(No Model.) 2 Sheets—Sheet 1.

H. B. WILLIAMS.

AUTOMATIC MARINE SPEED AND DIRECTION INDICATOR.

No. 486,008. Patented Nov. 8, 1892.

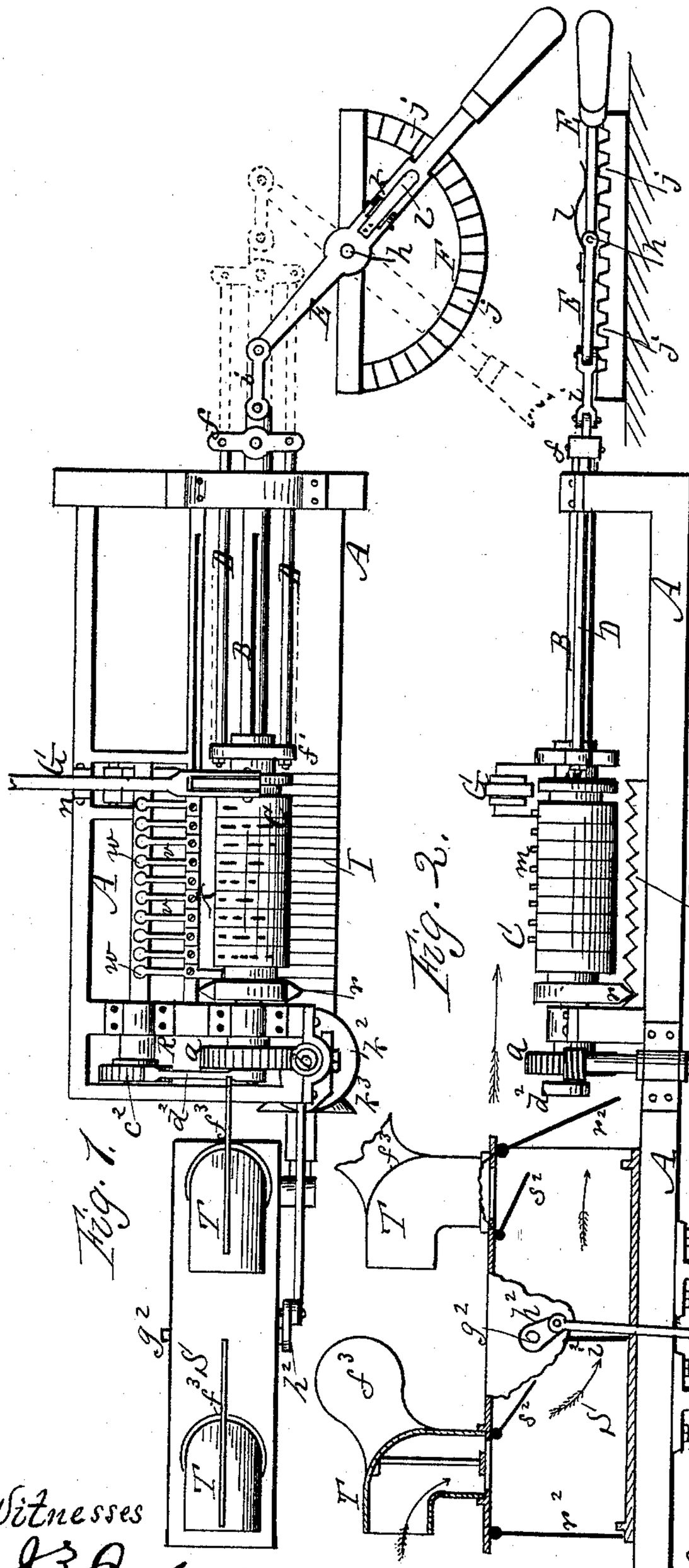

Fig. 1.

Fig. 2.

