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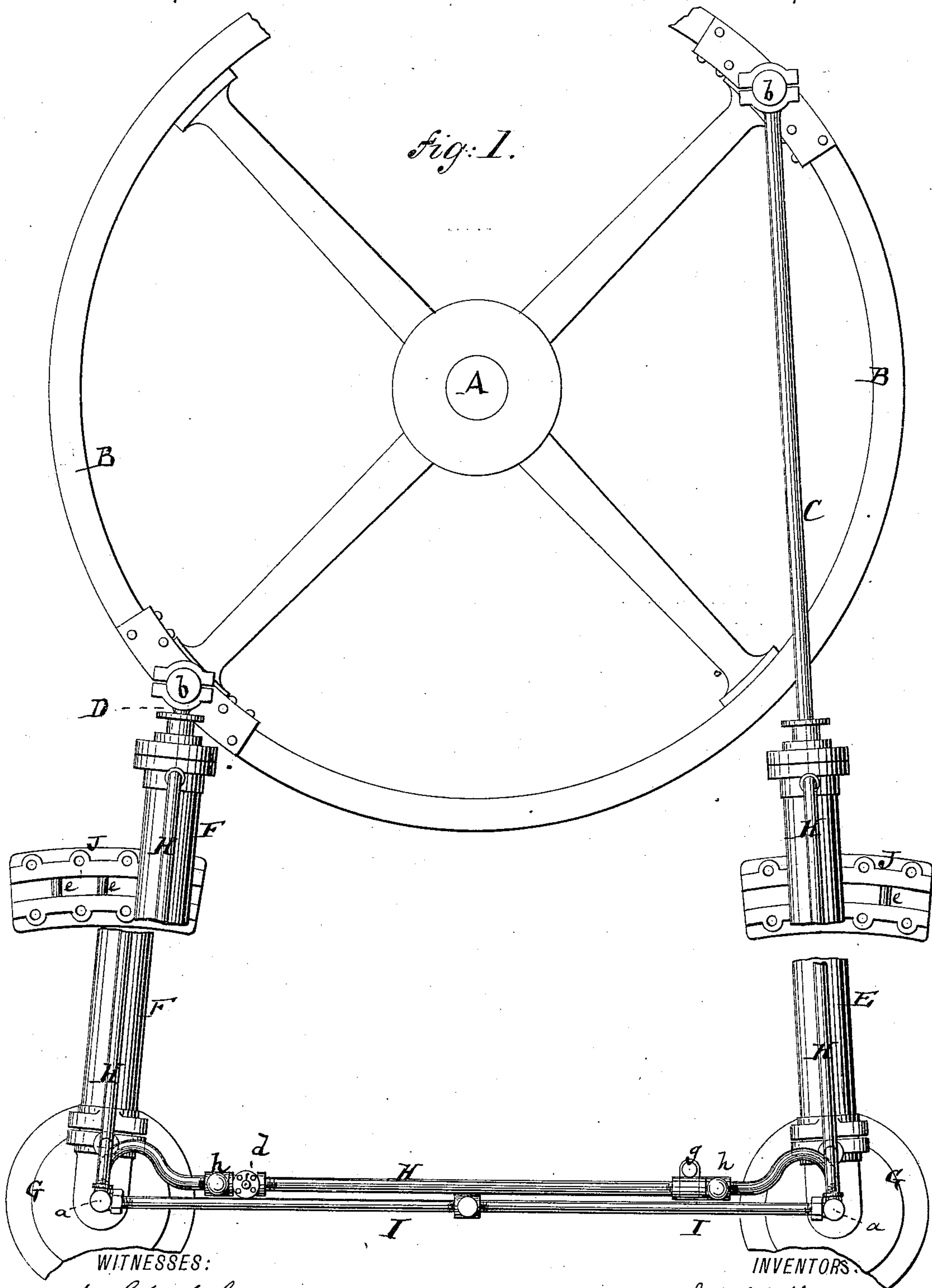
3 Sheets—Sheet 1.

G. McCOLL & W. B. CUMMING.

LIQUID RUDDER BRAKE.

No. 334,081.

Patented Jan. 12, 1886.



(No Model.)

