

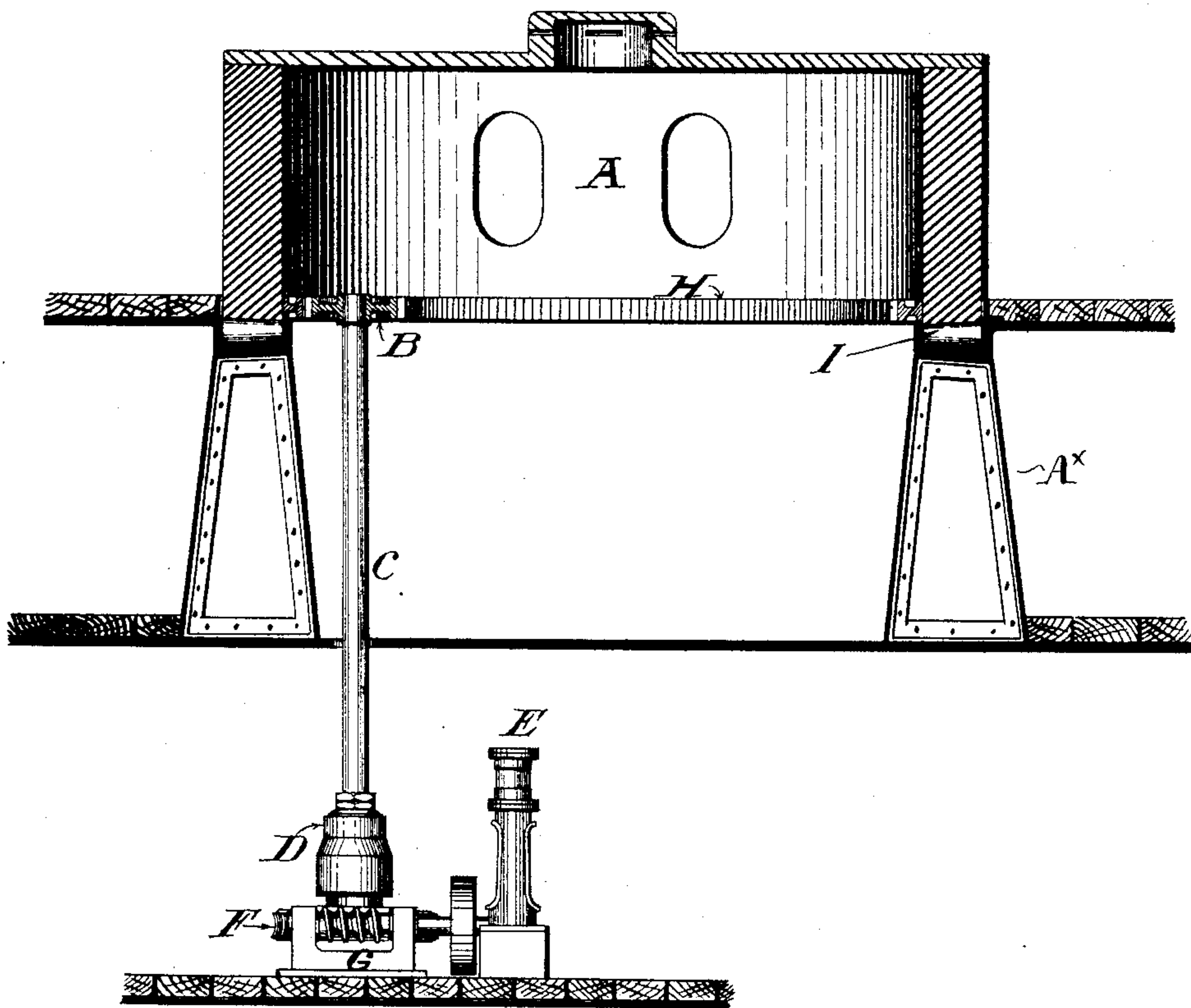
(No Model.)

2 Sheets—Sheet 1.

N. P. TOWNE.  
GUN TURRET.

No. 606,038.