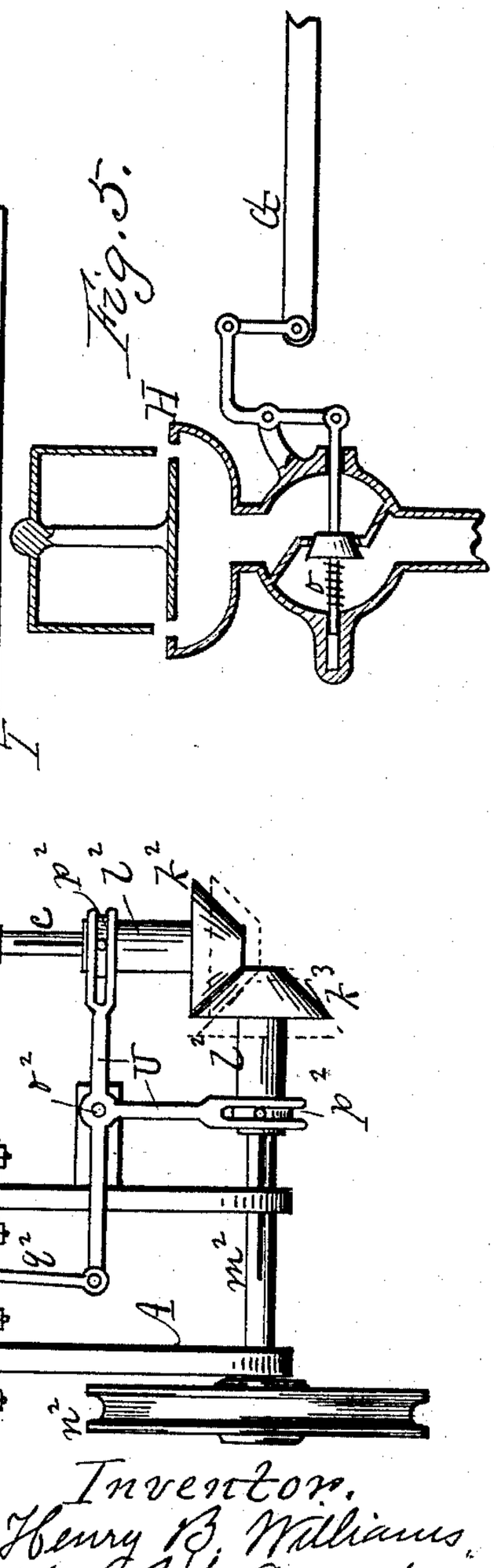

Fig. 5.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