3 Sheets—Sheet 2.

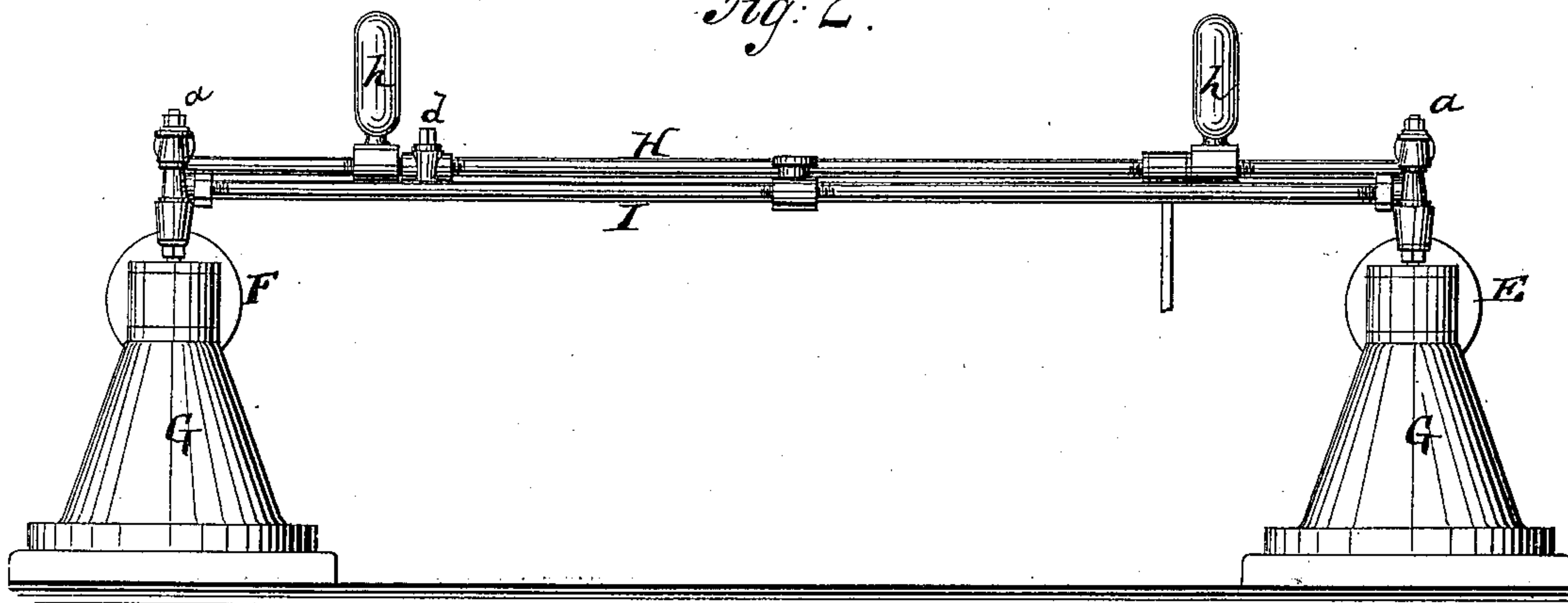
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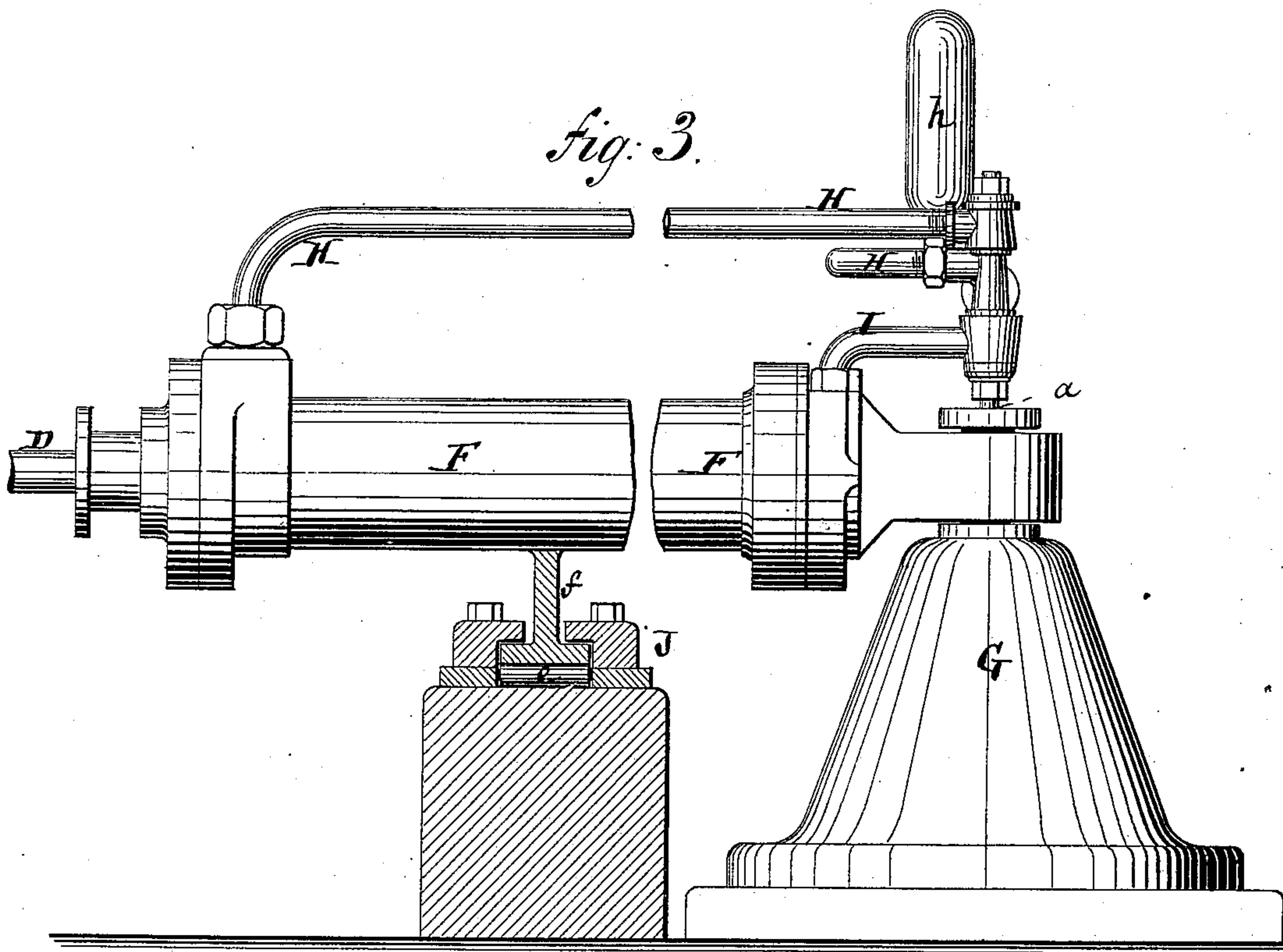
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*Fig. 2.*



