

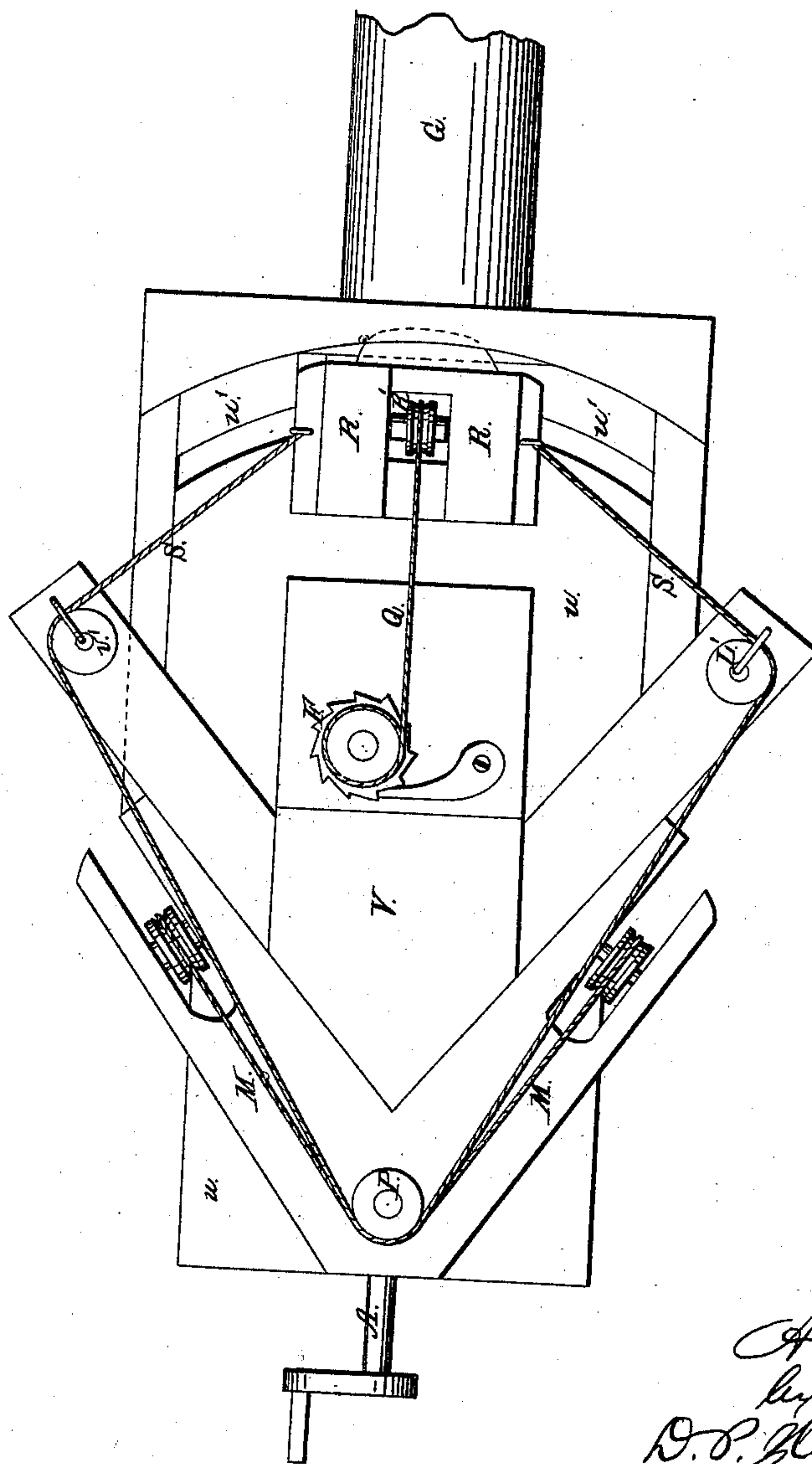
A. Duvall

Mechanical Movement

N<sup>o</sup> 86,826.

Patented Feb. 9, 1869.

Fig. 1.



Witnesses.

D. Sprague  
Chas. F. Claiborn

Inventor.

