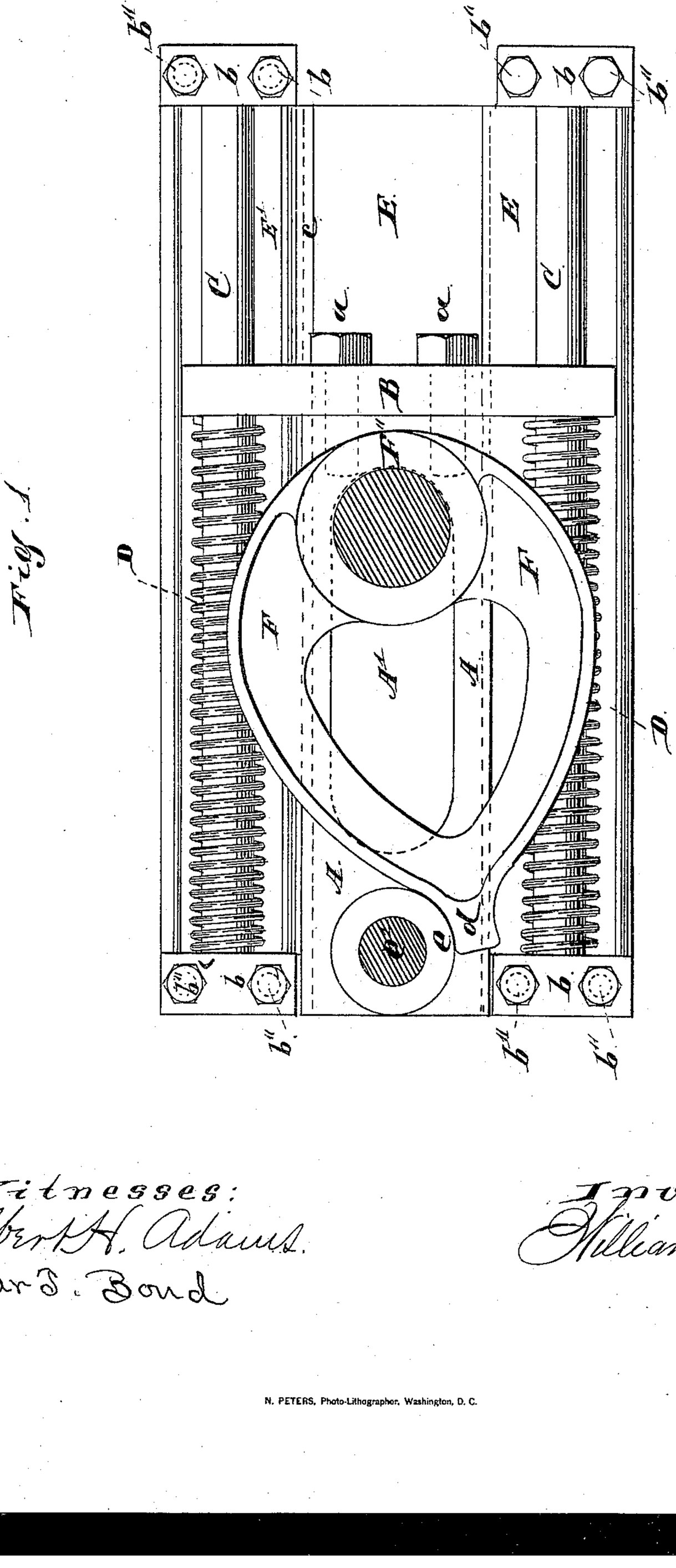
(No Model.) 4 Sheets—Sheet 1.

# W. H. CLARK.

## CUSHIONING DEVICE FOR SHAFTS.

No. 299,113. Patented May 27, 1884.

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Edgar J. Bond

Inventor:
William H. Clark

(No Model.) 4 Sheets—Sheet 2.

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## CUSHIONING DEVICE FOR SHAFTS.