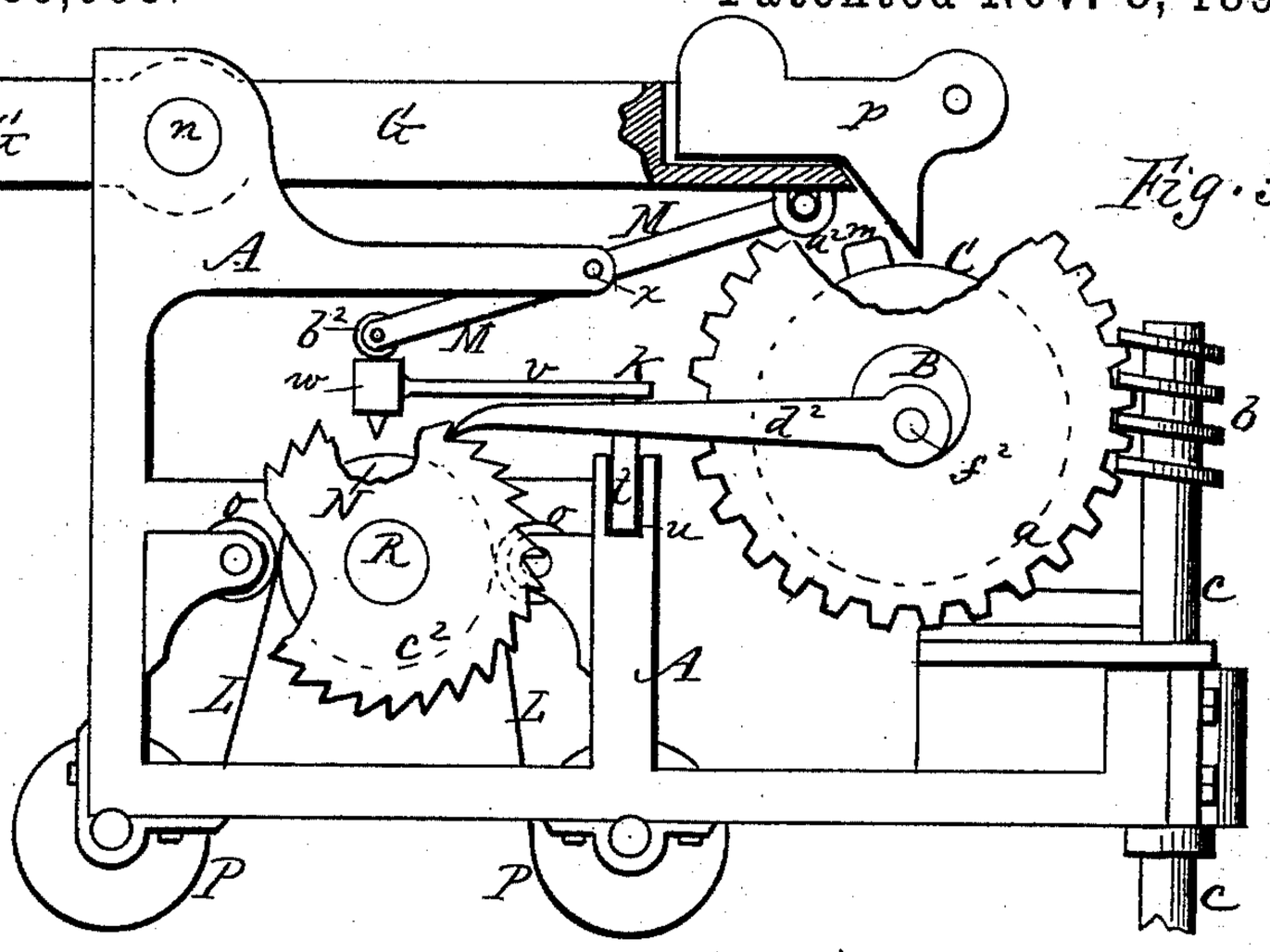
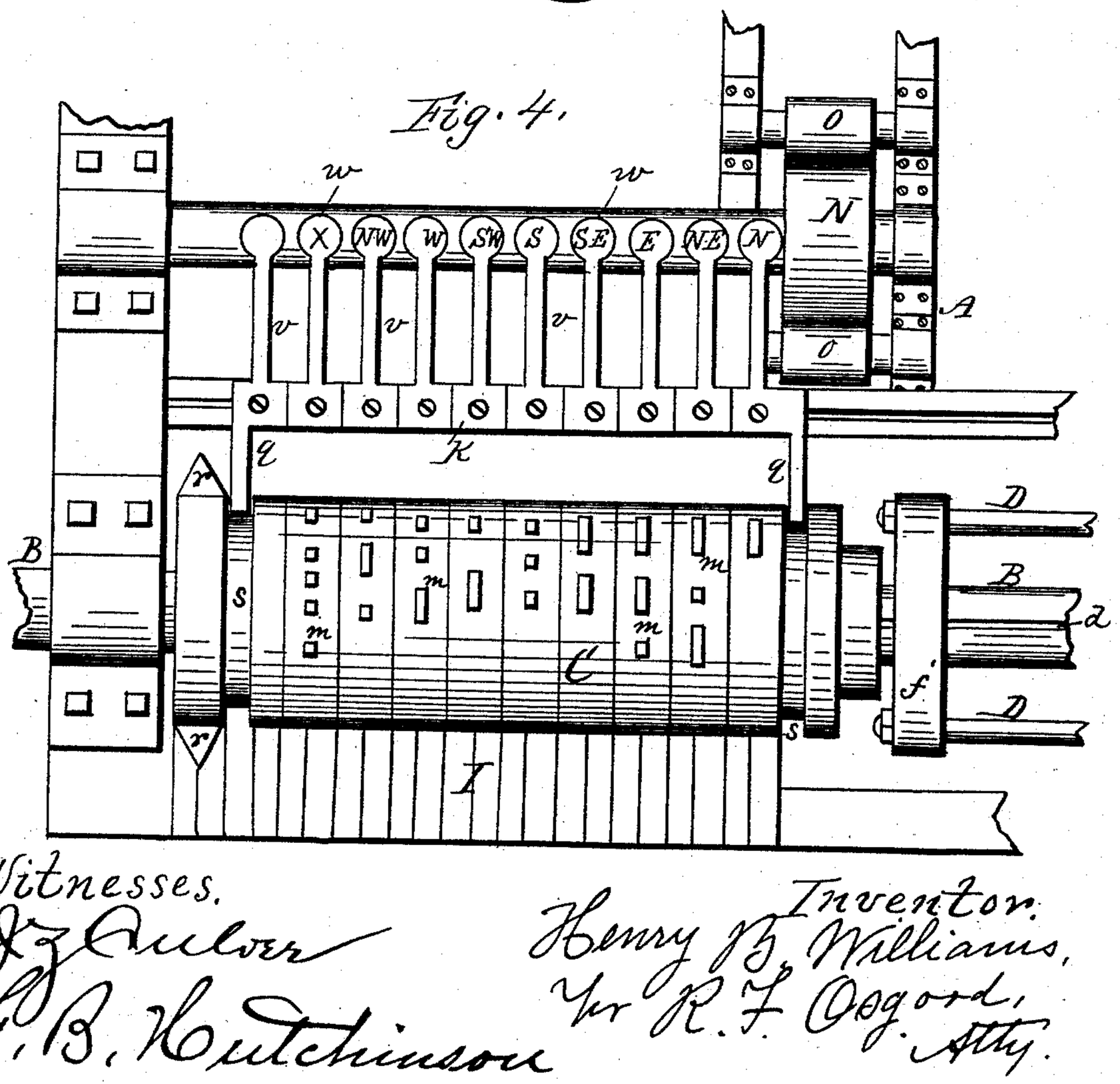