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his Atty -



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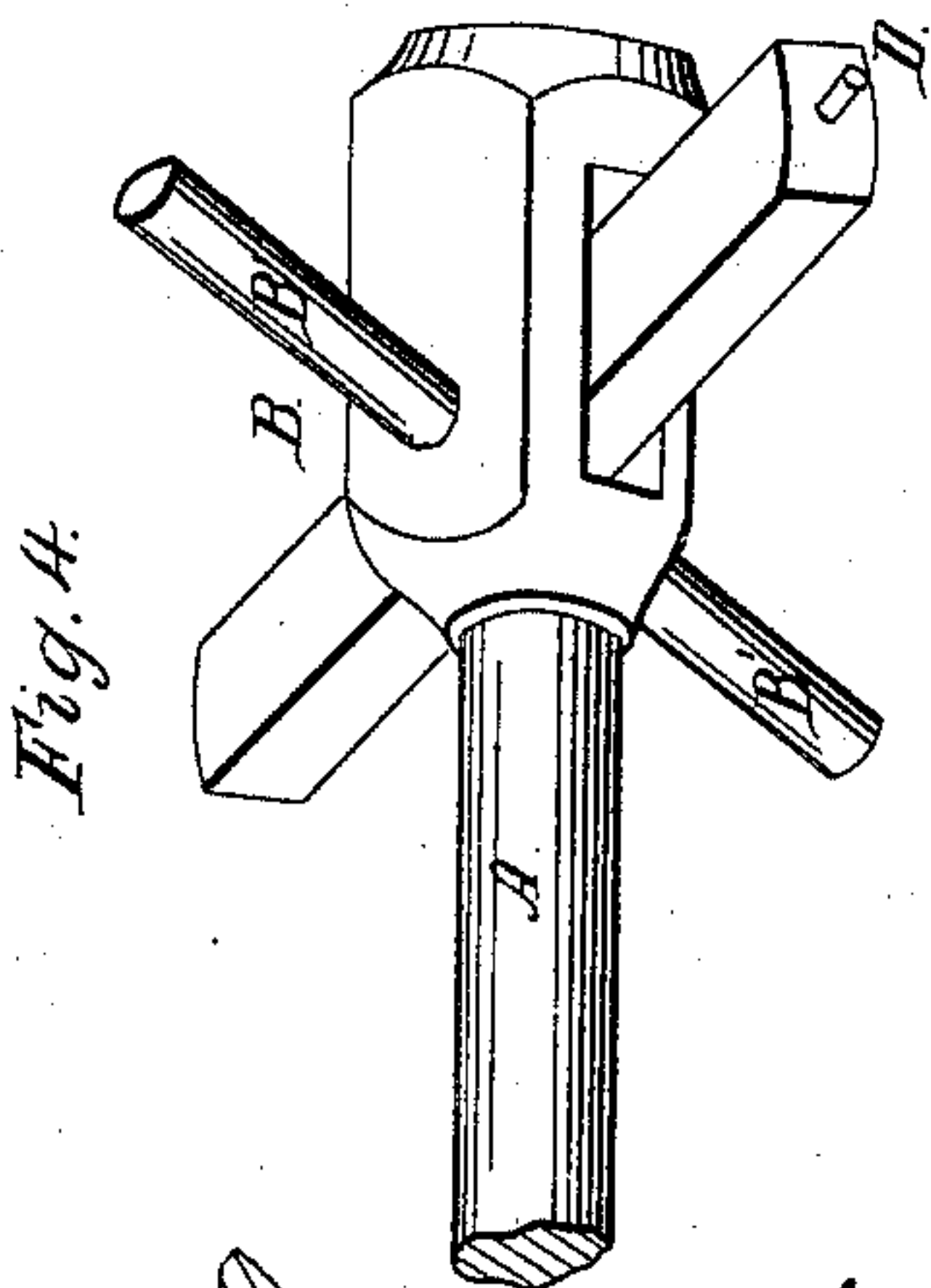
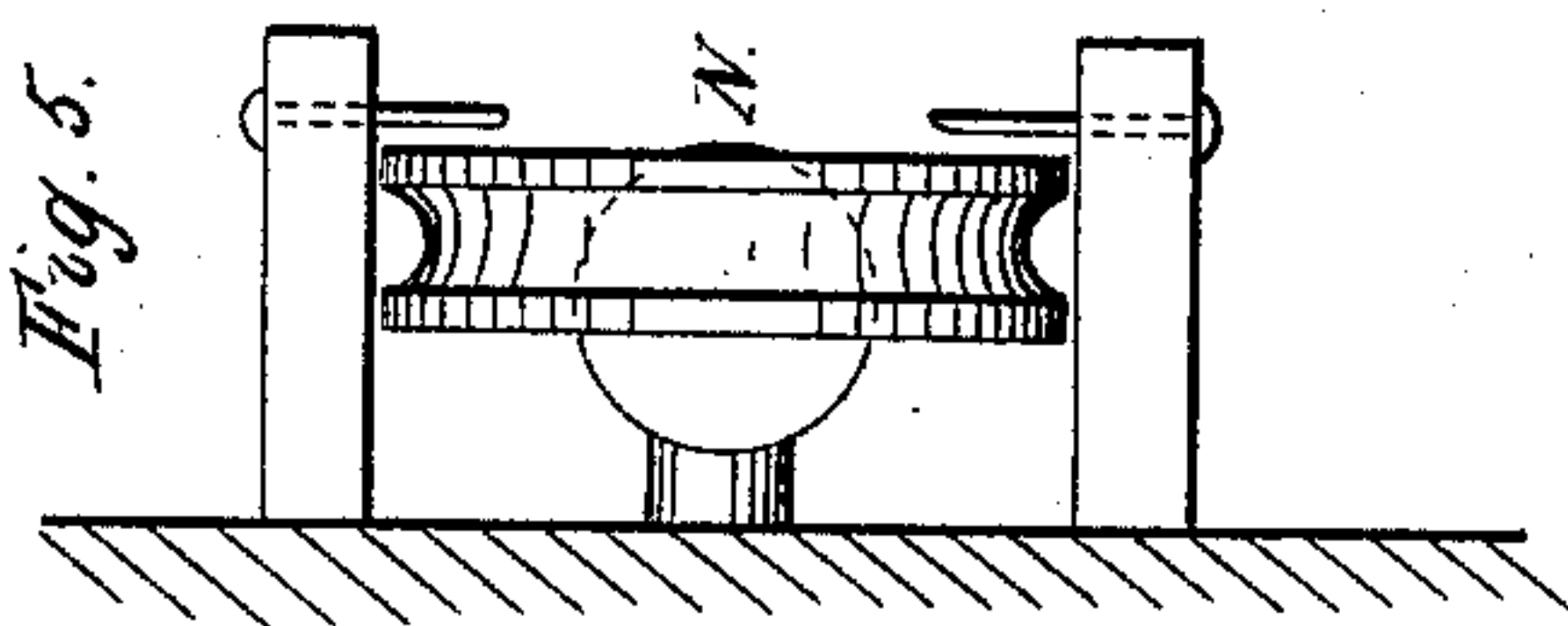


