

(No Model.)

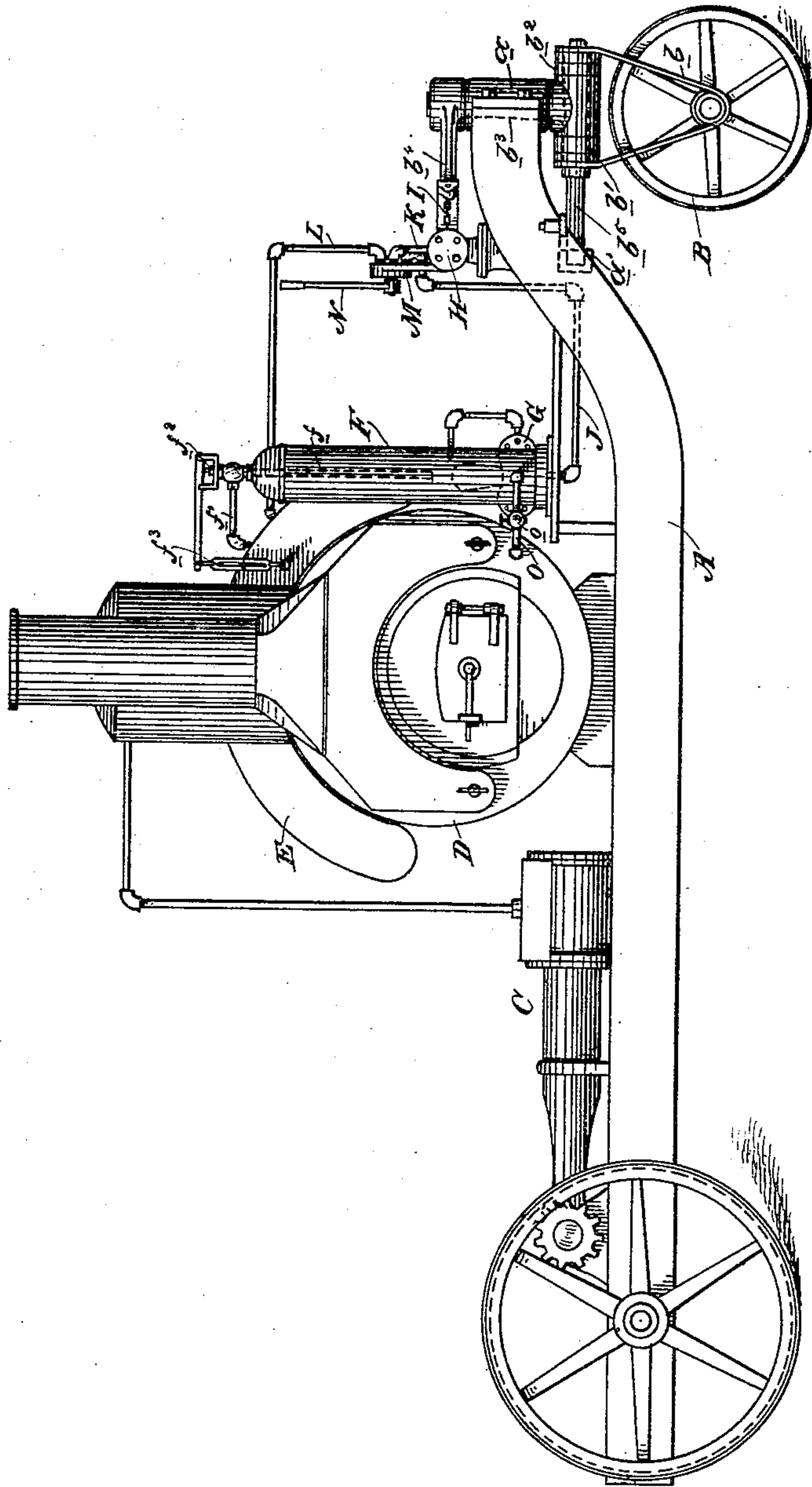
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J. B. JARDINE.  
STEERING APPARATUS.

No. 444,580.

Patented Jan. 13, 1891.

Fig. 1.



