

No. 708,818.

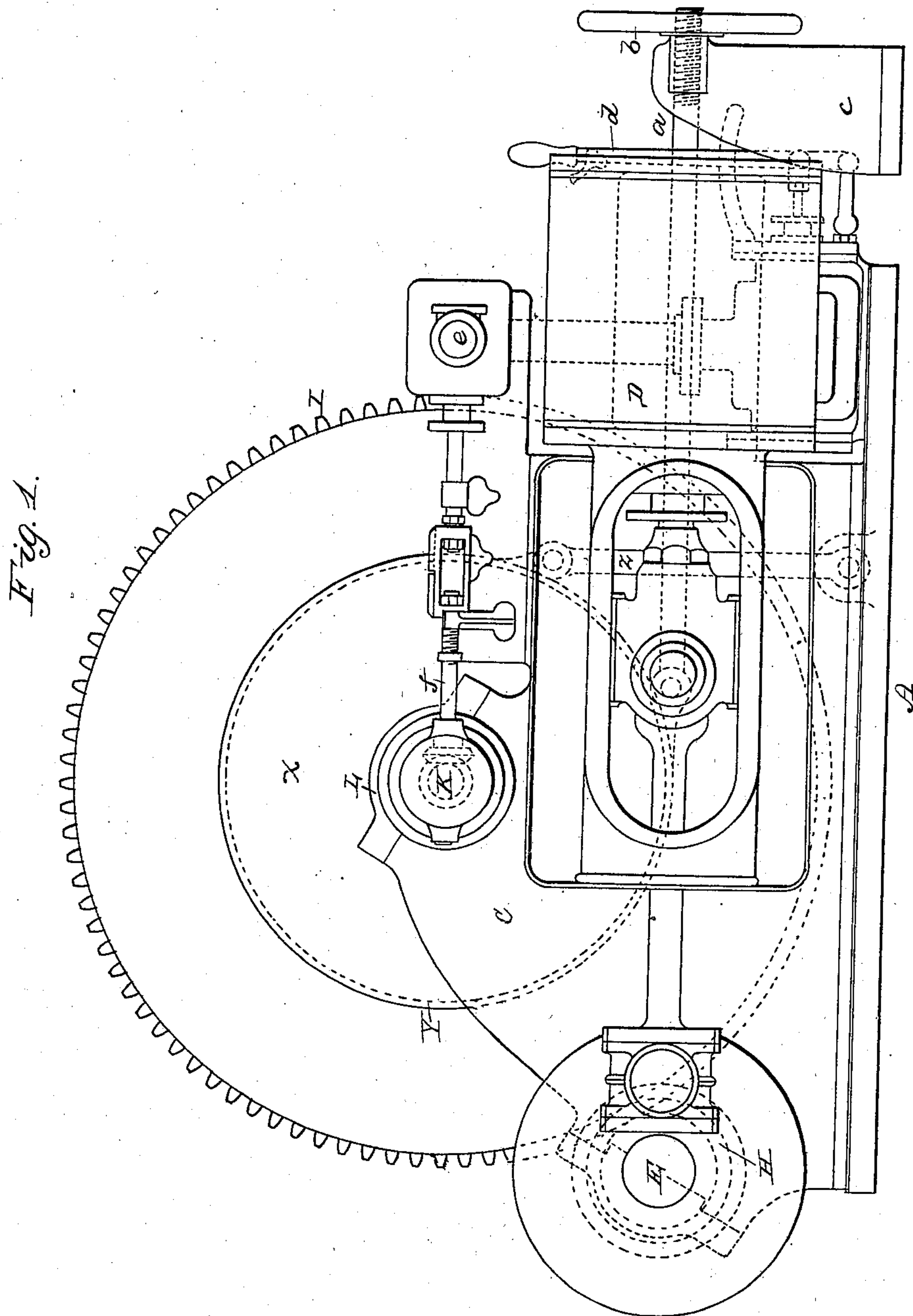
Patented Sept. 9, 1902.

F. S. MANTON.
WINDLASS.

(Application filed Dec. 15, 1899.)

(No Model.)

4 Sheets—Sheet 1.



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No. 708,818.