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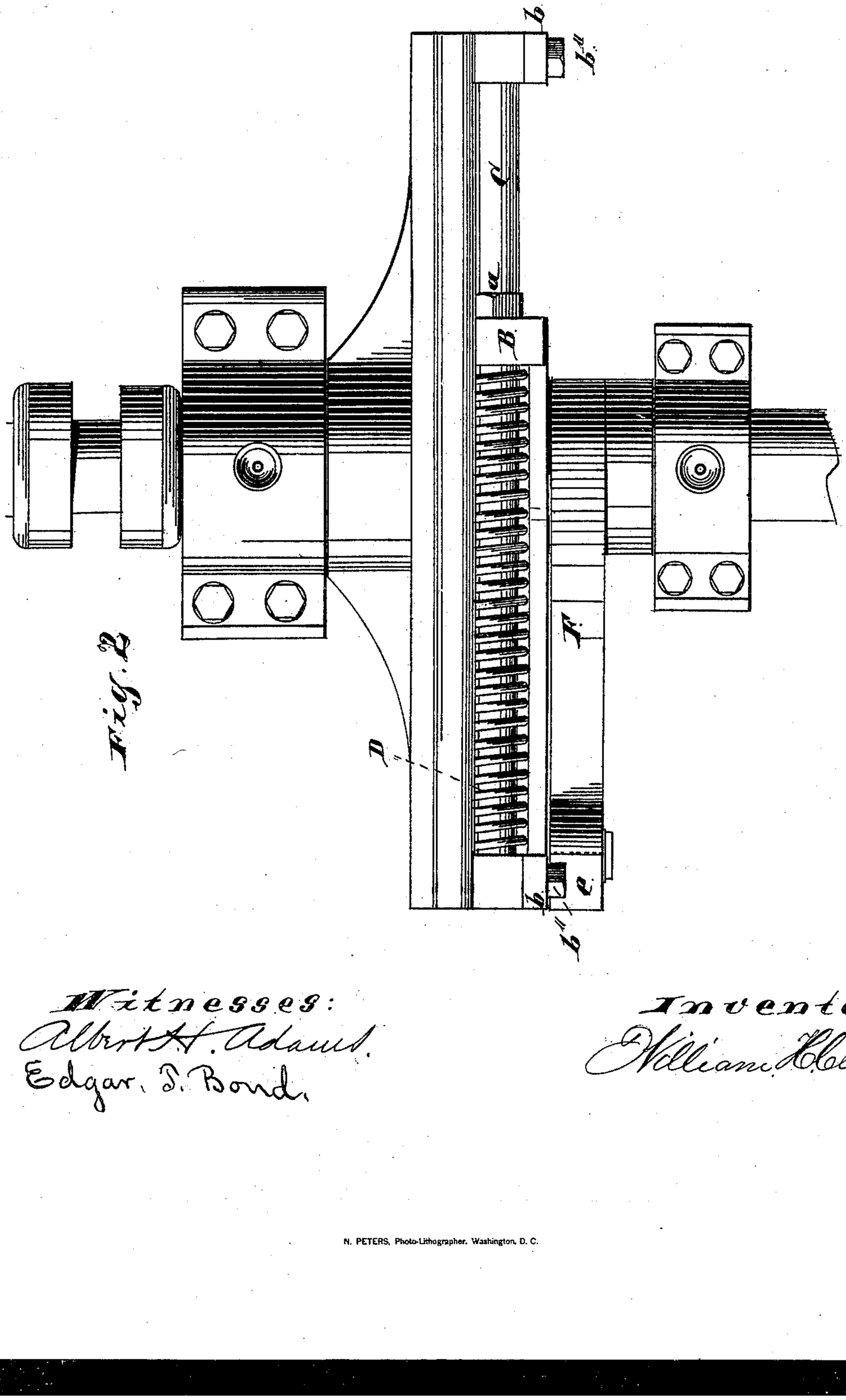


Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

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Fig. 4.