Fig. 3.

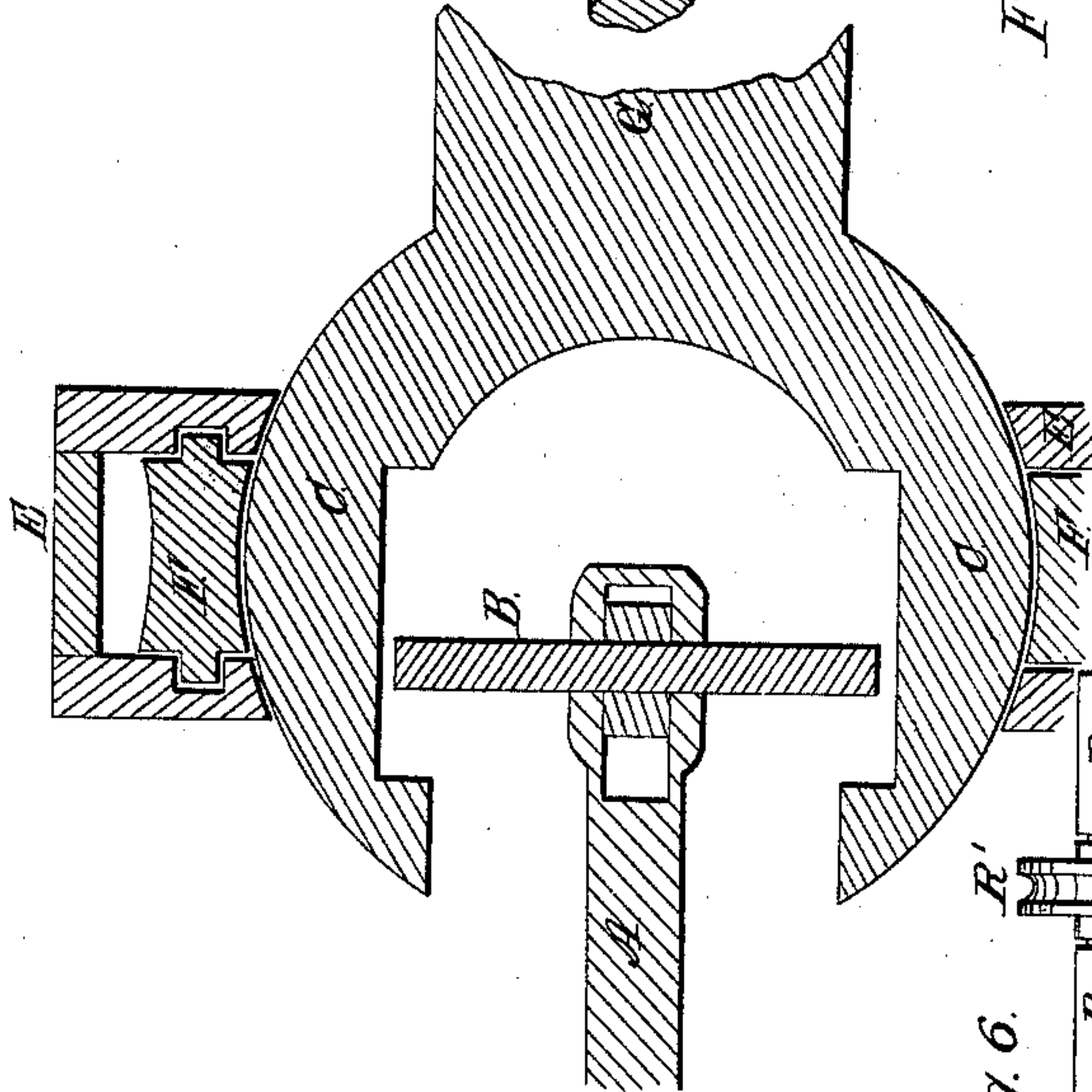


Fig. 7.