*Fig. 3.*



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3 Sheets—Sheet 3.

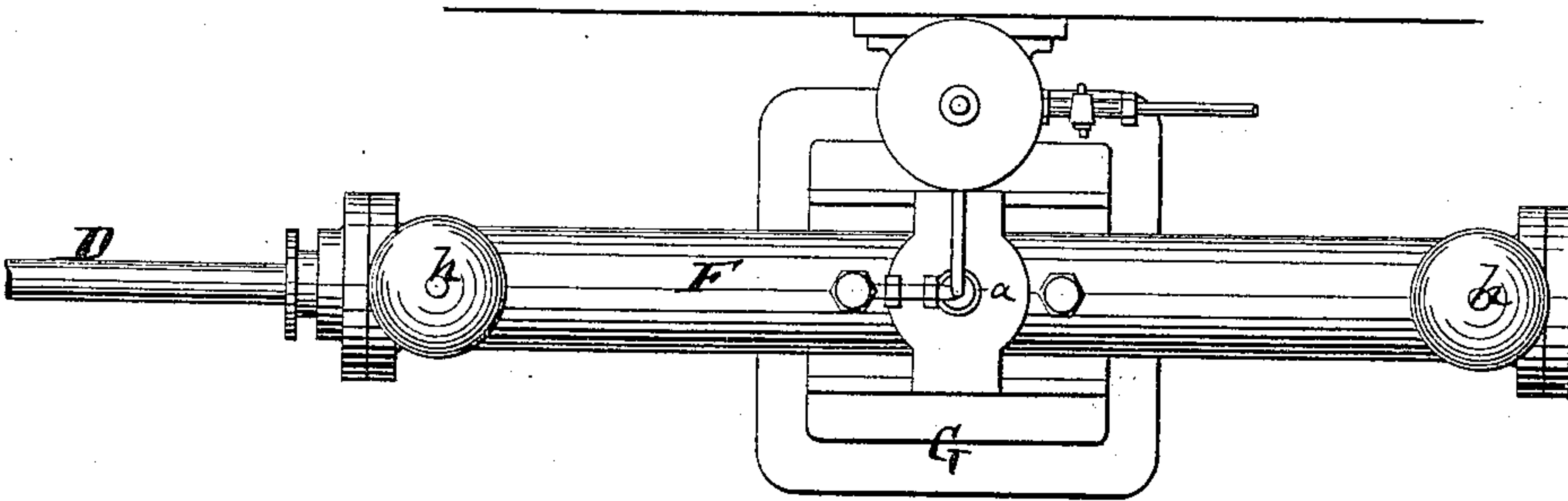
G. McCOLL & W. B. CUMMING.