Patented June 21, 1898.



*Fig. 1*

WITNESSES:

*J. Norman Dixon*  
*Thos. K. Lancaster*

*Nathan P. Towne,*

INVENTOR:

*By his Attorneys,*  
*Wm E Strawbridge*  
*Bonsau Taylor*

(No Model.)

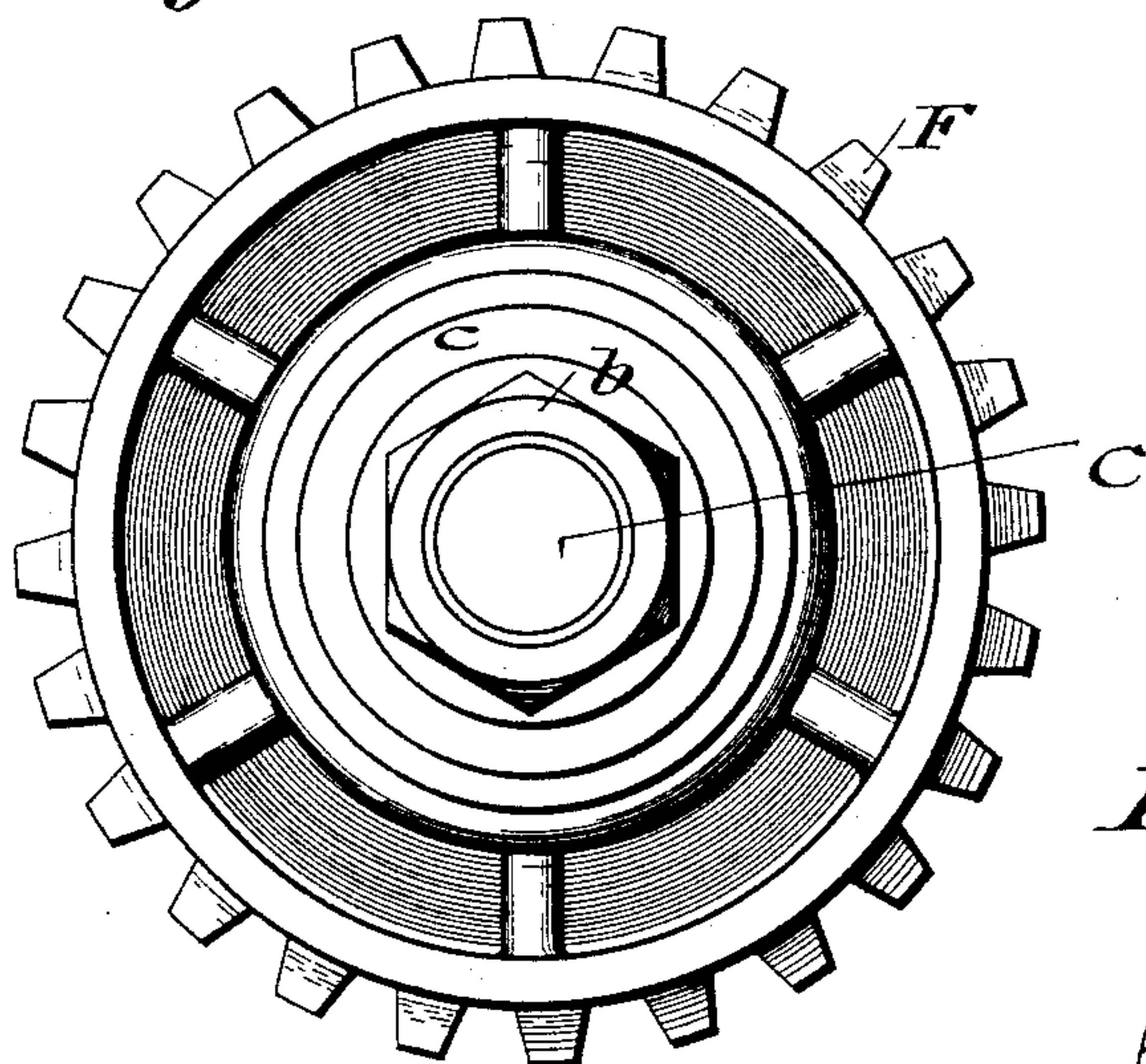
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