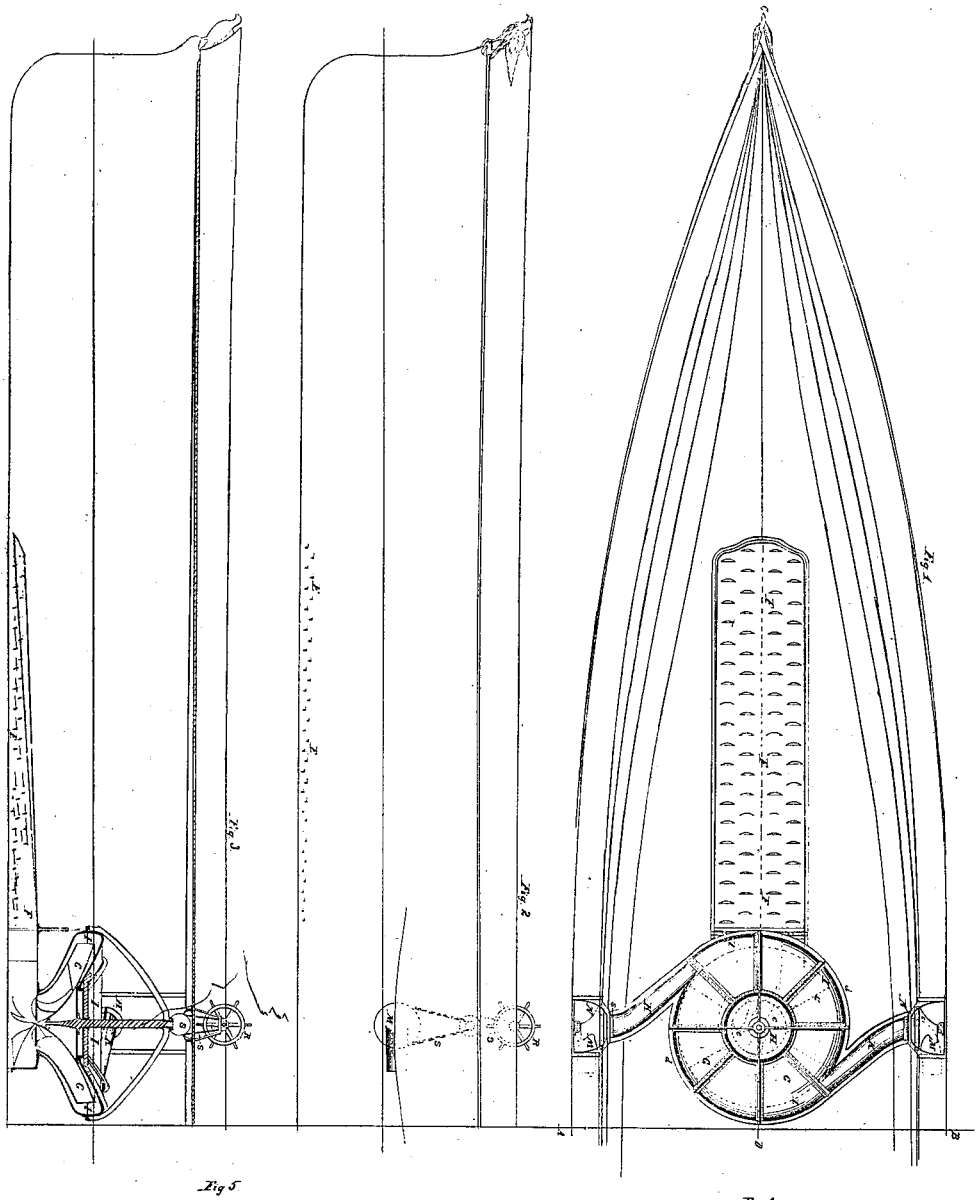


Fig 3

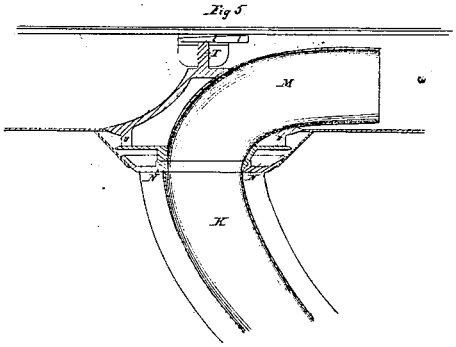
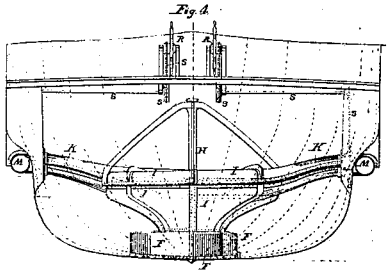


Fig 4



UNITED STATES PATENT OFFICE.

M. W. RUTHVEN, OF NEW YORK, N. Y.

PROPELLING VESSELS BY REACTION.

Specification of Letters Patent No. 6,468, dated May 22, 1849.

To all whom it may concern:

Be it known that I, MORRIS WEST RUTHVEN, of the city, county, and State of New York, have invented new and useful Improvements in Propelling and Navigating Ships, Vessels, or Boats by Steam or other Power; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification.