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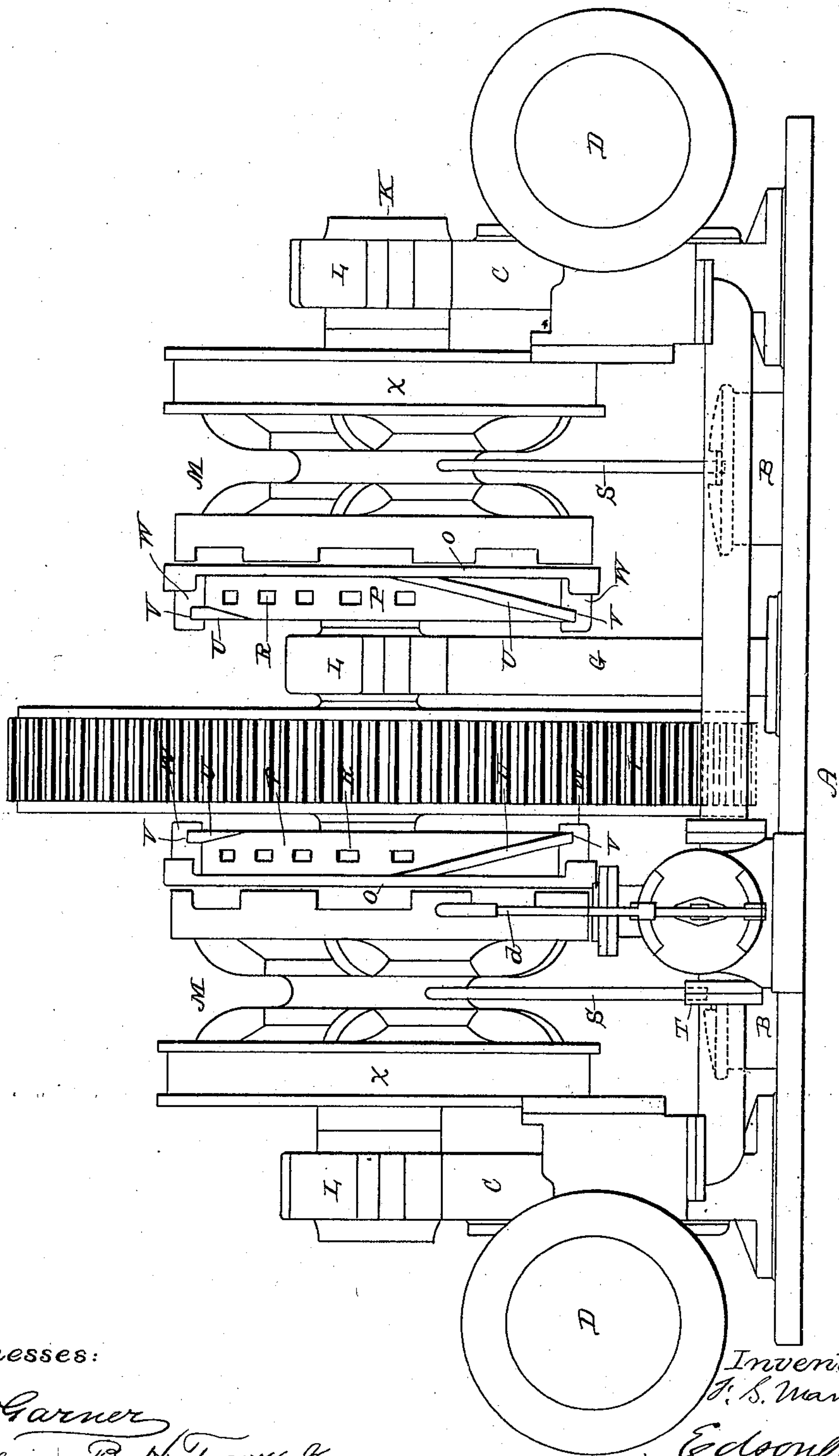
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Fig. 2.