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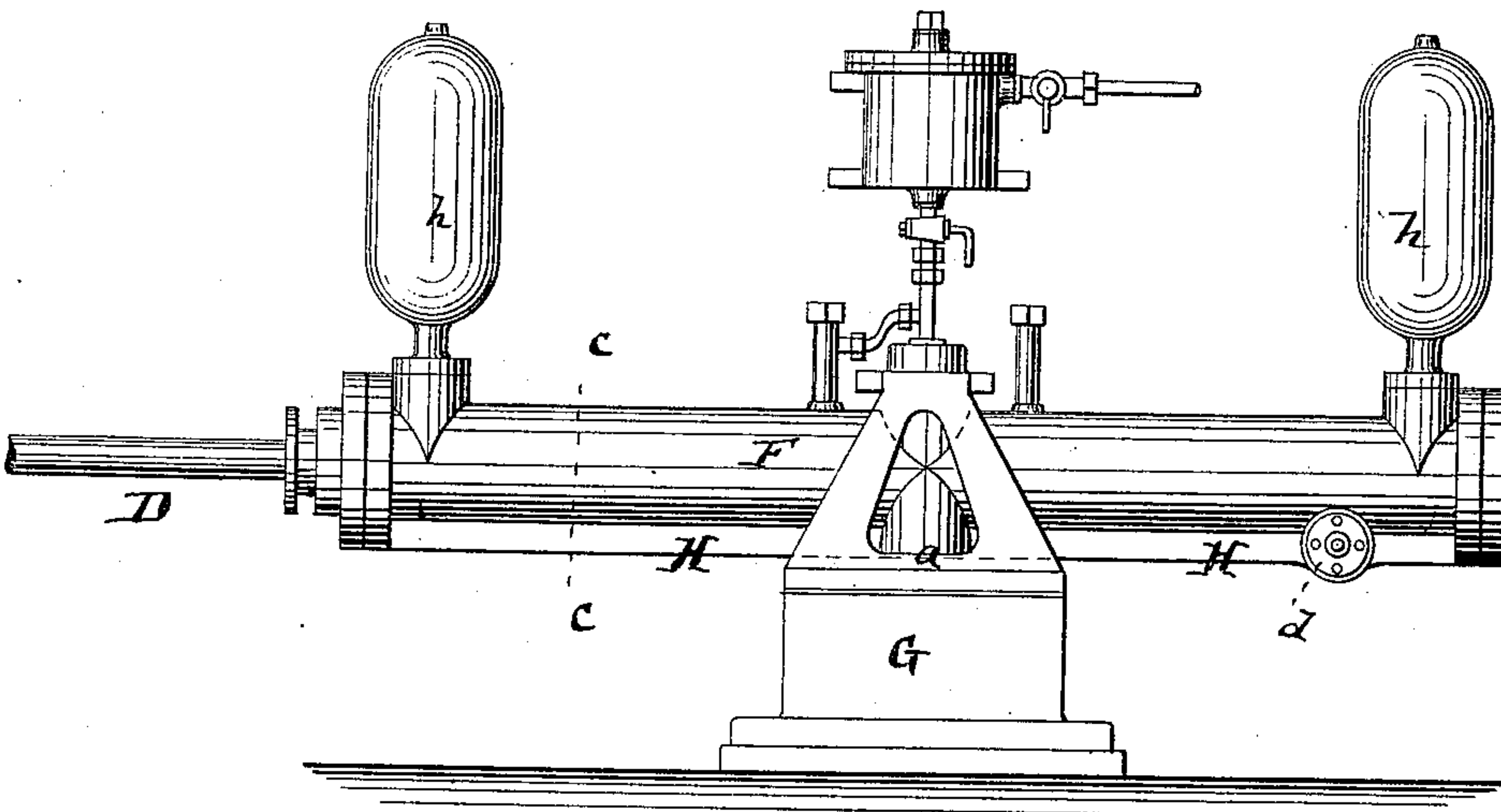
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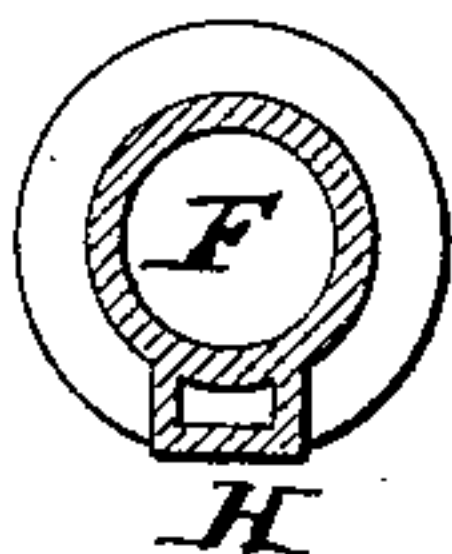
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