I propel and navigate ships vessels or boats by taking in and expelling water, the water being admitted through certain apertures in or through the bottom of the vessel into a canal or pipe, to supply a machine communicating with it, which machine being worked by steam or other power discharges the water through pipes taken from it to each side of the vessel and through it, at near or above the usual water line of the vessel, the direction in which it is discharged being attained by a nozzle or bent pipe at each side of the vessel on the outside communicating with the pipes from the machine in the vessel and made to move in a socket fixed in the side of the vessel, so that the direction of discharge may be changed as required; thus when the nozzle or bent pipe is placed so that the water is discharged toward the stern of the vessel, in a direction parallel to a horizontal line from stem to stern, the vessel goes ahead, when the nozzle is turned around in its socket so as to discharge it toward the bow the vessel goes astern, when made to discharge the water in a vertical direction there is no propelling force either way, the force being in the opposite direction to the discharge; it merely raises the vessel a little in the water when discharged downward, and according to the angle of direction between the vertical and horizontal position that it is made to discharge at, either toward the bow or stern so is the force more or less as a propelling force on the vessel to move it ahead or astern; and as these nozzles can be moved independent of each other, the vessel can be made to turn to either side by making the one nozzle discharge in a horizontal direction and the other at an angle, or the vessel may be made to turn around without progressing either ahead or astern by making the direction of discharge of the nozzle on one side of the vessel toward the bow and on the other side toward the stern; the management of these nozzles may be on any part of the deck or where most convenient and they cannot only be moved independent of each other but entirely independent of the steam or other power employed to discharge the water, so that a vessel can be propelled ahead or astern or stand still or turn around or to one side or other without the necessity of reversing or stopping the engine thus leaving the control of the motions of the vessel to those having the management of the nozzles, and should the rudder be lost or damaged the vessel can be navigated without it by attending to the nozzles.

My improvements in propelling or navigating ships vessels or boats by steam or other power, and the mode of attaining the above, will be understood by examining the accompanying drawings with the following explanations.

Drawing No. 1: Figure 1, is a top view of part of a vessel with the deck removed showing the machine, with pipes to each side of the vessel, the nozzles, and canal or pipe; Fig. 2, outside vertical side view of Fig. 1; Fig. 3, a vertical section through the length from "C" to "D" of Fig. 1. Fig. 4, a vertical cross section through "A" "B" of Fig. 1; Fig. 5, a section on an enlarged scale through the center of one of the nozzles supposed to be directed to bow or stern.

Drawing No. 2: Fig. 6, top view of the machine for discharging the water, on an enlarged scale; Fig. 7, top view of the end of the canal on which the machine is fixed; Fig. 8, vertical section of Fig. 6 through "C D."

Having thus noticed all the figures of the drawings I may state that the same letters refer to the same places in all the figures.

"E E" are apertures for admitting the water to the canal or pipe "F F" which conveys it to the machine by the working of which the water is expelled, of which "I, I, I," is the case containing the wheel "G G," the case "I, I, I," is fixed water tight to the canal or pipe "F F" communicating with it by the large round aperture "*e e*" and by the pipes "K K" to each side of the vessel communicating with the nozzle "M M." The wheel "G G" has blades or floats placed or fixed between two disks or circular plates extending to the extremities of the blades, made of a conical shape, as shown in section Figs. 3 and 8, with an