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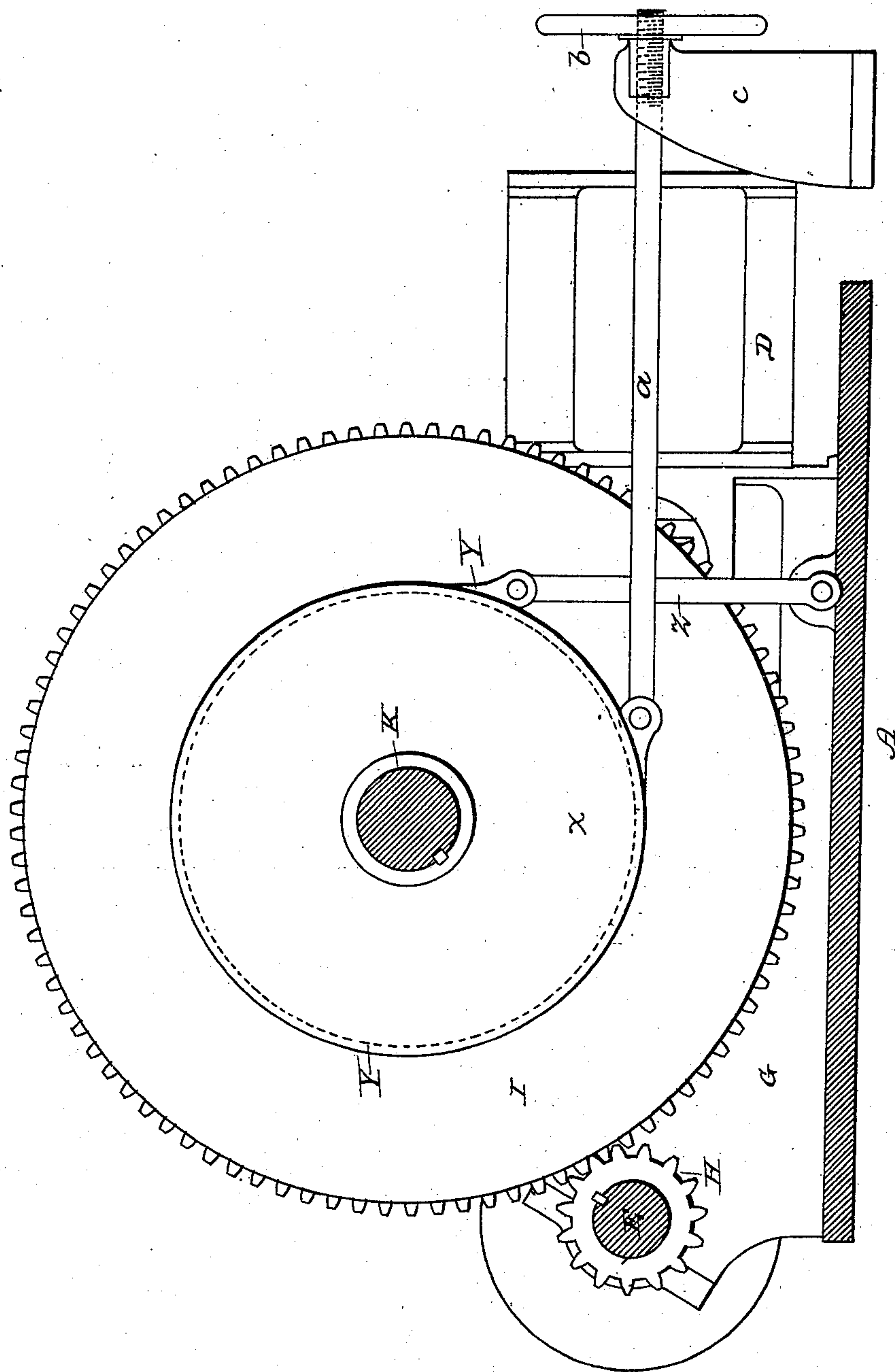
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Fig. 3.



