(No Model.)

A. ANDERL.

STEAM JET MARINE PLOW.

No. 420,670. Patented Feb. 4, 1890.

Fig. 1.

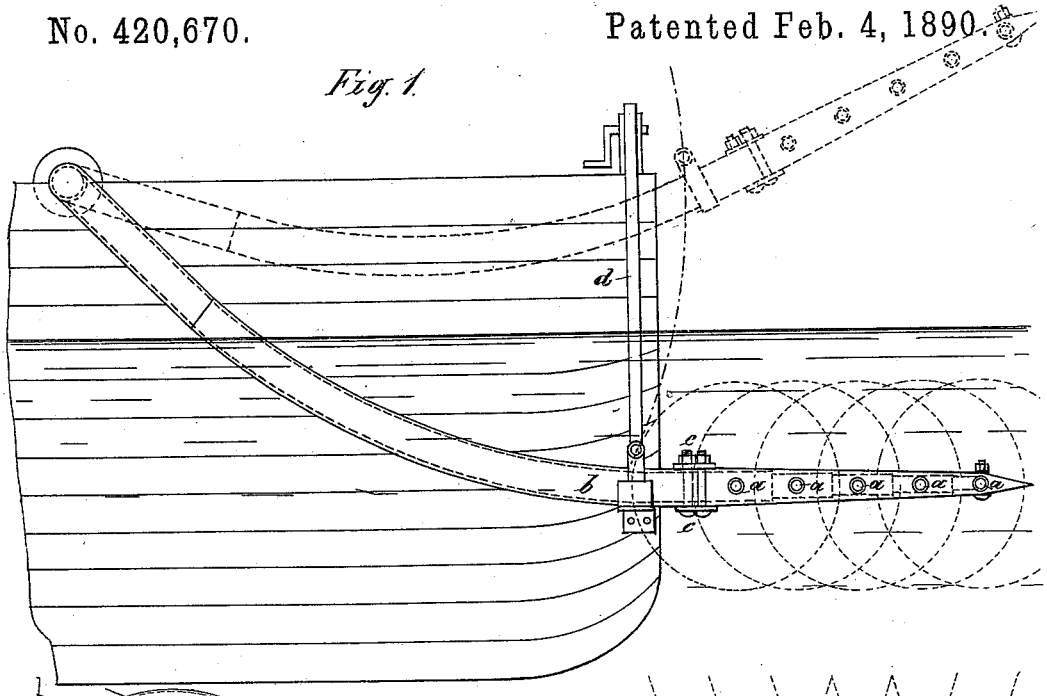
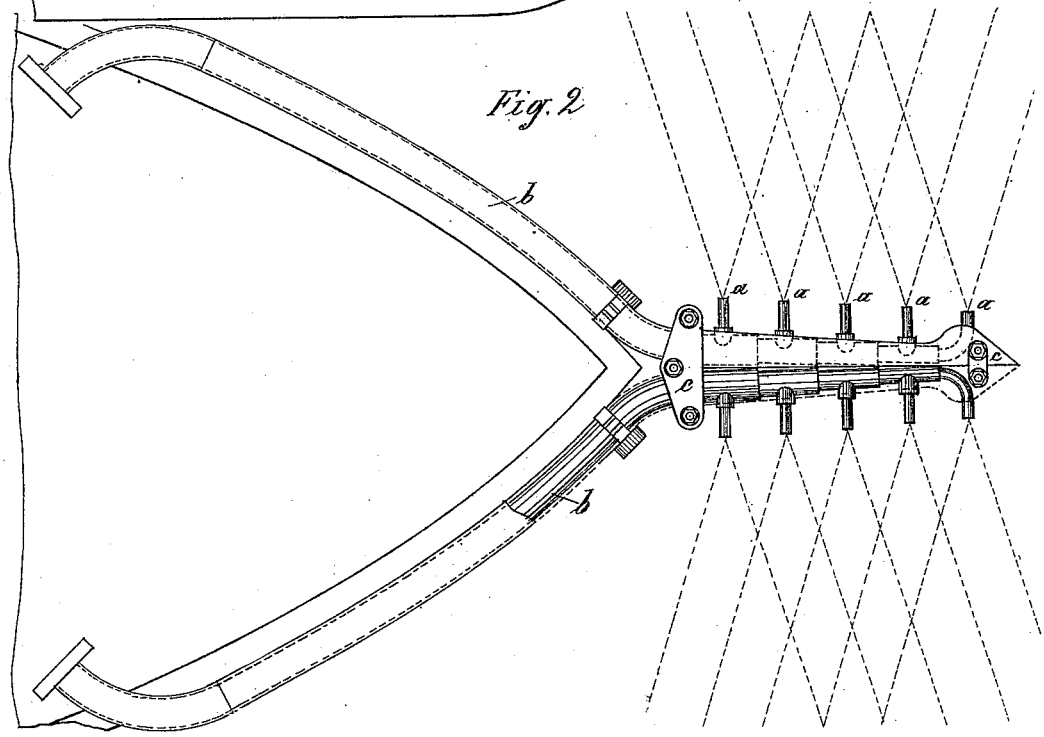


Fig. 2.