GAVIN McCOLL AND WILLIAM B. CUMMING, OF LIVERPOOL, COUNTY OF LANCASTER, ENGLAND.

## LIQUID RUDDER-BRAKE.

SPECIFICATION forming part of Letters Patent No. 334,081, dated January 12, 1886.

Application filed September 2, 1885. Serial No. 176,006. (No model.)

*To all whom it may concern:*

Be it known that we, GAVIN McCOLL and WILLIAM B. CUMMING, residents of Liverpool, in the county of Lancaster, England, and citizens of England, have invented an Improved Liquid Rudder-Brake, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 is a plan or top view of our improved liquid rudder-brake. Fig. 2 is an end view of the same; Fig. 3, a side view, partly in section, thereof; Fig. 4, a top view of a modification of the same; Fig. 5, a side view of that modification, and Fig. 6 a cross-section on the line C C in Fig. 5.

This invention has for its object to prevent accidents to the rudders of steamships and other vessels in the event of the steering-gear becoming disabled, or during heavy racing of the propeller when the same is not fully immersed in the water, and, in fact, whenever that loose vibration of the rudder is to be prevented, which is the prime cause of so many accidents thereto during heavy weather. Vessels are frequently disabled by injury to their steering-gear, because when the rudder is no longer held the action of the waves will cause it to swing violently to and fro, and finally will destroy it.

Our invention consists in combining with the rudder-posts and with the wheel or cranks thereon one or more cylinders, each having a piston that connects with the rudder-post, and each filled with a liquid substance and connected with a pipe through which that substance is moved whenever the piston moves under the influence of the rudder. The resistance which the motion of the liquid causes is sufficient to cushion the rudder and prevent violent movements thereof.

In the drawings, with more particular reference to Figs. 1, 2, and 3, the letter A represents the rudder-post, and B is a wheel mounted upon the same, which connects, in the usual or suitable manner, with the steering-gear at the pilot-house. This wheel, or, in lieu of it, a crank on the rudder-post, is connected with the piston-rods C and D, the pistons of which travel in cylinders E and F, respectively. The end