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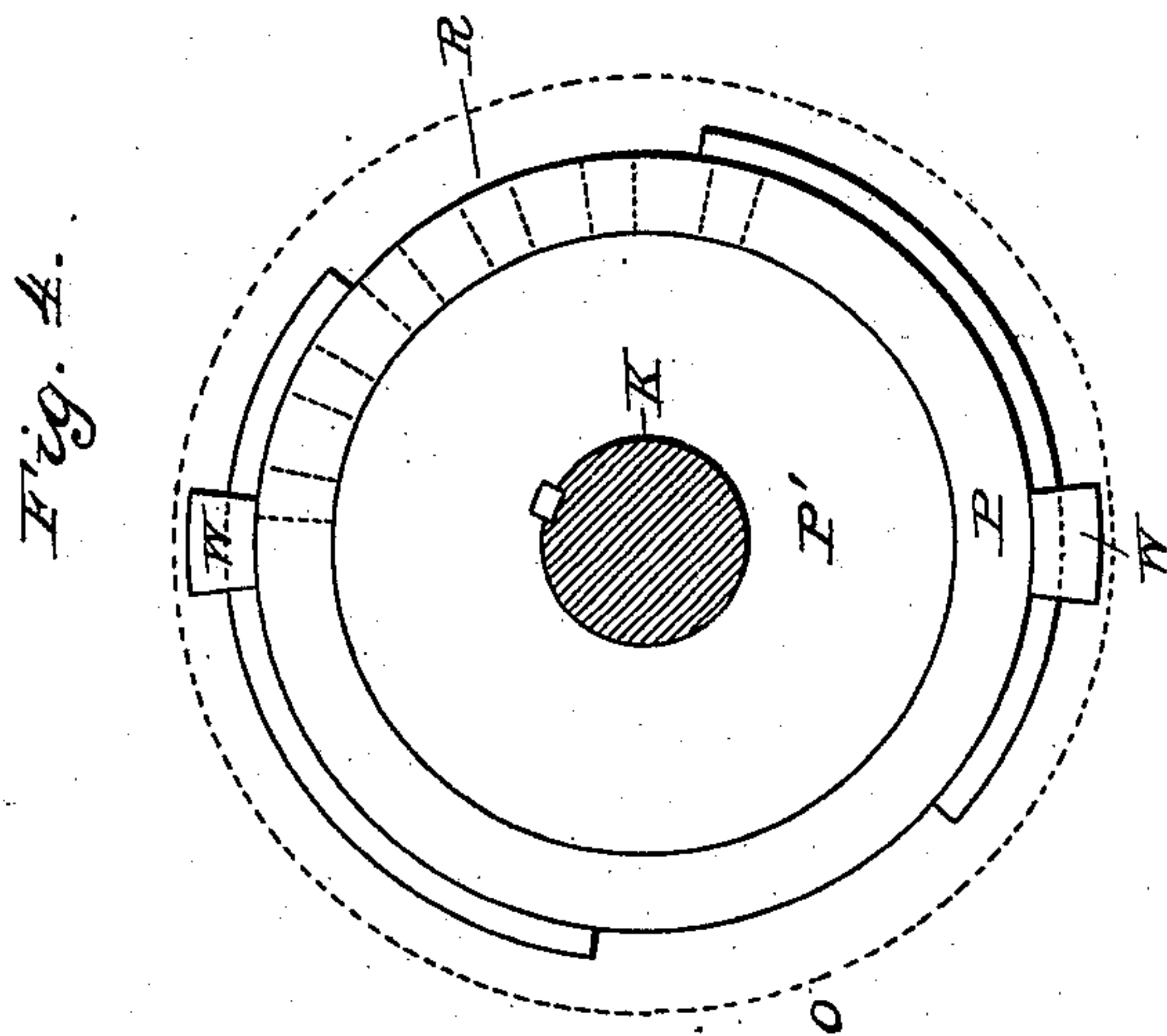
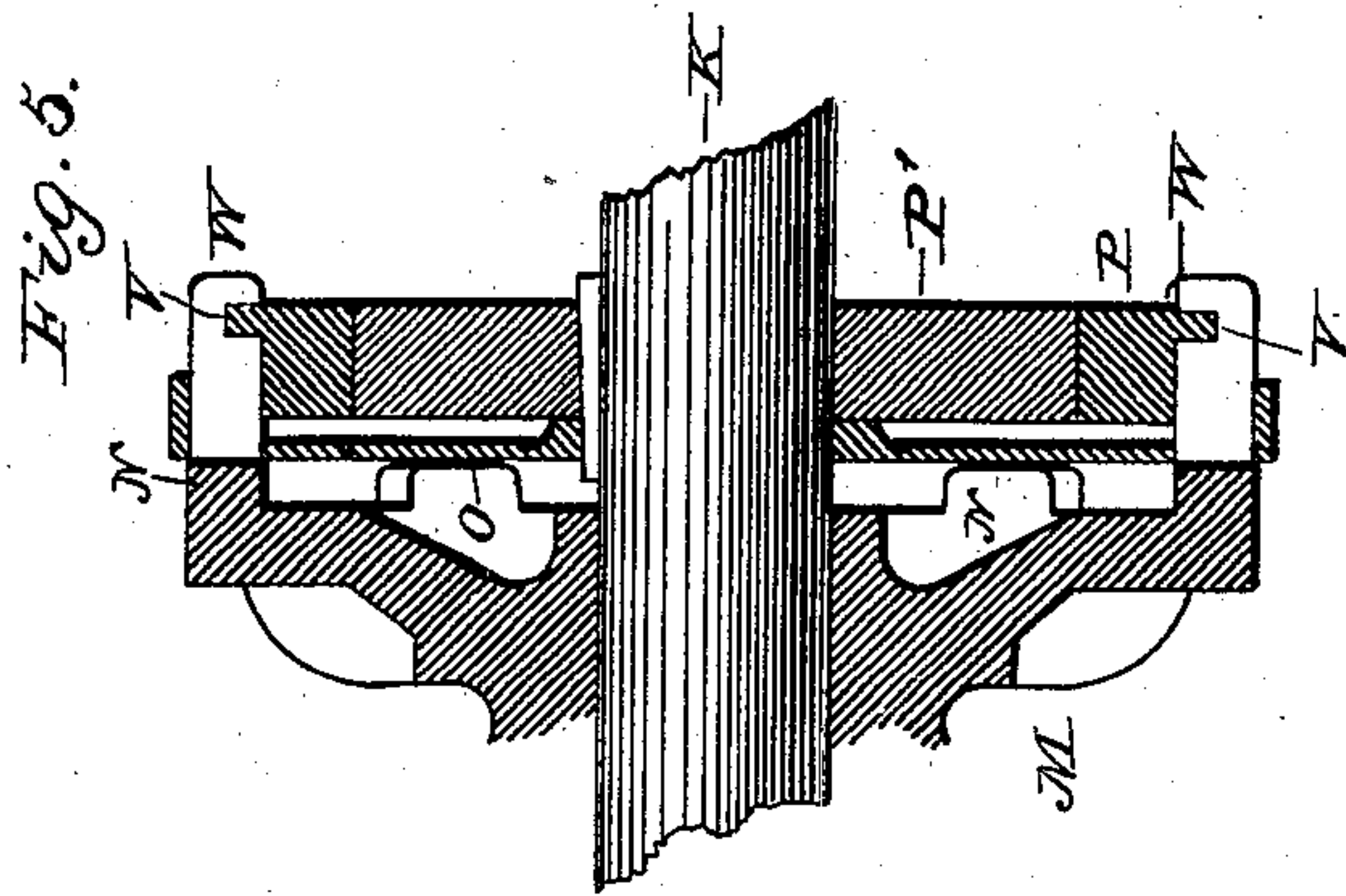
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

FRANK STEAD MANTON, OF PROVIDENCE, RHODE ISLAND.