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UNITED STATES PATENT OFFICE.

ADALBERT ANDERL, OF SCHWANDORF, BAVARIA, GERMANY.

STEAM-JET MARINE PLOW.

SPECIFICATION forming part of Letters Patent No. 420,670, dated February 4, 1890.

Application filed September 4, 1889. Serial No. 322,890. (No model.)

To all whom it may concern:

Be it known that I, ADALBERT ANDERL, a subject of the King of Bavaria, residing at Schwandorf, in the Kingdom of Bavaria, Germany, have invented a new and useful Steam-Jet Marine Plow, of which the following is a specification.

My invention relates to an apparatus which I term a "steam-jet marine plow," and which has for its purpose to force sidewise the swell in front of the head of fast-going ships. It is a known fact that at an increasing speed of the ship high wave-mountains are formed in front of the ship owing to the inertia of the water mass, which cannot rapidly enough be forced sidewise by the ship when in motion, whereby the velocity of the vessel is prejudicially influenced.

The object of this invention is to force the swell sidewise and to produce a wave-hollow for the ship moving at full speed, so as to assist in the forward motion of the latter.

The invention is illustrated in the accompanying drawings.

Figure 1 is a side view of the steam-jet apparatus. Fig. 2 is a plan view of the same.

The steam-jet apparatus consists of a series of nozzles or mouth-pieces *a*, arranged in groups of two by two opposite each other. The mouth-pieces, the shape and construction of which are dependent on the shape and construction of the ship, communicate through the steam-pipe *b* with the steam-space of the boiler, and they are immersed in front of the ship into the water, for the purpose of forcing very rapidly sidewise, by the action of the freely-escaping steam-jets, the water masses counteracting the velocity of the ship, and of assisting by these means in the forward motion of the ship. The mouth-pieces may be fastened to the pipes *b* by any suitable means, as by a screw-thread, and the pipes *b*, which are forwardly curved, are secured together at their forward ends by clamp plates and screws *c*. After the position of the pipes *b* has been fixed by the aid of an iron rod *d* the apparatus may be put in action at once.

The length of the apparatus, the number, position, size, and intermediate space of the mouth-pieces of the steam-pipe under the water-level, the more or less deep immersion, and the right-angular position of the same are dependent on the construction, size, draft, steam-power, &c., of the ship, and they are to be adapted, therefore, according to the particularities of the latter.

In order to prevent too great a loss of heat in the steam-pipes, the latter are protected by insulating layers and furnished with walls of strengthened sheet metal for resisting the bounding swell. At suitable places in the steam-pipes return-valves may be provided, through which, when the steam is cut off, air may permeate into the pipe for preventing impurities being sucked in.

The working of this device is as follows: The high-pressure steam flows from the boiler through the pipe *b* to the steam-jet apparatus, where it is divided. The steam enters then the nozzles *a*, arranged in groups of two by two, and it escapes then through the said mouth-pieces with a speed corresponding to its tension in sucking up the surrounding water, whereupon it combines with the latter and carries along in the given direction the water, the increasing quantity of which forms a cone. Finally the steam condenses in the water. By the uniform and simultaneous action of the steam-jets escaping in groups on both sides of the apparatus the swell in front of the ship is forced sidewise, so as to form a wave-hollow, whereby the pressure of the water against the beak-head of the ship is considerably reduced and the velocity of the latter increased.

Having now fully described and ascertained the nature of my said invention and in what manner the same may be performed, I declare that what I claim is—

1. A device for forcing sidewise by means of steam-jets the swell in front of the heads of fast-going ships, which device consists of the steam-pipes *b*, communicating with the steam-boiler and provided with nozzles or mouth-pieces *a*, projecting laterally therefrom and fastened by means of screws *c*, the device being held in its position by a rod *d*, substantially as described, and shown in the accompanying drawings.

2. A device for forcing sidewise by means

of steam-jets the swell in front of fast-going ships, consisting of steam-pipes *b*, communicating with the boiler and extending from the bow of the ship and provided with mouth-pieces *a*, projecting laterally therefrom, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ADALBERT ANDERL.

Witnesses:
FRIED. SANDERS,
LUDWIG ANDERL.