Fig. 4.



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UNITED STATES PATENT OFFICE.

HENRY B. WILLIAMS, OF ROCHESTER, NEW YORK, ASSIGNOR OF ONE-HALF TO LEMUEL A. JEFFREYS, OF SAME PLACE.

AUTOMATIC MARINE SPEED AND DIRECTION INDICATOR.

SPECIFICATION forming part of Letters Patent No. 486,008, dated November 8, 1892.

Application filed June 20, 1891. Serial No. 396,948. (No model.)

To all whom it may concern:

Be it known that I, HENRY B. WILLIAMS, of Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Automatic Marine Speed and Direction Indicators; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the drawings accompanying this specification.

My improvement relates to means for blowing a steam-whistle on a vessel, whereby both the speed of the vessel and the direction in which it is running will be indicated to any vessel within hearing in advance.

The invention consists in the construction and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a plan view of the apparatus. Fig. 2 is a front elevation of the same, portions being shown in section. Fig. 3 is an enlarged end elevation looking in the direction indicated by the arrow at the left in Fig. 2, the governing apparatus at the left being removed from place. Fig. 4 is an enlarged plan view of the cam-cylinder and printing apparatus and their connections. Fig. 5 is a vertical section of one form of steam-whistle.

A indicates a frame, in which the parts are mounted. B is a shaft located in this frame and receiving rotary motion from the propeller-shaft in any suitable manner.

As shown in the drawings, a gear-wheel *a* is attached to one end, with which engages a worm *b*, attached to a vertical shaft *c*.

C is a cam-cylinder located on this shaft B and revolving with it. The cylinder has a key or spline which rests in a longitudinal slot *d* of the shaft, by which means said cylinder can be slid along endwise on the shaft.

D D are guide-rods provided with cross-heads *f f'*, one of which is swiveled to a hub *g* of the cylinder, by which the latter is allowed to turn.

E is a lever pivoted at *h* and connected with the cross-head *f* by a pivoted link *i*. By swinging the lever E in one direction or the other the cylinder C will be correspondingly moved in or out on the shaft. This is indicated by the full and dotted lines in Fig. 1.

F is a segment provided with a series of teeth *j j*, with which engages a tooth on the under side of the lever E to hold the latter at any adjustment. The lever is made in two parts, hinged at *k*, so that the outer end can be raised to ride over the teeth, and said outer end is held down by a spring *l*, which bears down on its top.