WINDLASS.

SPECIFICATION forming part of Letters Patent No. 708,818, dated September 9, 1902.

Application filed December 15, 1899. Serial No. 740,470. (No model.)

To all whom it may concern:

Be it known that I, FRANK STEAD MANTON, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Windlasses; 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.

My invention relates to an automatic riding or anchorage windlass especially designed for handling the anchor-chains of vessels and for relieving said anchor-chains from the severe strains caused by the influence of the surging waves on the vessel when the latter is at anchor during a storm.

It has long been customary to equip vessels with elastic chain-stoppers which are capable of a limited compensating action in easing the strain on the anchor-chains when the vessel is riding out a storm at anchor; but when the strain on the anchor-chain is so severe that the yielding action of the stopper is exhausted the strain comes on the solid part of the stopper and the vessel, in consequence of which the anchor-chain parts or breaks and the vessel drifts from its moorings. In the lighthouse service this is especially disastrous, because the absence during a storm of a light-ship from its station misleads mariners at a time when the beacon-light is of service to them.

I am aware that prior to my invention various forms of windlasses for handling the anchor-chains have been proposed, and in one instance an elastic or spring mechanism has been proposed for use in connection with the windlass and a chain cable.

I am also aware that a steam-cushioned towing-machine has been proposed for use on vessels and adapted for handling a steel towing-hawser; but such a machine is not practical for use as an automatic anchorage-windlass.

In prior Letters Patent No. 562,316, issued to me on June 16, 1896, a combined towing-machine and windlass is disclosed; but this machine is so heavy, large, and cumbrous that it cannot be used successfully between decks and on a light-ship.

With the existing state of the art before me, as just briefly outlined, I sought in the present invention to provide a simple, strong, and efficient anchorage-windlass which should be practicable for use on light-ships and other vessels, which shall have its weight, height, and width so reduced as to enable its installation and successful use between decks, which shall provide for the proper handling of the port and starboard anchors of a vessel, so as to allow either anchor to be dropped or hoisted without interfering one with the other or to raise or drop the two anchors simultaneously, which makes provision for cushioning by steam-pressure the strain on either or both of the anchor-chains by the action of the engines forming an integral and indivisible part of the windlass, thus relieving the anchor-chains from the surging effects of the waves on the vessel, particularly during storms, and wholly overcoming the parting or breaking of the chains, so as to set the vessel adrift, and, finally, to bring all the parts into exceedingly compact arrangement, so that certain parts may be easily controlled or operated by hand, and it is possible to reduce the weight and dimensions of the apparatus as a whole. I have been able to secure these ends by constructing an automatic riding or anchorage windlass equipped with fluid-pressure surge-relieving mechanism and embracing a suitable bed-plate having suitable housings or pillow-blocks equipped with windlass-engine disposed on the outer sides of the opposite housings or on the opposite sides of said bed-plate, as preferred, an engine-shaft having its cranks set at different angles and journaled in one end portion of the housings or of the bed-plate and operatively connected with the two engines, a single elevated shaft parallel to the engine-shaft and geared directly thereto, a pressure-valve to one or both engines, valve-regulating mechanism controlled directly from said elevated shaft, and one or more wildcats or chain-wheels mounted directly and loosely on the identical shaft which controls the valve-regulating mechanism, said wildcat or chain-wheel adapted to be made fast to the shaft which actuates the valve mechanism by means of a clutch mech-

anism, so that the strain of the anchor-chain will be transmitted through the wildcat directly to said shaft and thence to the engines, which cushion and take up the strain elastically by fluid-pressure; but at the same time the wildcat is adapted to be unclutched from the valve-actuating shaft in order to rotate freely thereon, as is required in the operation of dropping the anchor, such rotation of the wildcat when unclutched being manually controlled by a friction-brake mechanism.

Further objects and advantages of the invention will appear in the course of the subjoined description, and the novelty will be defined more fully by the claims.

To enable others skilled in the art to understand my invention, I have illustrated a practical embodiment thereof in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of an automatic riding or anchorage windlass for vessels of any character embodying my improvements. Fig. 2 is an elevation at right angles to Fig. 1 looking from the right in said figure. Fig. 3 is a vertical transverse section through the windlass in the plane adjacent to one of the friction-brake mechanisms for one of the wildcats. Fig. 4 is a vertical transverse section through the main or valve-actuating shaft in a plane adjacent to one of the clutches by which the loose wildcat may be made fast to said shaft or be allowed to run freely thereon during the operation of "snubbing" or dropping the anchor. Fig. 5 is a detail section in the plane of the shaft and through a part of the clutch device shown by Fig. 4.