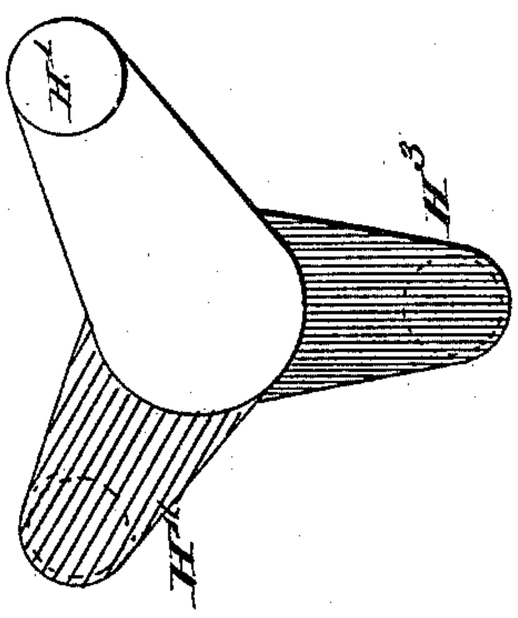
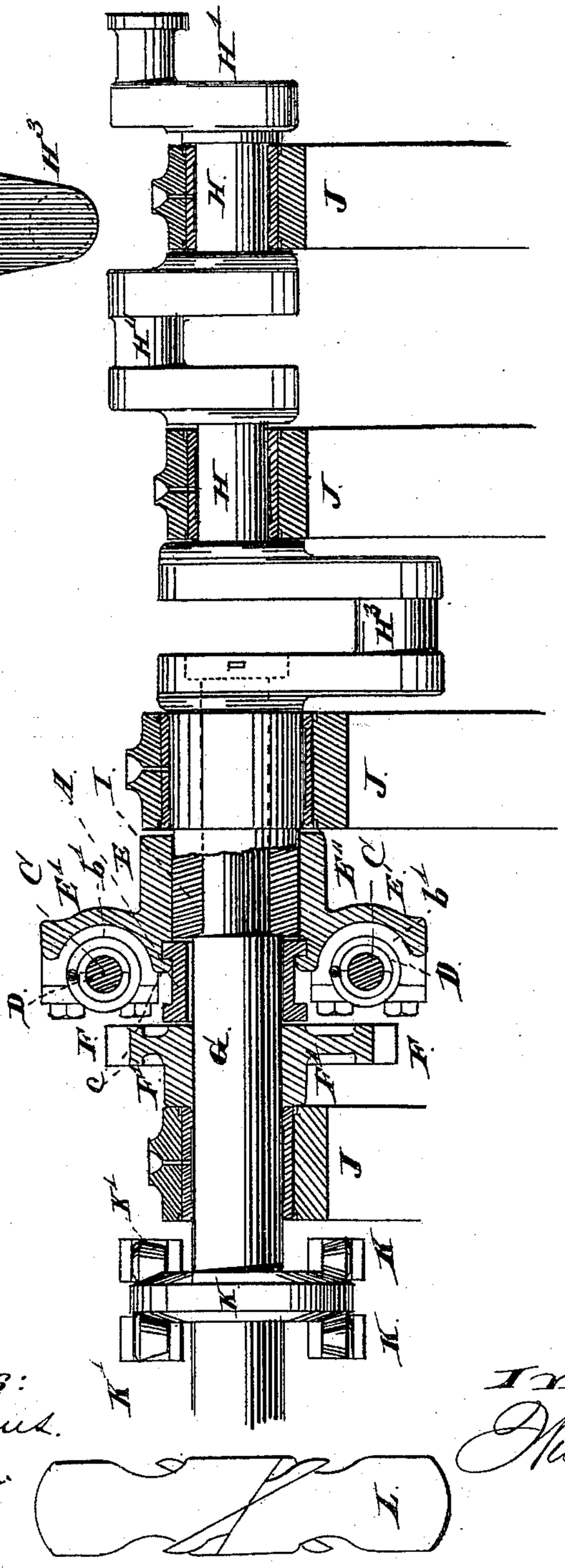


Fig. 3.