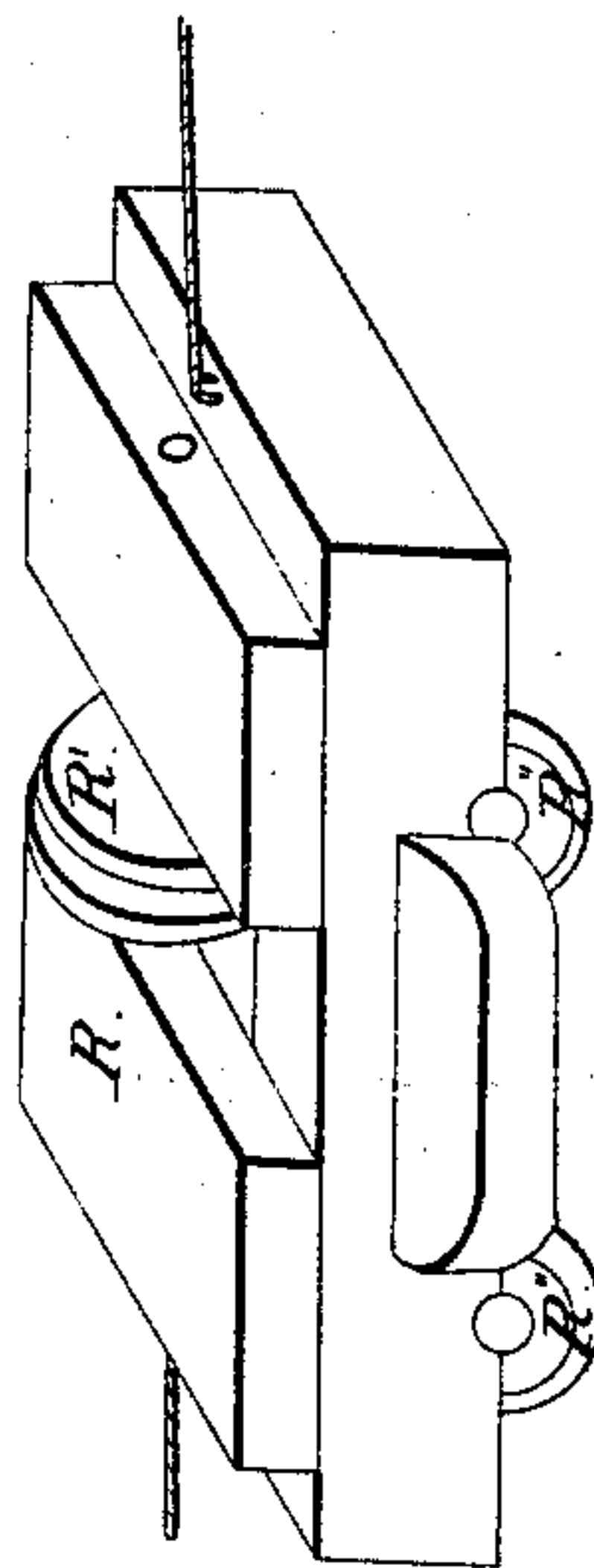
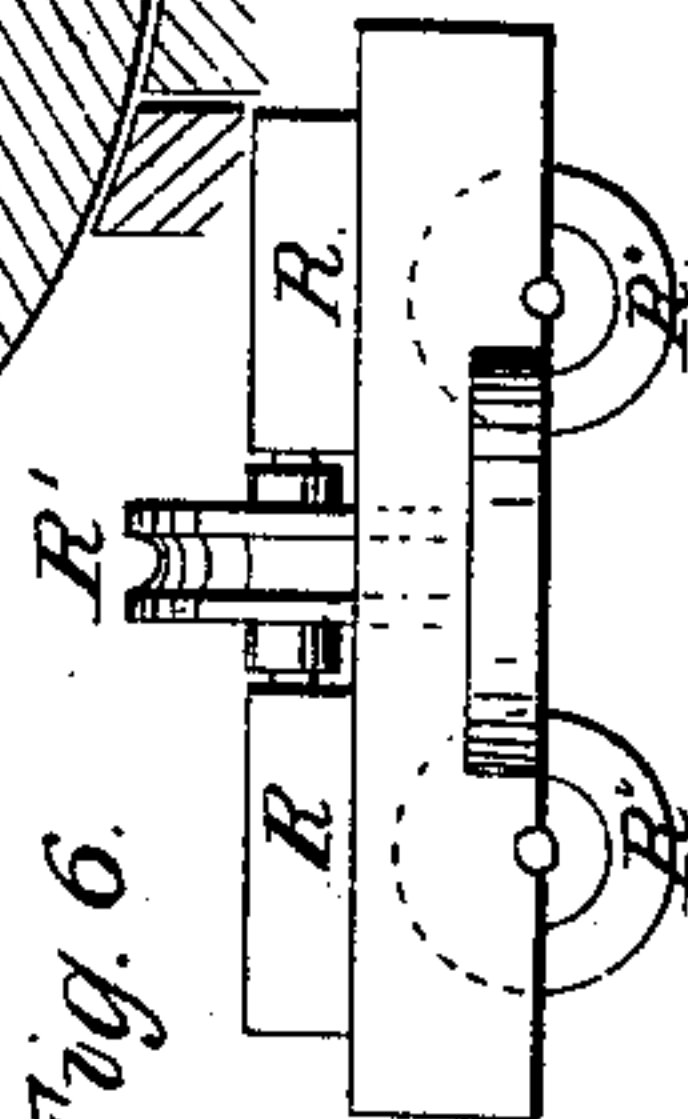


Fig. 6.