aperture at the side next the canal, nearly the size of the aperture "*e e*" of the case, and having the ring "*d d*" (see enlarged section Fig. 8) to fit the disk at the aperture "*e e*" more closely and lying so loosely in its bed that should the wheel "G G" be made to revolve a little to one side or other, it could carry the loose ring "*d d*" with it, so that the wheel "G G" might revolve pretty nearly water tight at that place with little or no friction. The case "I, I, I," is made of a similar shape to the wheel "G G" as shown by the sections Figs. 3 and 8, this shape depends for its proportions on the draft of water of the vessel as all or part of the wheel must be under the level of the water so that when standing at rest, the wheel and case may be full or nearly full of water. That the wheel "G G" may revolve water tight in the case "I, I, I," on the upper side there is the ring "L L," held to the wheel by the adjusting screws "*m m*" shown in Fig. 8, and which may have small springs on their points, the ring "L L" has a packing "*n n*" round it to make it water tight in the ring "*o o*" which forms part of the case "I, I, I," and yet allow it to be moved as required, by the adjusting screws "*m m*," to make the adjustment still more easy there may be a smaller ring let into the face of the ring "L L" with an elastic substance such as india rubber, behind it at "*r r*" thus making it water tight with little friction when the wheel is made to revolve in the case. The wheel might be made to revolve water tight at the upper side of the case by simply having the shaft of the wheel through a stuffing box, but the object of having the ring as described is to relieve the wheel from the pressure of water on the top side to the amount of that surface and by making it (the ring "L L") larger than the aperture at "*e e*" it tends when the wheel is in motion and a pressure of water in the case to relieve the weight of the wheel from its bearing and if the size be made sufficient according to the weight of the wheel and pressure produced in the case, the wheel may be floated as it were, the pressure being more on the under side than the upper and thus altogether relieve the weight from its bearing. The top views of the machine Fig. 1 and on the enlarged scale Fig. 6 shows the wheel "G G" and the blades (supposed to be seen through the case) in red ink, and the shape of the case I, I, I, showing the gradual increase in size from the place that the water leaves the case by one pipe "K" till it comes to the other where it leaves the case at nearly a tangent to the wheel and in the same direction that the wheel "G G" ought to be revolved in. The blades or floats are curved at and as they approach the aperture by which the water enters the wheel as shown by the red lines and also in the sections Figs. 3 and 8. The number of blades or floats is not important, six answers very well but more might be used for a large size of wheel. Fig. 7 shows a top view of the end of the canal or pipe "F F" on which the case "I I I" is fixed, but with the case and top covering removed showing the plates "X X" shaped or curved as shown and in connection with the section Fig. 8 shown also in faint lines in the top views of the machine Figs. 1 and 6 supposing them to be seen through the intervening parts; the purpose of them is to guide the water or change the direction of the current as it rushes along the canal so as to make it rise up into the aperture of the wheel and with something of a revolving motion in the same direction as the motion of the wheel. The canal or pipe "F F" is made to gradually increase in capacity till it comes to the last of the apertures "E E" that is the apertures nearest the case and wheel; the apertures "E E" being constructed as shown or similarly "M M" nozzles Figs. 1, 2, 4 and 5, movable in the socket "N N" fixed on the side of the vessel or end of the pipes "K K" which conveys the water from the case I, I, I, to the nozzle "M M" through which it is discharged when the wheel "G G" is revolved in the case "I I I," the power being applied to the shaft "H H" of the wheel "G G" "R R" wheels for turning the nozzles "M M" as required communicating to them by the chains or ropes and shafts "S S." The nozzles "M M" have an enlarged part "V V" for the chains to pass round and may be formed similar to what is shown; they have also a bearing or journal "T T" on a projection of the hull or a projection to defend the nozzles, which journal is also made so as to hold the nozzles into their sockets and may have a wedge "*t t*" as shown in the enlarged section Fig. 5 as an adjustment to keep it up to the scket.

Having thus described the different parts, I have only to state that the steam or other power being applied to revolve the shaft "H H" to which the wheel "G G" is fixed, the water in the wheel, that is in the spaces between the blades or floats of the wheel "G G" is carried round with it and by centrifugal force it presses outward to the periphery and not being allowed to escape by the water tight case "I I I", except by the pipes "K K" it is carried by them to the nozzles "M N" and discharged through them, a constant supply being received from the water in which the vessel floats, through the apertures "E E" and by the canal "F F". I may further state that a sluice or valve "W W" may be arranged so that by lowering it the communication would be cut off from the apertures "E E", and valves placed where most convenient round the end of the canal could be

opened so as to communicate with the interior or hold of the vessel and the machine so that in the event of any heavy leak the wheel might receive its supply from the hold of the vessel instead of the apertures "E E". I need merely point out that the canal may be of various dimensions, provided a free supply is obtained and taken from either the bow or stern as the vessel can be propelled either way, whatever the position a supply of water comes from, so it might be taken by an aperture right under the wheel, but for high speeds and when the vessel is mostly used going ahead it is best to have the canal as described in the drawings Fig. 1, &c., which represent the bow end of the vessel. The principle of propulsion is the fact of a pressure or force being obtained in the opposite direction to the discharge of a fluid this propulsive force being equal to the pressure of discharge at a speed or velocity equal to the speed or velocity with which the fluid is discharged: if the vessel moves at a less speed than the velocity with which the fluid is discharged then the propulsive force in the opposite direction to the discharge is greater than the pressure of the orifice of discharge; in short the action is similar to the action in the machine called Barker's Mill which is worked by a discharge of water; the discharge in Barker's mill being generally by a natural supply of water from a higher to a lower level, while for propelling vessels the discharge has to be effected by steam or other power acting on the machine as described producing a pressure by centrifugal force which acts the same as if the supply of water came from a height above the nozzle through which the water is discharged by the mode of propelling it may be arranged so as to lose no power in theory and but little in practice, whereas by the paddle wheel and all methods of propelling which act by pressing against the water outside the vessel much power is lost from the slip or giving way of the water beside loss from other sources.

I do not claim propelling vessels by discharge of water nor do I claim discharging the water through different apertures that may be closed at pleasure to steer the vessel nor do I claim the application of any of the well known forms of centrifugal pumps, to this particular purpose, but

What I do claim as my invention and for which I desire Letters Patent is,

1. The combination of a centrifugal pump constructed substantially as herein described, with the curved guide plates "X X" Fig. 7, by which means the water is put in motion and raised and discharged with less expenditure of force than the ordinary means now in use for propelling vessels by means of pumps.

2. I claim the bent nozzle pipe attached to the stationary pipe, and capable of motion in a vertical plane, by means of which the water may be discharged either fore or aft up or down with only one aperture and without the use of valves.

M. W. RUTHVEN.

Witnesses:
C. BOLTON,
JACKSON BOLTON.