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(No Model.) 4 Sheets—Sheet 4.

# W. H. CLARK.

## CUSHIONING DEVICE FOR SHAFTS.

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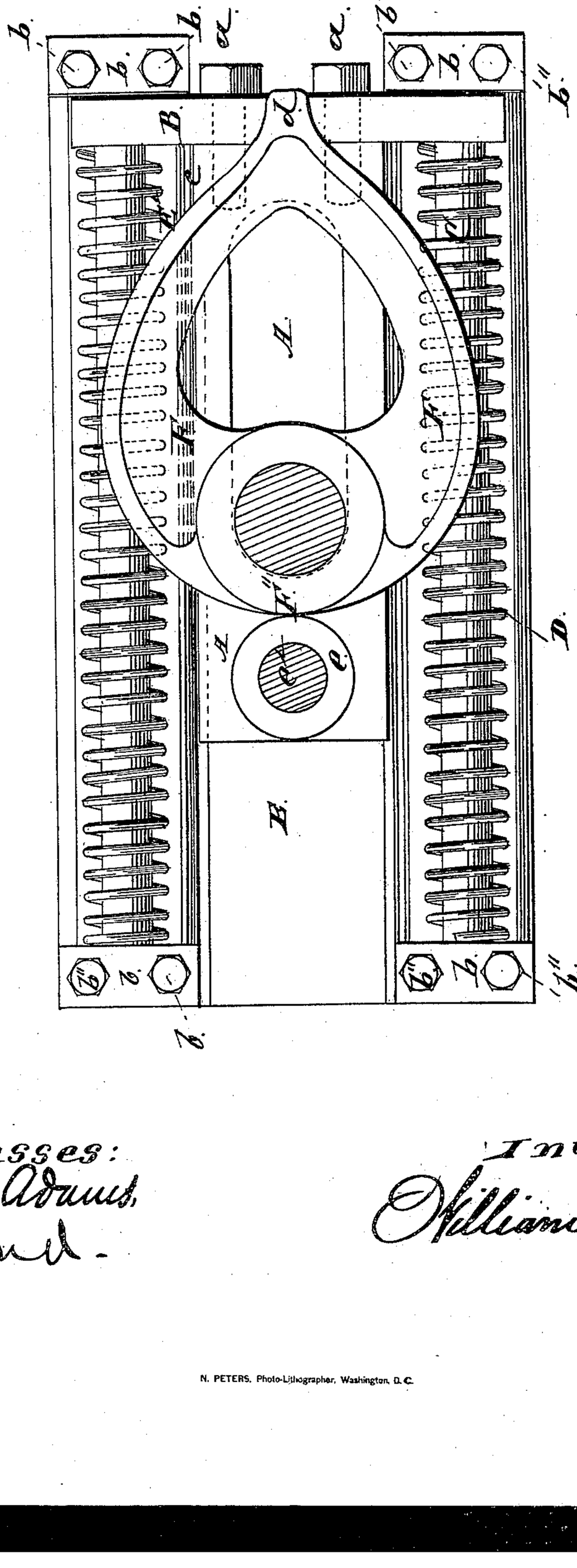
Fig. 5.

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Inventor:
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# UNITED STATES PATENT OFFICE.

WILLIAM H. CLARK, OF CHICAGO, ILLINOIS.

## CUSHIONING DEVICE FOR SHAFTS.

SPECIFICATION forming part of Letters Patent No. 299,113, dated May 27, 1884.

Application filed August 6, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. CLARK, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented new and useful Improvements in Cushioning Devices for Shafts, &c., of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is an end elevation of the cushioning devices, showing the shaft in section; Fig. 2, a top or plan view of the cushioning devices, showing the shaft broken off at both ends; Fig. 3, a longitudinal section of the bearings for the shaft and the cushioning devices, showing the shaft in elevation and a screw for a propeller; Fig. 4, an elevation of the crank end of the shaft. Fig. 5 is an end elevation of the cushioning devices, showing the shaft in section, and showing the parts in the position they occupy when in their normal condition, or under no strain, Fig. 1 showing them in the position they occupy when under strain.