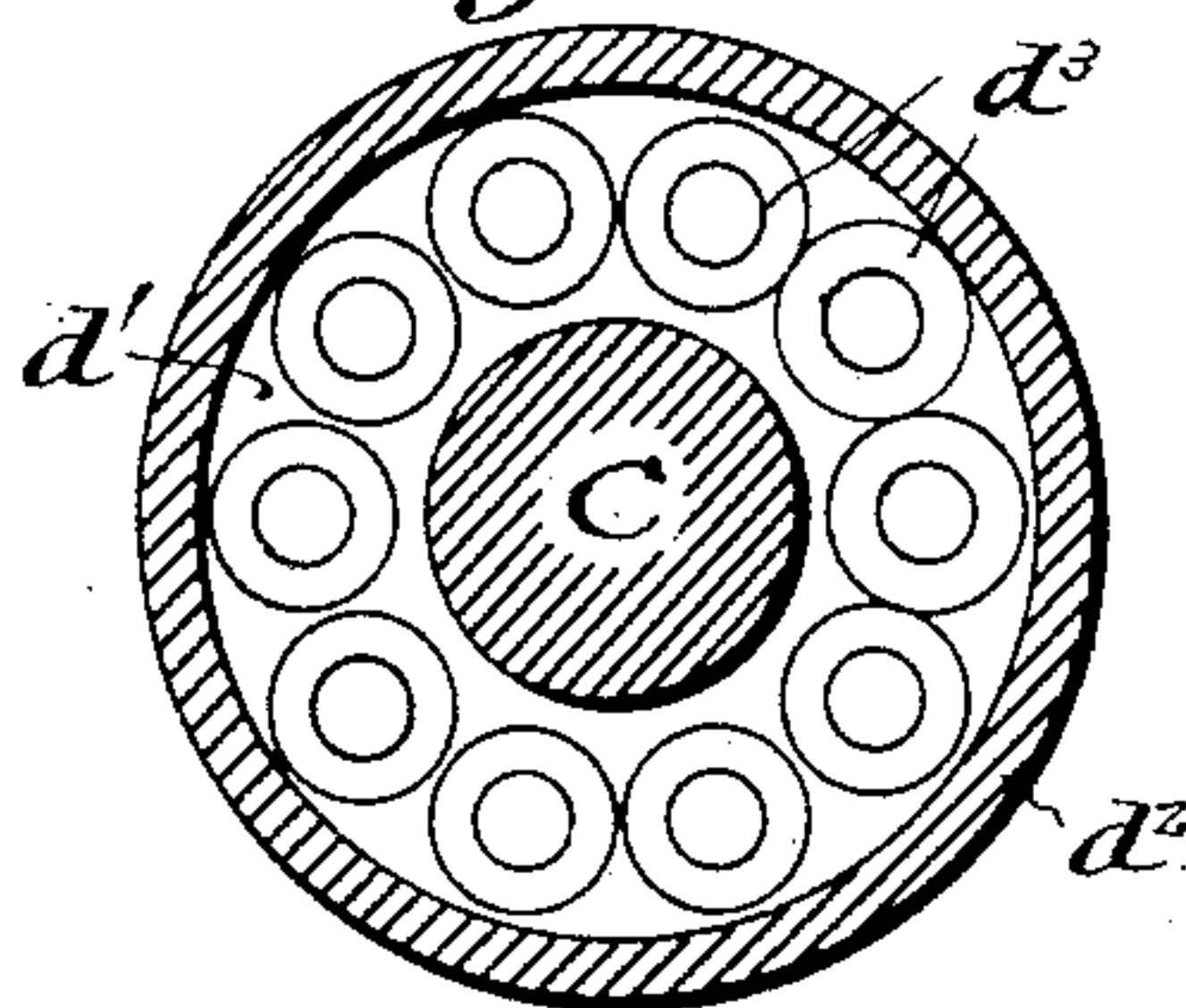
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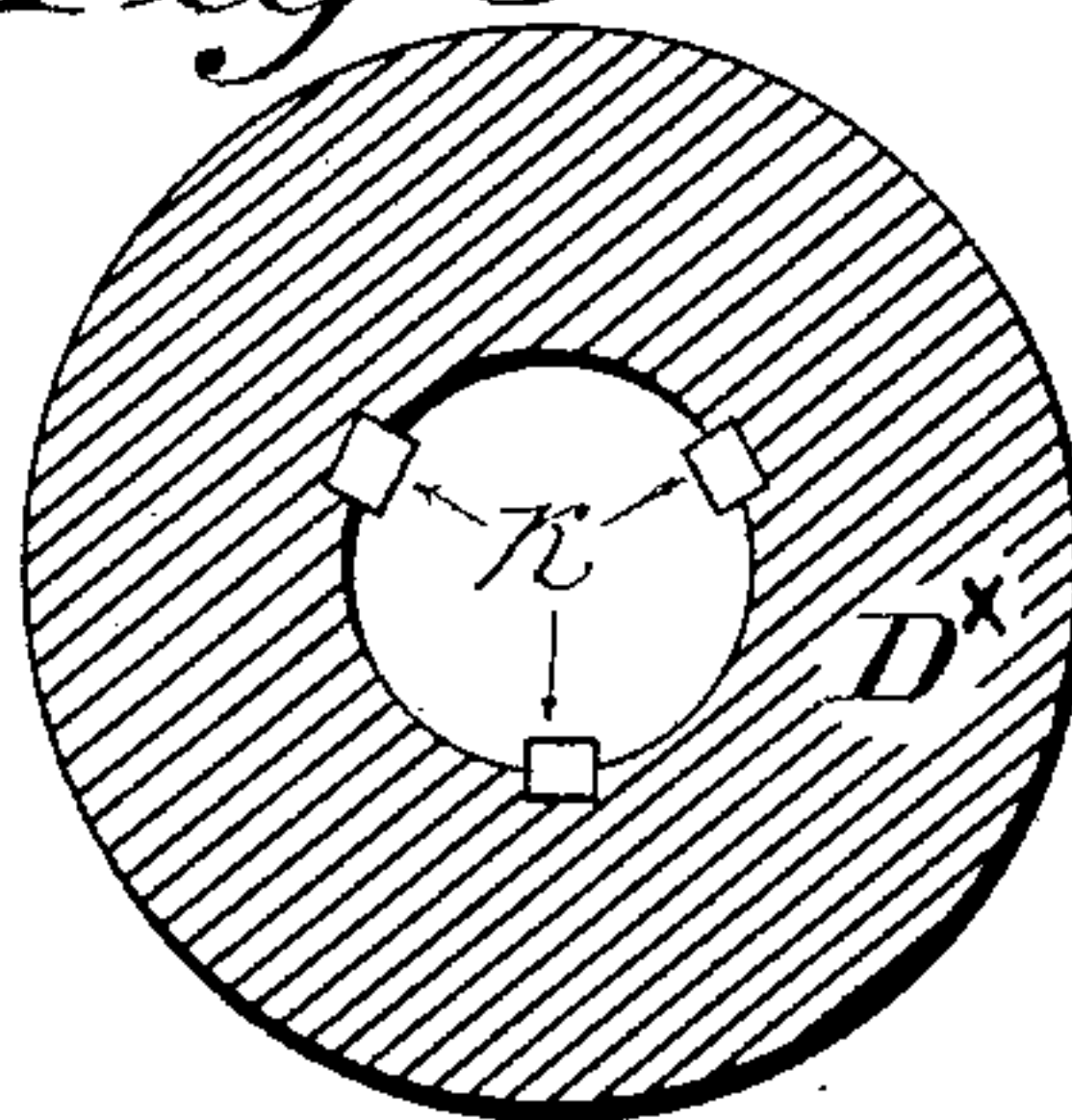
*Fig 3*