The cylinder C is provided on one side with a series of projecting cams *m m* in the shape of dots and dashes, similar to the characters used in the Morse telegraph-alphabet. These cams act on the end of a lever connected with the steam-whistle and throw it up and down to operate the whistle. G indicates the lever, and H the whistle. The lever is pivoted at *n*, and as its rear end is thrown up by the cams its front end opens the plug *o* of the whistle and sounds the alarm. After the passage of each cam the plug closes again and cuts off the alarm. The length of each alarm is determined by the length of the cam, a long cam producing a long sound and a short cam a short sound. The cams may be disposed on the cylinder in any desired way. As shown, a dash indicates "north;" a dash and a dot, "northeast;" a dash, a dot, and a dash, "east;" three dots, "south;" two dashes and a dot, "southeast;" a dot and a dash, "southwest;" two dots and a dash, "west;" a dot, a dash, and a dot, "northwest." These cams are arranged in series and in regular lines, and by moving the cylinder endwise any one set of the series is brought under the end of the lever that operates the whistle. Another series of cams is also arranged in the series to announce the number of the vessel, being arranged in dots and dashes in a similar way to that above described. Thus the five dots shown at the left, with three occupying the center and one at each end removed from the others, would indicate the vessel's number as "131."

By throwing the lever E into proper engagement with the segment F any one set of the cams can be brought under the lever G, thus indicating by whistle which direction the vessel is running or indicating the number of the vessel, the same serving as a warning to any vessel in advance. The lever G has a weighted toe *p*, pivoted at its rear end, resting over the

cylinder and so arranged that when the cylinder C turns in the proper direction it stiffens with the lever and raises it; but when turned backward the toe rises without operating the lever. This is shown most clearly in Fig. 3.

On one end of the cylinder C is a half-segment *r*, of V shape in cross-section, projecting beyond the surface of the cylinder and engaging with corresponding V-shaped grooves of a bed I, attached to the frame under the cylinder and extending the whole length of the latter. The segment rests on the opposite side from the cams *m m*, so that when the latter are in operation with the lever that operates the steam-whistle the cylinder is locked against end movement, and when it is desired to shift the position of the cylinder under the lever the segment is uppermost and disconnected from the bed and the cams are turned down, so that they will not come in contact with the lever G as the cylinder is shifted.

K is a carriage connected with the cylinder C by two arms *q q*, Fig. 4, which rest in grooves *s s* of the cylinder, by which means the carriage is adjusted forward and back with the cylinder. This carriage also has a flange or tongue *t*, Fig. 3, which rests loosely in a groove *u* of the main frame. To the carriage are attached a series of spring-arms *v v*, carrying at their outer ends types or markers *w w*, which are forced down at each throw of the lever G to impress a mark on a ribbon L, thus preserving a record of the running of the vessel and the sounding of the whistle. These types correspond in number and position with the several sets of cams on the operating-cylinder. At each throw of the lever G the types are pressed down by means of a rock-arm M, pivoted at the center at *x* to a stationary part of the frame and at one end to the under side of the lever G, as shown at a^2, and provided at the other end with a roller b^2, which rests on top of the type. Each upward throw of lever G causes the rock-arm to force the type downward. It should be stated that the type consists, simply, of a head with a pointer that bears upon the ribbon and impresses a dot or a dash corresponding with the length of the cam by which the motion is produced.

N is a roller over which the ribbon passes, and *o o* are small side rollers for keeping the ribbon in place. P P are spring-rollers on which the ribbon winds. The center roller N is attached to a shaft R, on one end of which is a ratchet-wheel c^2, driven by a pawl d^2, attached at f^2 to a crank-pin on the end of shaft B. By this means intermittent motion is imparted to the ribbon corresponding with the rotation of the cam-cylinder, by which the dots and dashes are produced on the ribbon in regular order. It is designed that the cylinder C shall make a revolution and sound an alarm on the steam-whistle during the passage of the vessel a given distance—say every quarter of a mile; but as the vessel is liable to be retarded by head winds or accelerated by stern winds the distance is liable to vary unless provision is made to compensate for the disturbance. I provide the following means for obviating this difficulty:

S, Figs. 1 and 2, is a chamber having two open-mouthed cowls T T at opposite ends, through which the wind passes freely to the interior of the chamber, said cowls turning freely to face the wind and being regulated by ordinary vanes f^3 f^3. g^2 is a cross-shaft in the center of said chamber between the cowls, having on one outer end a crank h^2 and inside a hanging valve i^2, which fills the cross-area of the chamber. The wind passing down through one cowl, as indicated by the arrows, deflects the valve and turns the crank on the outside. k^2 k^3 are two bevel friction-gears resting in contact and attached to sleeves l^2 l^2, one sliding up and down on the vertical shaft *c* and the other horizontally on another shaft m^2. They are made to revolve with the said shafts by ordinary spline connections. On the outer end of shaft m^2 is a pulley n^2, around which runs a band connecting with a pulley on the propeller-shaft or with other parts of the machinery driven from the propeller-shaft. U is a double-armed rock-lever pivoted at o^2 to some stationary part, said arms standing at right angles to each other and being forked at their outer ends, embracing clutch-rings p^2 p^2, which rest in grooves of the sleeves l^2 l^2, allowing the latter to revolve. To the rear end of the rock-lever is pivoted a connecting-rod q^2, which extends up and is pivoted to the crank h^2.

It will be seen that when the valve i^2 is deflected in one direction from the center the rock-lever U will be thrown so as to force the friction-gear k^2 downward and the other gear k^3 backward, as indicated by dotted lines in Fig. 2. This reduces the motion by reason of the shifting of the wide part of one gear to the narrow part of the other. Therefore if the wind is ahead the motion is slower and a greater number of revolutions of the propeller is required to give one revolution of the cam-cylinder. On the contrary, if the valve i^2 is deflected in the opposite direction by the entrance of wind from the stern the gear k^2 is raised and gear k^3 thrown forward, which brings the wide part of k^3 in contact with the narrow part of k^2, thus accelerating the motion in proportion to the accelerating power of the wind on the vessel. By this means the whistle is sounded intermittently in passing over given distances approximately correct, whether the vessel is retarded or accelerated by winds.

r^2 r^2 are two valves hung loosely in the open ends of the chamber S and striking stops to prevent swinging inward beyond the vertical line, one of said valves opening and the other closing to allow proper passage of the wind through the chamber.

s^2 s^2 are other small valves hung under the cowls T T, one opening to allow entrance of wind on one side, the other closing to prevent

passage of the wind upward through the other cowl, and vice versa.

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

1. In a marine signaling apparatus, the combination of a revolving shaft, a cylinder mounted thereon revoluble with the shaft and adjustable longitudinally to different positions, a series of cams arranged in sets on said cylinder, a lever on which said cams act, said lever being connected with a whistle, a lever connected with the cylinder by suitable means to produce the end adjustment of the same, and a segment over which said lever works, the segment being provided with teeth, with which engages a tooth on the lever, as and for the purpose specified.

2. The combination of a revolving shaft, a cylinder mounted thereon revoluble with the shaft and adjustable longitudinally to different positions, a series of cams arranged in sets on said cylinder, a lever on which the cams act, said lever being connected with a whistle, a carriage connected with the cylinder so as to move longitudinally with it, types connected with the carriage and lying in line with the cams, a movable ribbon upon which the types strike when brought into position, and means for automatically depressing the types by the movements of the lever, as herein shown and described.

3. The combination, with the cylinder C, of the carriage K, connected therewith, the arms *v v*, attached to the carriage and provided with the types *w w*, the lever G, and the rock-arm M, pivoted at one end to the lever and intermediately to the frame and bearing upon the types, as shown and described, and for the purpose specified.

4. The combination, with the shaft *c*, which operates the cam-cylinder, of the chamber S, the cowls T T, connected therewith to turn axially the shaft g^2, provided with the valve i^2, resting crosswise in the chamber, the cone-gears k^2 k^2, attached, respectively, to the shafts *c* and m^2 and engaging together, the double-armed crank-lever U, connecting with the hubs of the cone-gears, whereby they are moved forward and back, and the rod q^2, connecting the lever U with a crank h^2 on the shaft g^2, as shown and described, and for the purpose specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

H. B. WILLIAMS.

Witnesses:
R. F. OSGOOD,
RICHARD F. WHALEN.