The object of this invention is to prevent the shock and strain on an engine and driving devices consequent on meeting the resistance, and it is primarily designed for use on screw-driven steamers, but can be used in connection with other machinery and for other purposes; and its nature consists in providing a cushion located between the power and the load, and arranged to take the resistance of the load and prevent its transmission to the power except in such gradual manner as not to be felt, thereby relieving the power-transmitting devices from the strain and resistance of the load.

In the drawings, A represents a metal plate having a central longitudinal opening, A′, of width sufficient for the passage of the driving-shaft.

B is a cross-bar or plate, secured to one end of the plate A by bolts or screws *a*, or in any other suitable manner.

C represents guide-rods, one on each side of the sliding plate A, each rod passing through a suitable opening in the cross-bar B in such manner as to leave the cross-bar free to slide on the rods.

D represents coiled springs, one on each rod C, and located around its rod below the cross-bar B.

E E′ represent a backing or supporting plate, the central portion, E, of which forms a bearing-surface for the plate A, which plate is held in position by recesses formed by flanges *c*, so as to leave the plate A free to slide. The outer portions, E′, of this backing or supporting plate, as shown, are concaved or depressed for the reception of the springs D; but the entire plate E E′ might be plain on its front face, the guide-rods being set sufficiently out therefrom for the location of the springs clear of the plate. At the center of the plate is a hub or collar, E″, having an opening for the passage of the shaft, and on each end of the portions E′ of the backing-plate is a flange, *b′*, which receives the end of the rod C on each side, the fastening being completed by means of a half-box or cap, *b*, secured in place by screws or bolts *b″*, and these flanges *b′* and half-boxes or caps *b* at one end form the support for one end of the springs D, as shown in Fig. 1.

F is a cam or eccentric of a heart shape approximately, having at its apex a projection or extension, *d*, as shown in Fig. 1, and having at its base a hub or collar, F′, with a central opening for the passage of the shaft, on which shaft the cam or eccentric is secured by set-screws passing through the collar or hub F′, or by keys or any other suitable manner. The sliding plate A has a journal-pin, *e′*, at one end, on which is mounted an anti-friction roller, *e*, with which the edge of the cam or eccentric F comes in contact, so that as the cam or eccentric is turned the edge will bear on the roller and move the plate A, and, as shown, the extension *d* performs the office of a stop to limit the rotation of the cam and prevent the cam from turning completely around and passing the apex, so as to have the roller engage the opposite sides thereof, which might be the case in the event the resistance was stronger than the force of the spring.

G is the driving-shaft, which, as shown, is the shaft for driving a propeller-screw, which shaft is supported in suitable bearings, as usual, and to which the cam or eccentric is se-

cured by its hub F′ in any firm manner, so that the cam and the shaft will move together.

H is the crank-shaft, having a series of cranks, H′ H″ H³, as shown.

I is a sleeve attached to or formed with the crank H³ in the form of construction shown, and having a central opening to receive the end of the shaft G, which shaft at the end is smaller in diameter than the body of the shaft. The sleeve I has secured thereto, by the hub E″, the supporting-plate E E′, and this plate is located to bring it in position for the sliding plate A to be in contact, or nearly so, with the face of the cam or eccentric F, and have the cam or eccentric be engaged by or engage with the roller *e*.

J represents bearings for supporting the crank-shaft H, and J′ one of the bearings for the shaft G. The bearing J, which is adjacent to the collar E″, has an opening of sufficient diameter for the passage of the collar I.

K is a collar located on the shaft G, and engaging with anti-friction rollers K′, arranged on each side, as shown in Fig. 3, which collar is for the purpose of receiving the end-thrust of the shaft in use and preventing damage from such end-thrust, and as many such collars and anti-friction rollers may be used as required to hold the shaft against the end-thrust.