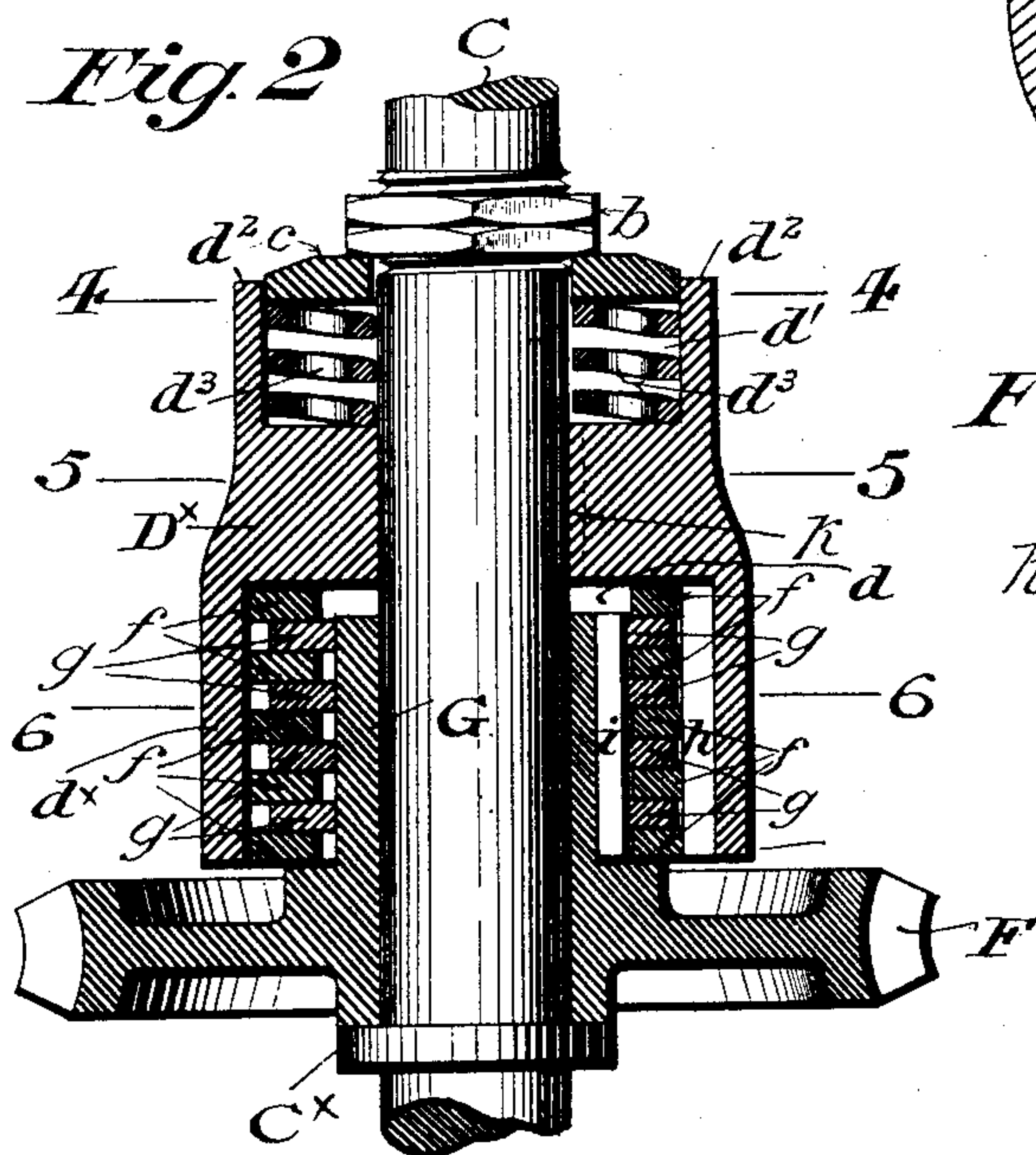
*Fig. 4.*



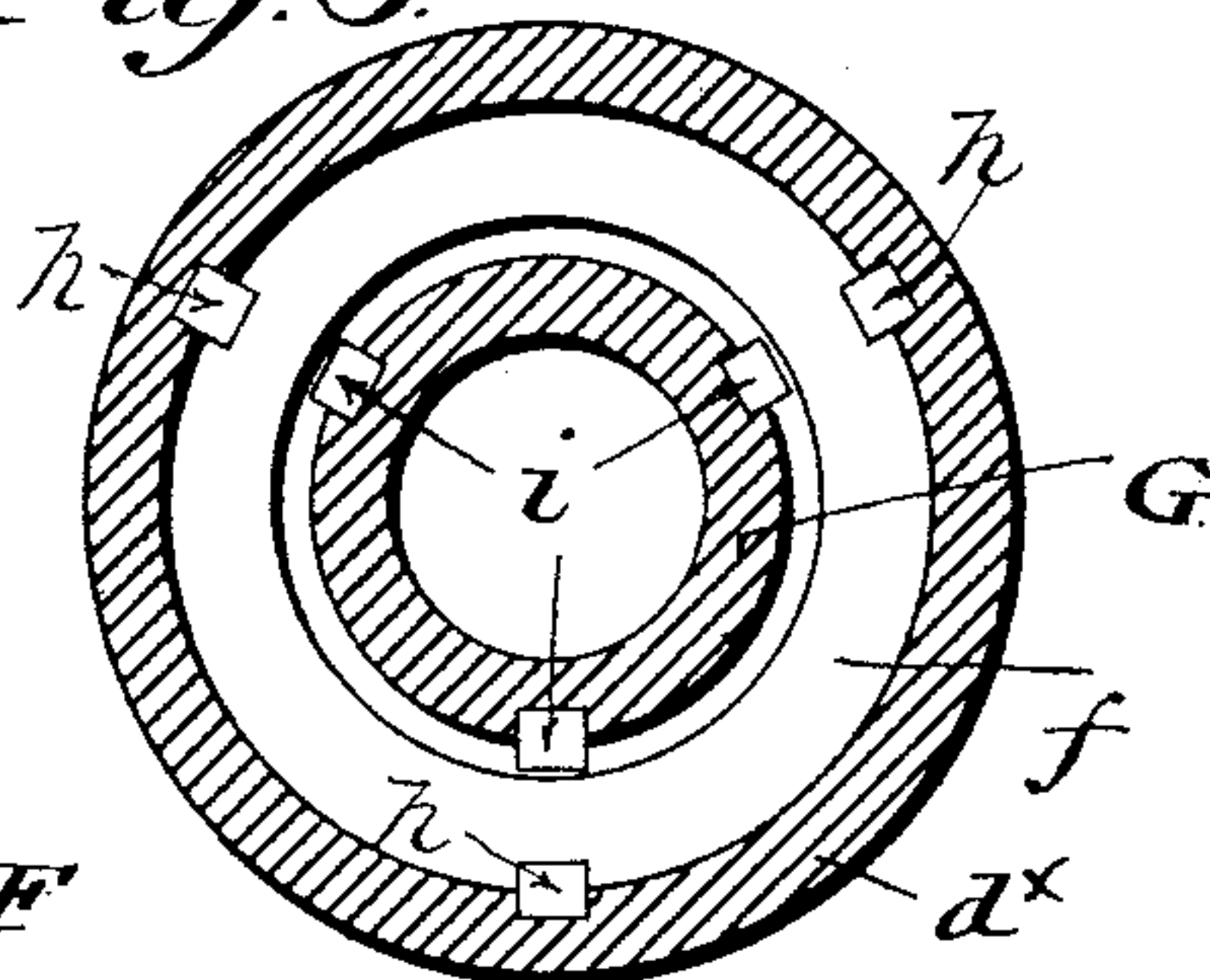
*Fig 5*



*Fig. 2*



*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

NATHAN P. TOWNE, OF PHILADELPHIA, PENNSYLVANIA.