The same letters of reference indicate like and corresponding parts in each of the several figures of the drawings.

A designates the bed-plate, which is made of suitable dimensions to accommodate the several working elements of the apparatus and of the strength and weight necessary to insure stability in the service of the windlass under the most trying conditions. In order to provide for the passage of the anchor-chains, this bed-plate is provided with one or more holes, two of which are indicated by dotted lines at B B in Fig. 1, so that the chains for the port and starboard anchors may easily pass from the windlass. This bed-plate is furthermore provided with the upstanding pillow-blocks C C and G, the former of which, C C, are disposed at the side portions of the bed-plate, while the remaining block G is situated at or near the middle of the bed-plate. These pillow-blocks or housings are solid with the bed-plate, or they may be bolted to said plate, and they rise a suitable distance therefrom for the proper support of the main shaft K of the apparatus, said shaft serving the double purpose of actuating the pressure-regulating valve *e* for the windlass-engines and the means for directly supporting one or more wildcats or chain-wheels M. In view of this adaptation of the shaft K, I will here-

inafter refer to it as the "valve-actuating shaft," it being understood that this main shaft is adapted to directly carry the wildcats or chain-wheels.

The pillow-blocks C C and G are provided at their upper portions with shaft-bearings L, which are situated at the transverse middle portion of the bed-plate, at a suitable distance above the plane of the latter, and are disposed in alinement with each other, whereby the bearings L provide a substantial support for the valve-actuating shaft K. Said pillow-blocks or housings are provided at one end with other shaft-bearings disposed in a plane below that of the bearings L, and in these lower bearings is journaled the engine or crank shaft E, the latter being below and parallel to the valve-actuating shaft K. These two shafts K E are connected operatively and directly together by the intermeshing gears H I. The part H is a gear-pinion of smaller diameter than the other part I, and this small gear-pinion H is secured to the engine or crank shaft E in any approved way. The other part I is a gear-wheel of large diameter, which is made fast with the valve-actuating shaft K at the middle thereof.

On the pillow-blocks C, at the ends opposite to those upon which is mounted the crank-shaft E, are secured and made fast by any approved means the windlass-engine cylinders D D, forming an inseparable part of the improved riding-windlass. The engines are disposed on opposite sides of the bed-plate in order that the crank-shaft E may be driven with minimum strain thereon. As is usual, the engines include in their construction the reciprocatory pistons having cross-heads slidable in suitable ways, and from these cross-heads extend the driving-pitmen, which are connected with the crank-shaft E in any approved way, the cranks of said shaft E being set at different angles to the other and said cranks being located at the end portions of the engine-shaft. The engines are controlled—that is, started and stopped—through a suitable throttle-valve, (not shown,) which is adapted to be actuated by a lever *d*. In addition to the parts described the engines are equipped with a pressure-regulating valve *e*, which has connection with the engine cylinder or cylinders to control the admission of the motive fluid thereto, and this valve *e* is intended to be opened more or less by automatic devices under the action of the valve-actuating shaft *k*, which supports the loose wildcats. This automatic actuation of the pressure-regulating valve is effected by a counter-shaft *f*, (shown by Fig. 1,) said counter-shaft being constructed in sections which are coupled by suitable means and one member of said valve counter-shaft being driven by intermeshing bevel-gears (shown by dotted lines in Fig. 1) directly from an end portion of the valve-actuating shaft K, while the other member of the two-part counter-shaft *f* is connected with the pressure-regulating

valve *e*, so as to open the latter more or less, according to the axial movement of the shaft *k*.