L is a propeller-screw, which is to be secured to the end of the shaft G, as usual. The shaft G is loose in the collar I, so that the collar is free to revolve independent of the shaft, and the connection between the cranks and the shaft is made through the supporting-plate for the springs D, and sliding plate A, which is connected with the collar I through the hub E″ by set-screws, keys, or other suitable means, and the cam or eccentric F, which is secured in a like manner upon the shaft G, which cam or eccentric, by its engagement with the roller *e* of the plate A, connects the plate with the cam, and through the sliding plate A and supporting-plate therefor connects the crank with the shaft. This connection is a yielding one, and is inoperative until the power and the resistance are equalized, and in case the power and resistance are unequal the difference will be carried by the connecting devices and not be expended on the cranks or the engines or the bearings, the result being that a cushion is provided between the power and the load, which receives the resistance and compensates therefor.

The operation will be readily understood from the foregoing description, but briefly is as follows: The power applied to the cranks from the engines or other motive power is transmitted through the collar I to the supporting-plate, rotating such plate and bringing the roller *e* into contact with the face of the cam F, around which the roller travels until the resistance of the spring exerts sufficient power to force the roller into contact with the cam, to cause the cam to be rotated thereby, which rotation of the cam drives the shaft G, and the distance that the roller travels around the cam will depend upon the resistance of the load, the travel of the roller on the cam being permitted by the plate A sliding in the grooves on the supporting-plate, and in case the resistance decreases the springs will return the roller to the proper point of the plate to counteract the amount of resistance. By this arrangement it will be seen that, no matter how much the resistance or load may be varied, it will be compensated for through the cam, roller, sliding plate, and spring, which form a cushion between the power and the roller to receive the various effects of the resistance, the result being that the jar and tremble and the strain heretofore resulting when the resistance is met is entirely overcome, as the effects of the resistance are transmitted to the cushioning device instead of to the other parts.

Coiled springs are shown; but it is evident that other forms of springs could be used, and, as shown, the cam or eccentric is locked to the shaft and the resisting or cushioning devices connected with the crank; but it is evident that the location of these parts could be reversed without departing from the invention. The form of the supporting-plate and the manner of connecting the rod therewith, and of locating the coiled or other springs and arranging the sliding plate and cam, can be varied from that shown so long as these parts will perform the required office of producing a resistance or cushion between the power and the load, and these devices can be varied to suit the location of the driving mechanism and the place where used. As shown in Fig. 1, the springs or cushioning devices are in the position they occupy when under strain of considerable resistance, and as shown in Fig. 5 the parts are in their normal condition, in which case the roller *e* is engaged with the base end of the cam or eccentric F, or the eccentric stands above and clear of the roller, as the case may be; and it will be seen that no ill effects of the resistance arising from either a forward or a reverse movement of the shaft will be transmitted to the power, for the reason that the cam or eccentric, being of the same shape on both sides, will perform the required work of acting on the springs to furnish the cushioning effect, no matter in which direction it may turn, by which arrangement ill effects cannot be had with either a forward or reverse movement.

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

1. A cushioning device located between the power and the load, and operating to relieve the strain in use under varying resistance on either a forward or reverse movement of the shaft, substantially as specified.

2. A cam or eccentric, a sliding plate carrying a roller, a supporting-plate for the sliding plate, and resisting-springs for the slid-

ing plate, in combination with a driving-crank and shaft, substantially as and for the purpose specified.

3. The combination of the cam or eccentric F and sliding plate A, having the roller *e*, with resisting-springs D, and interposed between the power and the load to receive the shock of the resistance, substantially as specified.

4. The sliding plate A, carrying the roller *e*, supporting-plate E, guide-rods C, and springs D, in combination with the cam or eccentric F, and interposed between the power and the load, substantially as and for the purpose specified.

5. The sliding plate A, carrying the roller *e*, cross-head B, guide-rods C, springs D, and supporting or backing plate E E′, in combination with a cam or eccentric, F, substantially as and for the purpose specified.

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Witnesses:
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