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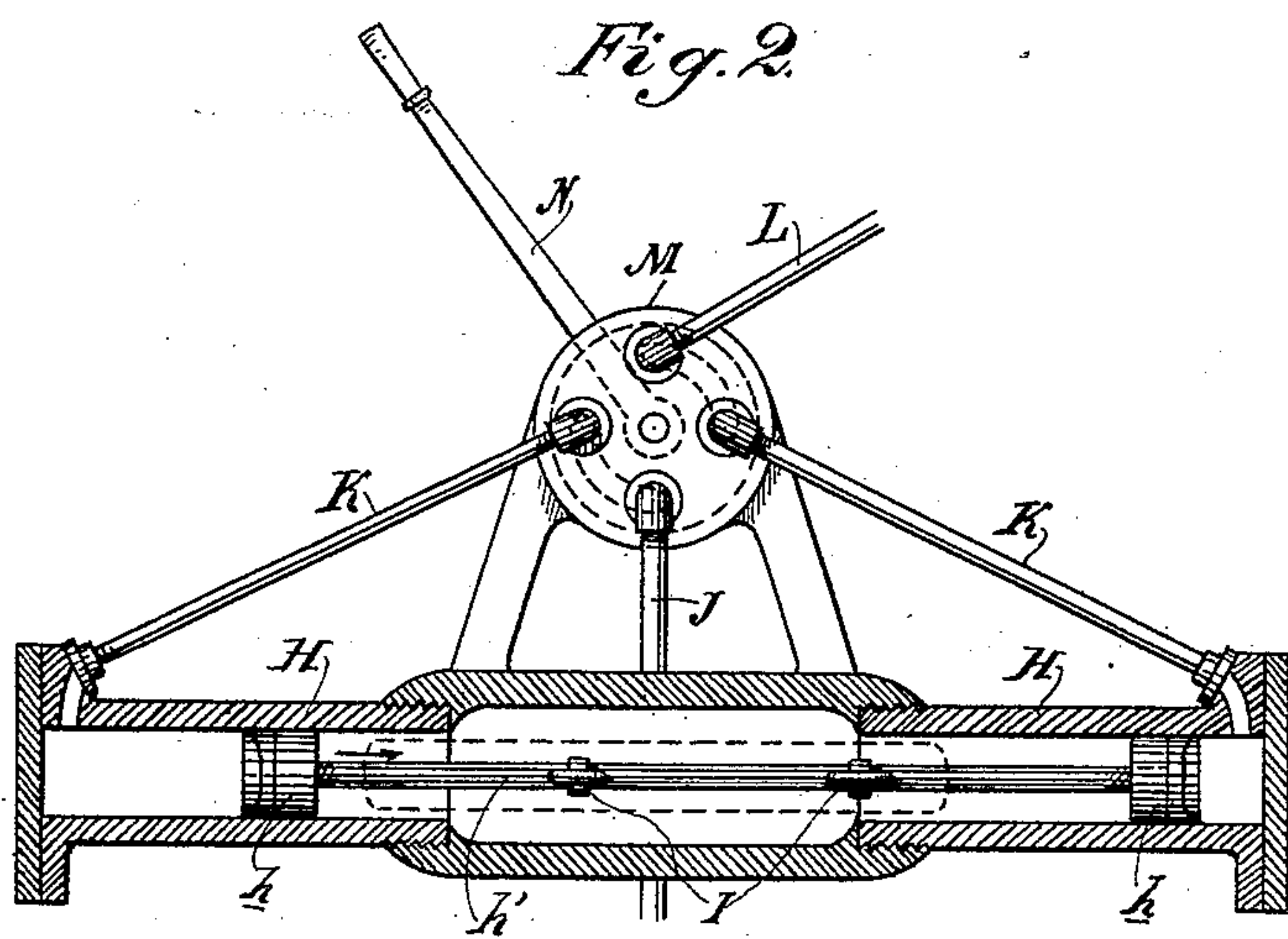
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