From the foregoing description it will be noted that the gears *H I* are located at the middle of the shafts *E K*, thus leaving the opposite portions of the valve-actuating shaft (or the main shaft) *K* available for the mounting thereon of the wildcats or chain-wheels *M M*, which are adapted to handle the chains for the port and starboard anchors. These chain-wheels are loosely or idly fitted to the shaft *K*, on opposite sides of the gear *I* thereon, and said wildcats are separate from one another, so that they may be used independently for the handling of either anchor. Each wildcat is located quite near to one of the outside pillow-blocks, and on the side which faces the bearing *L* on said block *C* each wildcat or chain-wheel is provided with a brake-disk or annular brake-surface *X*, the same being fast or integral with said outer side of the wildcat. A brake-band *Y* loosely encompasses this brake surface or disk *X* of each wildcat, one end of said band being attached to a link *Z*, which is fastened to the bed-plate, while the other end of the band is pivotally connected to a straining rod or link *a*, as clearly shown by Fig. 3. This link or rod *a* extends in a generally horizontal direction outwardly from the brake and the other end of said rod or link formed with a male screw-thread, said threaded extremity of the rod passing loosely through an opening formed in the upper part of a short post *c*, which is fastened securely to the ship's deck at a point adjacent to an edge of the bed-plate *A*. A hand-wheel *b*, with a central nut or threaded opening, is screwed on the threaded end of the straining-rod *a* and is arranged to bear against the fixed post *c*, thus making provision for tightening the brake-band around the friction surface or disk *X*, whereby the brake is adapted to retard or arrest the rotation of the wildcat when the latter is unclutched from the valve-actuating shaft and is engaged in "snubbing" or dropping the anchor. The two wildcats or chain-wheels are adapted to be made fast individually to the valve-actuating shaft *K* by the manual manipulation of independent clutches which are compactly arranged in relation to the large spur-gear *I* and the wildcats themselves. These clutch devices are situated between the wildcats and the spur gear-wheel *I*, so as to take up the minimum amount of room. Each clutch device contemplates the use of the carrier-head *O* and the clutch-disk *P'*, both of which are made fast with the valve-actuating shaft in any suitable way—as, for instance, by a common key or spline, as shown by Fig. 5—although the carrier-head and the clutch-disk may be secured individually to the shaft. The carrier-head *O* lies next to the inner side or face of the wildcat, and it is provided at or near its periphery with transverse openings for the reception of the slidable bolts or dogs *W*, the lat-

ter being thus mounted in the head so as to be supported thereby and at the same time be slidable therein toward or from the wildcat *M*. That face of the wildcat which is opposed to the carrier-head *O* is provided with laterally-extending lugs *N*, which are spaced suitably on the wildcat and adapted to be engaged by the bolts or dogs *W* when it is desired to make the chain-wheel *M* fast with the valve-actuating shaft. The clutch-disk *P'* lies between the carrier-head *O* and the spur gear-wheel *I*, and on the peripheral edge of this clutch-disk *P'* is seated or mounted an axially-turning clutch-shifter *P*, which is in form of a ring that is operatively connected with the series of bolts or dogs *W*. This ring forming the clutch-shifter is provided with spiral ribs or cam-fins *U*, which project from the ring and are disposed in inclined directions across the same, and these ribs or fins are snugly fitted in grooves or notches *V*, which are provided in the inner ends of the bolts or dogs *W*. The ring *P* is furthermore provided with a plurality of radial sockets *R*, so disposed that they will avoid or clear the cam-ribs, and into one or the other of the sockets *R* is adapted to be thrust a hand-bar *S*, one of which is provided for each clutch. These hand-bars *S* are kept in positions adjacent to the clutches by thrusting them into sockets *T*, which are provided in the bed-plate *A*. While I have shown and described one specific form of clutch mechanism adapted for manual control or operation, it is evident that other forms of clutch devices may be adopted, although practical experience has shown that this special type of clutch just described is especially useful in machines of this character.

It is to be observed that the valve-actuating shaft *K* has all the parts disposed in exceedingly compact relation thereon or thereto. This compact disposition of the mechanisms and the absence of any and all contrivances which do not have any necessary relation to an anchorage-windlass enables me to reduce the essential parts to the fewest possible number, to very materially lessen the height, width, and length of the apparatus, to avoid the cumbersome and heavy construction of the apparatus, and, what is very important in an apparatus of this character, to materially reduce the weight of the machine as a whole, thereby making said machine especially adaptable to installation between the decks of a lightship or other vessel.

The improved windlass is intended to be secured firmly to the deck of a ship across its longitudinal axis, and thus the two wildcats are placed in positions for handling the chains of the port and starboard anchors, said chains being free to run through suitable hawser-holes and through the chain-holes *B B* in a bed-plate *A*. Either or both of the wildcats may be used, according to whether or not the port and starboard anchors are dropped. When it is desired to cast one anchor, the

