(No Model.) 2 Sheets—Sheet 1.

C. F. LITTLEJOHN.

CONNECTION FOR STEAM ENGINES.

No. 490,852. Patented Jan. 31, 1893.

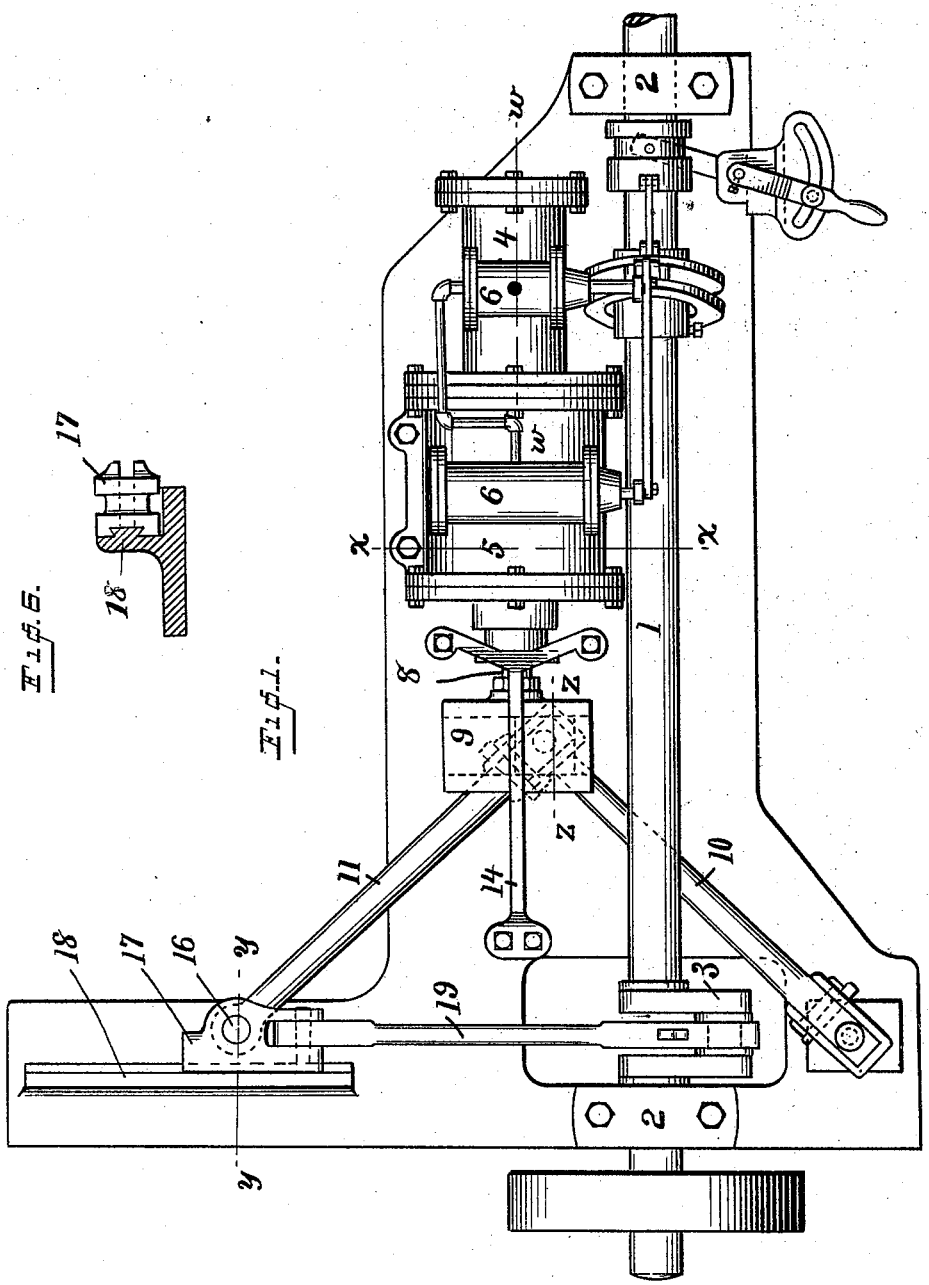

Fig. 6.