## GUN-TURRET.

SPECIFICATION forming part of Letters Patent No. 606,038, dated June 21, 1898.

Application filed July 30, 1897. Serial No. 646,469. (No model.)

*To all whom it may concern:*

Be it known that I, NATHAN PRATT TOWNE, a citizen of the United States, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Gun-Turrets, of which the following is a specification.

My invention has especial relation and application to the class of gun turrets for ships which are driven by spur gearing applied to the periphery of the turret and which rest and run upon peripheral roller or other suitable bearings, but it also has application to turrets upon land and which when provided with laterally disposed guns are liable to rotary recoil.

Broadly stated, the object of the invention is to protect against injury the motive and the connective mechanisms of the turrets both of ships and of land fortifications.

In practice it has been found that the turrets of ships, owing not only to their own great weight and inertia but also to the eccentric disposition, so to speak, of the weight of their projecting guns, are, in the incessant shiftings of position and inclination of the vessel in a sea-way, and at times as a result of the discharge of their guns, liable to abnormal, and sometimes abrupt and violent, rotary movements or swayings in either direction, with the result that the driving mechanism by which said turrets are connected to the motor and also the motor itself, are subjected to such strains and shocks as are apt to dismantle or injure them.

The disastrous results referred to, are, moreover, especially liable to occur when the motion of a motor driven by any elastic fluid is transmitted to the turret by means of a worm-gear, or when water is employed as the prime mover in connection with any kind of gearing.

In the case of the turrets of ships, the dismantling of the motor and driving mechanism is, furthermore, peculiarly liable to occur at times when the ship is engaged in "action" or in gun practice, and the turret, in consequence, is not locked, but merely temporarily retained, in a given position, solely by means of the motor and the connecting mechanism, which must necessarily be free to occasion the next desired rotary movement of the turret,

and the dismantling of which would render the latter useless.

Inasmuch as no means have heretofore been devised by which the motor and connecting mechanism have been protected from the irregular and necessarily uncontrollable swaying or rotary movements of a turret prepared for action, under the motion of a ship in a sea-way,—or by which the same devices may be protected from the recoil of turrets upon land,—it is, as stated, the object of my invention to provide means by which the motor and connecting mechanism may be so protected,—to which end my invention comprehends the provision between the turret and motor of a connecting mechanism which includes or embodies such a yielding device as will take up, or absorb, so to speak, and at the same time limit and control, any abnormal rotary movement of the turret without permitting it to reach or affect the motor itself,—and also the provision of a locking device applied to said yielding connection for positively locking it out of action.

In the accompanying drawings I show, and herein I describe, a good form of a convenient embodiment of my invention, the particular subject-matter claimed as novel being hereinafter definitely specified.

In the accompanying drawings,

Figure 1 is an elevational view, sectional as to the turret and in side elevation as to the other devices, of a turret and a driving gear employed to rotate said turret, and shown as equipped with my improvement.

Figure 2 is a central sectional elevation through the barrel casing.

Figure 3 is a top plan view of the parts shown in Figure 2.

Figure 4 is a sectional plan on the dotted line 4-4 of Figure 2.

Figure 5 is a sectional plan on the dotted line 5-5 of Figure 2.

Figure 6 is a sectional plan on the dotted line 6-6 of Figure 2.

Similar letters of reference indicate corresponding parts.

In Figure 1 in which the parts are shown in a relationship convenient for the purpose of illustration and description, A is a turret, the annular wall of which extends below the upper level of the upper floor represented



and rests upon a series of radially disposed rollers I, arranged upon a track or way formed on or by the upper face of an annular trestle-work or framework  $A^x$ , resting upon the floor or deck beneath the floor or deck first mentioned, said turret being shown as equipped with an annular rack H secured to the inner face of its basal portion.

E is a motor of any selected character from which motion is transmitted to the turret through the worm-shaft G working in a worm-wheel F mounted upon the lower end of a vertically disposed shaft C, the upper end of which is equipped with a driving pinion B working in the annular rack H above referred to.