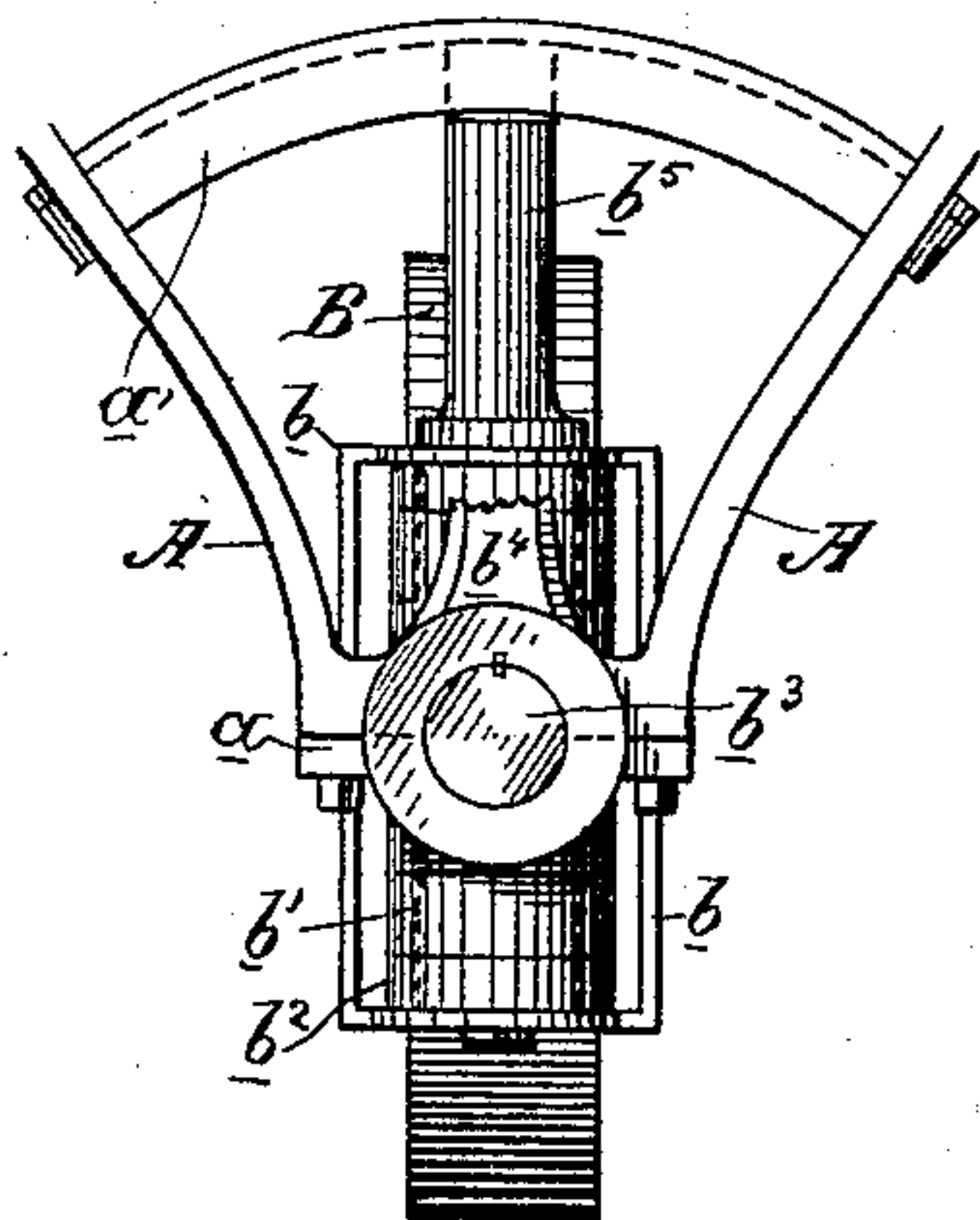
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*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