Witnesses.

J. H. Sprague.  
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# United States Patent Office.

ALFRED DUVALL, OF BALTIMORE, MARYLAND.

Letters Patent No. 86,826, dated February 9, 1869.

## IMPROVEMENT IN MECHANICAL MOVEMENT.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that I, ALFRED DUVALL, of Baltimore, in the county of Baltimore, and State of Maryland, have invented a new and useful Improvement in Mechanical Movements, particularly adapted for use in dredging-machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a plan.

Figure 2 is a side elevation.

Figure 3 is a vertical section of the ball-and-socket joint.

Figure 4 is a perspective view of the head of the driving-shaft.

Figure 5 is an elevation of a pulley.

Figure 6, an elevation of the traversing-carriage.

Figure 7 is a perspective view of the same.

The same letters in all the figures indicate identical parts.

This improvement relates to the arrangement of mechanism particularly designed for use in dredging-machinery; and

It consists in arranging a hollow sphere within a section of a spherical socket, and causing the same to revolve by a universal joint, so attached within the hollow sphere, as to cause the same to revolve while the shaft or rod projecting therefrom is pointing in any required direction.

In the annexed drawings—

A is the driving-shaft, which is connected with the interior of the spherical joint C, by a universal joint, B, which is so connected therewith, that it will cause the ball to revolve at any required inclination of its axis.

This is effected by causing the journals D D to be attached to the inside of the globe, and the arms B' to move in slots cut in the inner face of the sphere, in lines parallel with the shaft A.

The ball C is held within a journal-box, E, attached to the frame of the machine.

This box is formed as a section of a hollow sphere, and made to conform to the convexity of the ball C, which bears against friction-rollers F, placed around the wheel between the two plates which form the case of said journal-box.

This combination of the ball and its box will enable the operator to direct the shaft or pipe G in any required direction, the ball being made to revolve in any position, by the shaft A operating as described, and connected therewith by means of the universal joint B.

The outer bearing of the shaft or pipe G is formed within a ring, I, which surrounds it,

To diminish friction, a flange, H, is formed on the shaft G, against which the balls J turn in sockets within the ring I, and the bearings of the shaft are, against a series of friction-rollers, K, placed within the said ring.

The shaft or pipe G may be turned in any direction by means of the following mechanism :

Eyes L are attached to the sides of the ring I, and these are connected by ropes M, passing over pulleys N, (see figs. 2 and 5,) which turn on spherical bearings, and over the pulleys O, to the capstan P. By turning the capstan, the ropes M will cause the pipe or shaft G to swing horizontally to either side.

Its vertical oscillation is controlled by means of a rope, Q', attached to a bail, Q, fastened also to the ring I.

This rope, passing over a pulley, R', in the traversing-carriage R, is fastened to a capstan, T, so that, by turning the capstan in one direction or the other, the shaft G may be raised or lowered at pleasure.

In order to maintain the relative position of the capstan T, the rope Q', pulley R', and shaft G, at all positions of the latter in the horizontal plane in which it oscillates, the pulley R' is placed on a traversing-carriage, R, which runs on wheels R', resting on each side of a slot, U', in the frame U, said slot being an arc of a circle, and permitting the rope Q' to hang perpendicularly through said slot in any position of the shaft G.

The ropes S are attached to the carriage R, and, passing over pulleys V' on the arms V, are connected to the capstan P, so that, as the shaft G is turned to one side or the other, the carriage R shall, by the same operation, move equally and in the same direction.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the hollow sphere C, bearing E, and shaft A, connected with the former by a universal joint B, substantially as described.

2. The combination of the spherical journal C and bearing E, and the shaft or tube G, flange H, and annular bearing I, arranged substantially as described.

3. The combination of the oscillating shaft G, pulleys N, constructed as shown, ropes M, and capstan P, arranged substantially as described.

4. In combination with the oscillating shaft G, rope Q', and traversing-carriage R, the ropes S and M, so connected with the capstan as to cause the carriage R to move uniformly with the horizontal oscillation of the shaft G, substantially as described.

ALFRED DUVALL.

Witnesses :

JOHN HILBERT,  
JESSE H. MURRAY.