Fig. 1.

WITNESSES:

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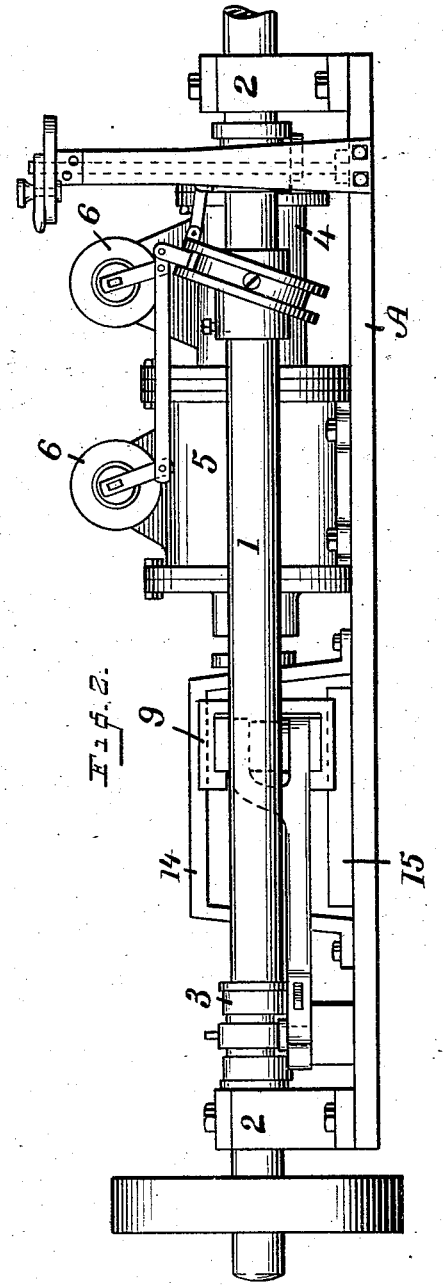

Fig. 2.

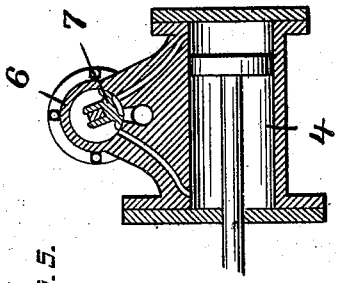

Fig. 5.

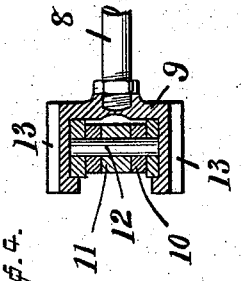

Fig. 4.

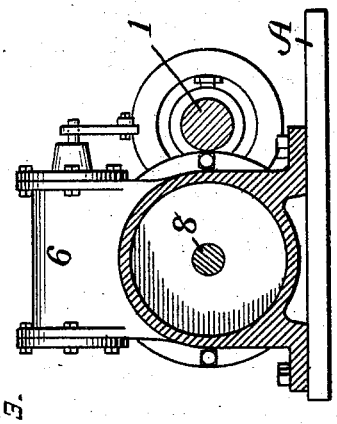

Fig. 3.

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UNITED STATES PATENT OFFICE.

CHARLES F. LITTLEJOHN, OF BRIDGEPORT, CONNECTICUT.

CONNECTION FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 490,852, dated January 31, 1893.

Application filed March 21, 1892. Serial No. 425,739. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. LITTLEJOHN, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Connections for Steam-Engines; and I 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 appertains to make and use the same.

This invention relates to certain new and useful improvements in connections for steam engines, but more particularly is it designed as a means for transmitting the motive power for steamers and yachts where it is desirable that the weight of the motor should be placed as low as possible and where space is important; and with these ends in view my invention consists and resides in the construction and combination of elements hereinafter fully to be explained and then recited in the claims.