JOSEPH B. JARDINE, OF SAN FRANCISCO, CALIFORNIA.

## STEERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 444,580, dated January 13, 1891.

Application filed April 9, 1890. Serial No. 347,287. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH B. JARDINE, a citizen of Great Britain, residing in the city and county of San Francisco, State of California, have invented an Improvement in Steering Apparatus; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of apparatus for steering or guiding moving vessels and vehicles, more especially traction-engines.

My invention consists in the novel compressing-cylinder and its connections with the steering-cylinder and with the water-tank and boiler, as I shall hereinafter fully describe.

The object of my invention is to provide a simple and effective steering apparatus, the motive power of which may also serve to feed the boiler.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a side elevation of a traction-engine, showing my steering apparatus. Fig. 2 is a section of the hydraulic steering-cylinder and its attachments. Fig. 3 is a plan of the front or steering-wheel portion.

A is the frame of the traction-engine having the steering wheel or roller B in front.

C is the driving-engine. D is the boiler, and E is the water-tank.

F is the compressing-cylinder, having extending downward into it from its top an escape-pipe  $f$ , which at its top communicates through pipe  $f'$  with the water-tank, said communication being controlled by an ordinary by-pass or relief valve  $f^2$ , governed by a common safety device, such as a steelyard and connections, (represented by  $f^3$ .)

G is a pump of suitable description and arranged to be operated by the engine. The pump should be a positive moving one, and its suction is to be connected suitably with the tank. The discharge of this pump is connected with the lower end of the compressing-cylinder.

Upon the front of the frame is mounted the cylinder H, having within it the pistons  $h$ , connected by a rod  $h'$ . The cylinder is practically a double one, the chambers being formed in each end and lying between the pistons and the cylinder-heads. The middle

of the cylinder is open to provide for the connection with the piston-rod  $h'$  of the chains I, which operate the steering-wheel.

J is a pipe communicating at one end with the lower end of the compressing-cylinder F and its other end with the valve-casing M, which said casing communicates by pipes K with the end chambers of the cylinder H behind their pistons. The valve-casing also communicates with a pipe L, leading to the water-tank. These communications are controlled by a suitable valve within casing M and operated by a lever N.

The steering wheel or roller B is mounted in a yoke  $b$ , in the head of which is a bolt  $b'$ . Upon this bolt is journaled the foot  $b^2$  of the king-pin  $b^3$ , which is journaled in a bearing  $a$  on the front of the frame. The head of the king-pin has a lever  $b^4$ , with which the steering-chains I are connected. This is a common construction; but heretofore there has been a difficulty in the tendency of the king-pin to break at its foot. To overcome this I form an extension  $b^5$  of bolt  $b'$ , the rear end of which extends into and plays in a curved guide  $a'$ , secured under the front of the frame. This resists the strain on the parts caused by the wheel meeting an obstruction in either backing or going ahead, and prevents the king-pin from breaking at its base. The bottom of the compressing-cylinder is connected with the boiler by a pipe O, controlled by a valve or cock  $o$ .

The operation of this apparatus is as follows: I keep the pump G running with such power as to maintain a certain pressure of air in the upper portion of cylinder F. This pressure is sufficient to force the water through pipe J into the steering-cylinder, it being admitted to either end, as desired, and exhausted back again into the tank. Thus the steering-wheel is turned; but the cylinder F serves a second purpose, as follows: The pressure in said cylinder is maintained at a higher point than the maximum pressure in the boiler, so that the water from said cylinder will flow into and feed the boiler through the pipe O. Any excess of pressure in the cylinder is reduced by the water ascending pipe  $f$  and overcoming the regulated by-pass valve, so that it proceeds into the tank again. Thus the



pressure in cylinder F can be nicely regulated, both for steering and for feeding the boiler.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a steering apparatus, and in combination with the steering-cylinder and connections for operating the steering device, the compressing-cylinder F, having an escape-pipe extending down into it from its top and connected with the water-tank, a regulated by-pass or relief valve controlling said connection, and a pump for forcing water into the cylinder F and maintaining it under air-pressure, substantially as herein described.

2. In a steering apparatus for steam-propelled bodies, the cylinder F, in which water is maintained under an air-pressure greater than the pressure in the boiler, said cylinder having hydraulic connections with the steering device and a pipe connection with the boiler, whereby the water in said cylinder is utilized to operate the steering device and to feed the boiler, substantially as herein described.

3. In a steering apparatus for steam-propelled bodies, the combination of the cylinder F, the pump for forcing water therein and maintaining it under an air-pressure greater

than the pressure in the boiler, hydraulic connections between said cylinder and the steering device, and a valve-controlled pipe connection between the cylinder and the boiler, substantially as herein described.

4. In a steering apparatus for steam-propelled bodies, the combination of the water-tank, the boiler, the cylinder F, the pump connected with the water-tank and with the cylinder, an escape-pipe connection between the cylinder and the water-tank, a regulated relief-valve controlling said connection, a valve-controlled connection between the cylinder and the boiler, and valve-controlled hydraulic connections between said cylinder and the steering device, substantially as herein described.

5. In a steering apparatus, the yoke carrying the steering-wheel, the bolt *b'* in the head of the yoke, the king-pin journaled on said bolt, the extension *b<sup>s</sup>* of bolt *b'*, and the fixed curved guide in which the rear end of said extension plays, substantially as herein described.

In witness whereof I have hereunto set my hand.

JOSEPH B. JARDINE.

Witnesses:

S. H. NOURSE,

H. C. LEE.