clutch of the wildcat devoted to that anchor is operated so as to withdraw the dogs or bolts W from the lugs of the wildcat, and the brake is then operated so as to control the rotation of the wildcat. By thus operating the clutch the wildcat is free to turn idly on the shaft K without bringing into service the engines D, and the presence of the brake enables the attendant to retard or arrest the wildcat, so as to control the paying out of the anchor-chain. After the anchor shall have been cast the clutch is operated to again make the wildcat fast with the shaft K, and the brake at the same time is replaced. The strain on the chain which is coiled or wound on the wildcat is transmitted by the latter directly to the shaft K, which in turn transmits the strain to the engine-shaft E, and the latter operates to transmit the strain to the engine's pistons, which are cushioned by the fluid-pressure in the cylinders. The axial rotation of the shaft K under the strain of the anchor-chains on the wildcat serves to operate the counter-shaft *f* in a manner to open the regulating-valve *e* and admit more steam to the engine-cylinders under an increase in the strain on the anchor-chain; but when the strain is eased the engines turn the shaft E in an opposite direction, which imparts a corresponding movement to the valve-actuating shaft K, thus taking up the slack in the anchor-chain and operating-valve *e* to reduce the area of its ports, and consequently reduce the admission of steam to the cylinders. By this operation of the parts the anchor-chain is paid out under an increased strain due to the surging of the vessel when riding at anchor in a storm; but when the strain eases the anchor-chain has its slack taken up by the action of the engines, whereby the motion of the wildcat is compensated for by the automatic operation of the fluid-pressure cushioning mechanism. It is evident that either of the wildcats and the anchor-chains may be used in the manner described or that both of the anchors and the wildcats may be in service at one time, the engines being of the capacity necessary to cushion the strain on both of the anchor-chains. When one of the anchors shall have been dropped and the wildcat is clutched to the shaft K, so as to be cushioned by the engines, the other anchor can be easily brought into service by first releasing the other wildcat from the shaft K by the operation of the clutch and then using the brake for the wildcat so released, the last-mentioned wildcat being free to turn on the shaft K and to be controlled by its individual brake. After the second anchor shall have been cast the brake is released and the clutch operated to make said second wildcat fast with the shaft, thus placing the two wildcats and the anchors under the control of the engines. The anchors may be raised separately or simultaneously by the operation of the engines to drive the shaft E, and thereby turn the shaft K to pro-

pel one or both of the wildcats, according to the conditions of the service.

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

1. An automatic riding or anchorage windlass equipped with surge-relieving mechanism and comprising a main shaft serving as a valve-actuating shaft, an engine, an engine-shaft geared to the main or valve-actuating shaft, a pressure-valve having means controllable by said valve-actuating shaft to vary the fluid-pressure in the engine, a wildcat or chain-wheel mounted directly and loosely on the valve-actuating shaft and capable of turning freely thereon in paying out the anchor-chain, and a clutch for making said wildcat fast directly to the valve-actuating shaft and causing the latter to directly transmit the strain to the engines and to actuate the pressure-valve.

2. An automatic riding or anchorage windlass equipped with surge-relieving mechanism and comprising a main or valve-actuating shaft, an engine, an engine-shaft geared to the first-named shaft, a pressure-valve controllable by said main or valve-actuating shaft, a wildcat or chain-wheel mounted loosely and directly on the main or valve-actuating shaft and free to rotate idly thereon in paying out the anchor-chain, a clutch for making the wildcat fast with said shaft, and a brake operatively related to the wildcat and adapted to control the latter when free from the valve-actuating shaft; said clutch and the brake being operable separately, and the clutch remaining in service with the wildcat when the latter turns the main shaft under the strain on the anchor-chain.

3. An automatic riding or anchorage windlass equipped with surge-relieving mechanism and comprising a main or valve-actuating shaft, an engine-shaft geared to said first-named shaft, the engines, a pressure-regulating valve controlled by said main shaft, the port and starboard wildcats mounted individually and loosely on the valve-actuating shaft and each adapted to turn idly thereon in paying out an anchor-chain, separate clutches operatively related to the main shaft and the wildcats and adapted to individually make the latter fast to said shaft, and separate brake devices in operative relation to the individual wildcats to control the latter when free from said valve-actuating shaft.

4. An automatic riding or anchoring windlass equipped with surge-relieving mechanism and comprising a main or valve-actuating shaft, the engines, an engine-shaft driven by said engines, the centrally-disposed gears on said shafts, a pressure-regulating valve controllable by said valve-actuating shaft, the port and starboard wildcats independently and loosely mounted on said valve-actuating shaft and disposed on opposite sides of the gearing, each wildcat adapted to turn freely on said shaft, clutches fast with said valve-

actuated shaft and having operative relation to the individual wildcats for individually making the latter fast with said shaft, and separate brake devices operatively fitted 5 to the separate wildcats and arranged to retard or arrest the latter when unclutched from said valve-actuating shaft.

5. An automatic riding or anchorage windlass equipped with surge-relieving mechanism and comprising a main or valve-actuating shaft, the engines, an engine-shaft having a central pinion meshing with a like gear on the main shaft, a pressure-regulating valve controllable by the valve-actuating shaft, the 15 port and starboard anchor wildcats fitted loosely on the valve-actuating shaft on opposite sides of the gear thereon, each wildcat

provided on one side with a brake-surface and on its opposite side with clutch-faces, movable brake elements operatively related 20 to the brake-surfaces of the wildcats and arranged to separately control the same, and clutch devices mounted on the valve-actuating shaft between the gear thereon and the separate wildcats, each clutch device having 25 movable dogs arranged to engage the clutch-faces of the wildcats and to individually make the latter fast with the valve-actuating shaft.

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

FRANK STEAD MANTON.

Witnesses:

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GEORGE S. LINCOLN.