of each of these cylinders which is farthest away from the wheel B is pivoted at *a* to a bracket or support, G, there being two such brackets, as shown in Fig. 1, one for each of the cylinders. The piston-rods C and D are also pivoted to the wheel B, as is shown at *b* in Fig. 1. The ends of the cylinders E and F which are nearest the wheel B connect with a pipe, H, which may either run directly from one cylinder to the other in a more or less straight line, or which may, as in Figs. 1, 2, and 3, run from the end of one cylinder which is nearest the wheel B to the swivel-connection *a*, and then to the end of the other cylinder which is nearest the wheel B. It being understood that the pipe H is filled with liquid, and that it communicates with the two cylinders E and F, which are also filled with liquid on those sides of their pistons which are nearest the wheel B, it follows that whenever the wheel B is turned by the steering-gear one of the pistons will be pushed into its cylinder toward the support G, while at the same time the other piston is drawn in its cylinder away from the support G. Thus the liquid which fills the pipe H and parts of said cylinders is moved by the motion of these pistons, and it retards the movements of the piston, and also the movements of the wheel B and of the rudder, by its frictional contact with the walls of the pipe H. The smaller the diameter of the pipe H the more will the movement of the rudder be retarded. A cock, *d*, is also provided in the pipe H to regulate its diameter—that is, to lessen it when desired—and thus increase the resistance caused by the liquid. When this cock is entirely closed, which may be done in case of necessity, it will serve to lock the rudder so that it cannot be moved spontaneously.

Should the steering-gear give out, or the propeller-race or the rudder become exposed to the action of the waves, our arrangement of cylinders and pipe H will permit no motion of the rudder, except one that is quite gentle and slow. All violent motion is absolutely prevented.

Those parts of the cylinders E F which are nearest the brackets G are either perforated to communicate with the air or are connected by a pipe, I, so that the air behind the pistons



will be moved from one cylinder to the other in the same ratio as the liquid in front of them. In case the cylinders are of undue length, or should require central support, we have provided for that purpose a segmental railway, J, 5 beneath each cylinder, in which railway are hung friction-rollers *e*, against which bears a foot, *f*, that projects downward from the cylinder, which appears more clearly in Fig. 3 of the drawings. The pipe H has a suitable 10 branch, *g*, for replenishing it with liquid that may be lost by leakage, and for filling it in the first instance. Air-chambers *h h* should also be erected on the pipe H to prevent injury to 15 the part, especially when the cock *d* is more or less closed.

We have thus far described the arrangement of the rudder with two cylinders, E and F, and two piston-rods; but it is quite evident that the 20 same result may be obtained with the use of but one cylinder, provided the same is connected with the circulating-pipe at both of its ends, instead of at one end only, as shown in Fig. 1. This modification is represented in 25 Figs. 4, 5, and 6, in which the letter D represents the single piston-rod, which is to connect with the wheel or crank on the rudder-post, and which enters the single cylinder F. The two ends of this cylinder are connected by a 30 pipe, H, which is represented at the lower part of Fig. 5, and which, being filled with liquid, will, when the piston is moved, allow the liquid to circulate from one end of the cylinder to the other. The cylinder itself is swiveled at *a* in 35 the bracket G. The pipe H has a cock, *d*, and

the cylinder F carries air-chambers *h*, as shown. Whenever the piston on the rod D is pushed into the cylinder by the motion of the rudder in one direction, the liquid will be moved in the pipe H toward the rudder-post; but when 40 the piston is moved in the opposite direction the liquid will also be moved in the pipe H in a reversed direction. The diameter of the pipe H will regulate the speed with which the rudder is allowed to move. 45

We do not claim moving a rudder by hydraulic means, and shown in Patent No. 27,875.

We claim—

1. The combination of the rudder-post and the wheel or crank thereon, and suitable means 50 for turning the same, with one or more pivoted cylinders, one or more piston-rods that are pivoted to said wheel or crank, and with the liquid-circulating pipe H on said cylinder or cylinders, all arranged as a cushion for the 55 rudder, substantially as herein shown and described.

2. The combination of the rudder-post A and its crank or wheel B, and suitable means 60 for turning the same, with the piston-rod D, pivoted thereto, cylinder F, pivoted to a fixed support, pipe H on said cylinder, and cock *d* in said pipe, as specified.

The foregoing specification of our invention signed by us this 14th day of July, 1885.

GAVIN McCOLL.

W. B. CUMMING.

Witnesses:

GEO. RUGH. VEST,  
WILLIAM PIERCE.