In order that those skilled in the art to which my invention appertains may fully understand its construction and method of operation, I will describe the same in detail, reference being had to the accompanying drawings which form a part of this specification, and in which,

Figure 1, is a plan view, Fig. 2, a side elevation, Fig. 3, a transverse section on the line *x*—*x* of Fig. 1, Fig. 4, a vertical section on the line *z*—*z* of Fig. 1, Fig. 5, a longitudinal section on the line *w*—*w* of Fig. 1, and Fig. 6, a section on the line *y*—*y* of Fig. 1.

The same numerals and letters denote the same parts in each of the figures.

The main shaft, which, in a steamer, supports and drives the propeller, is denoted by 1, and this shaft is hung in bearings 2 which are suitably arranged.

3 is the main driving crank.

In the drawings I show a compound steam engine consisting of two cylinders 4 and 5 of high and low pressure respectively and connected in tandem. Each of these has a steam chest 6 containing the valve 7, as shown at Fig. 5. The valve in each of these steam chests is preferably of the construction, and operated by the means, which are shown and described in a certain application for Letters Patent for improvement in valve gears filed by me on even date herewith Serial No. 425,740. As in this engine it is applied in substantially the same manner as in the above mentioned application, further description is unnecessary. The two cylinders just described drive the piston rod 8 upon whose end is a cross head 9 having therein a slide way transverse to the length of the piston rod, as is shown in the section Fig. 4. This slide way contains the pivotally connected ends of two levers 10 and 11, the bolt connection between them being designated by the numeral 12, as also appears at Fig. 4. In the top and bottom sides of the cross head 9 are formed grooves 13 into which are fitted upper and lower ways 14 and 15 for the guidance and support of said cross head. As is shown at Fig. 1, the outer end of the lever 10 is fulcrumed to the bed of the machine, which in each of the larger figures is designated by the letter A. The outer end of the lever 11 is fulcrumed by means of a pivotal connection 16 to a sliding head 17 whose inner side is gibbed to and adapted to slide on a way 18. To this part 17 is connected the driving pitman 19 whose outer end operates the crank 3 on the main shaft 1. By the reciprocatory movement of the piston rod 8 the cross head 9 receives a longitudinal movement in its bearings 14, 15, and in a straight line. When the outward movement of this cross head occurs it of course tends to straighten the levers 10 and 11. If the outer ends of both of these were free to move they would separate after the manner of an ordinary knuckle joint, but as the outer end of the lever 10 is incapable of movement except about its fulcrum, the head 17 is moved along its way, and the joint between the two levers moves slightly in its bearing in the cross head 9. The back and forth movement of the head 17 through the pitman 19 imparts rotative movement to the shaft 1.

By the arrangement of the parts herein shown and described, not only is a motor produced which has no upwardly projecting parts and is therefore particularly adapted to be placed in the hold of a vessel or launch, but the movement of the piston is parallel with the line of the main shaft and therefore with the length of the vessel, and this is important as it greatly reduces the vibration. Furthermore the interposition of the levers 10 and 11

apply the power very advantageously to the shaft.

I do not wish to be confined to the precise arrangement of parts herein shown and described, since these may be combined in various other ways without departing from the spirit and aim of my invention as set forth in the claims.

I have shown two cylinders in a certain specific arrangement and provided with a special form of valve gear hereinbefore referred to, but these are not essential to my invention, and other forms may be substituted in their place.

I claim,

1. The combination with the piston rod, of the guided cross head having therein a transverse slide way, the levers 10 and 11 fulcrumed together and guided in the cross head, a sliding head 17 operated at right angles to the length of the piston by one of said levers, and a pitman connecting said head to the main shaft crank, the whole arranged as described and for the purpose set forth.

2. The combination with the piston rod and means for driving the same, of the cross head 9 guided in ways in the line of the piston stroke and having a transverse slide way arranged therein, the lever 10 fulcrumed to the base, the lever 11 fulcrumed to the lever 10, and the joint arranged to have movement in the cross head, the slide head 17 carried by the lever 11, and the pitman 19 whereby the main shaft is driven, the whole arranged substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES F. LITTLEJOHN.

Witnesses:
S. H. HUBBARD,
A. J. TANNER.