In the special form of gearing resorted to in the embodiment of my invention illustrated in the accompanying drawings the devices or instrumentalities adapted to effectuate the objects of my invention are disposed at the point where the worm-wheel F is mounted upon the shaft C, although it is of course to be understood that in this as well as in other forms of driving gearing to which resort may be had at the election of the constructor, said appliances may be otherwise located or disposed.

These appliances, moreover, which constitute a yielding device in the connecting mechanism between the turret and motor, may be of various constructions, a particularly good construction being that represented in the accompanying drawings, and of which the following is a description:—

The worm-wheel F, which is mounted upon the shaft C, is free, that is, not keyed or otherwise positively secured to said shaft, and rests and bears as to the lower end of its hub upon a collar  $C^x$  on said shaft C, while the upper end of the hub of said wheel F is prolonged to form a sleeve G as shown.

D is a cylindrical casing, having a cylindrical chamber  $d$  formed by the annular lip  $d^x$  at its lower end, and a cylindrical chamber,  $d'$ , formed by the annular lip  $d^2$ , at its upper end, and a central web  $D^x$  having a bearing through which the shaft extends, and which web is keyed by the keys K or otherwise fixed to said shaft, so that said casing or barrel rotates positively with said shaft, while free to move longitudinally with respect to it.

Within the annular space between the annular lip  $d^x$  of the casing and the sleeve G of the worm-wheel F, are disposed a series of friction rings  $f g$ , having flat side faces, whereby the adjacent disks may make close frictional contact with each other.

Alternate rings of the series, namely, those lettered  $f$ , are, by keys  $h$  or otherwise, common to them all, secured to the lip  $d^x$  of the cylindrical casing in such manner as to be free for vertical movement independent of the casing but to be held to positive rotation with it, while the remaining rings, namely, those designated  $g$  are, by the keys  $i$ , secured

to the sleeve G in such manner as to be free for vertical movement independent of said sleeve, but to be held to positive rotation with it.

The lowermost of the rings  $f$  rests and bears upon the upper face of the hub of the wheel F, and the upper ring of the series  $f$  is in contact with the under face of the web  $D^x$  of the casing.

As a result of this arrangement, when the wheel and the casing are forced toward each other, the rings carried by the sleeve are forced into close frictional contact with those carried by the casing, with the result that the wheel F, which is normally free to rotate upon the shaft C, is, through said frictional contact of the respective sets of rings, locked to the casing D, which is keyed to the shaft, and with the further result that rotation imparted to said wheel will be transmitted to said shaft.

In order, however, to carry the casing, which is free for longitudinal movement with respect to the shaft, yieldingly toward said worm-wheel, so that the respective sets of rings will be held in contact by a yielding spring pressure, and the connection between the wheel F and shaft C be consequently free to "give" slightly, I interpose springs  $d^3$  between the casing D and a washer  $c$ , or similar device, mounted on the shaft and held to a selected position by a jam-nut  $b$  as shown in Figure 2.

The annular chamber  $d'$  within the upper end of the casing is formed for the purpose of providing a convenient receptacle for the springs  $d^3$ , which are, as shown, arranged in a concentric series within it, with their lower ends bearing upon the bottom of the chamber  $d'$ .

The washer  $c$  is of diameter slightly less than the interior diameter of the chamber  $d'$ , so as to be capable of being, as shown in Figure 2, forced down within said chamber, to compress the springs, and is formed with a central aperture by which it is seated upon the shaft C free for longitudinal movement with respect thereto.

The shaft C is, of course, threaded for such distance as represents the desired movement of the jam nuts.

When the nuts have been screwed down to such an extent as to cause the complete compression of the springs by the washer, the result, as is obvious, will be the positive locking of the cylindrical casing, the friction disks, and the worm wheel, with respect to the shaft,—the yielding connection as an entirety thus becoming a positive locking device.

The operation of the device will be readily understood.

The rings of the casing are by the stress of the springs  $d^3$ , under the control of the jam-nuts and washer, held in such close contact with the rings of the sleeve that in the ordinary normal operation of the motor, the worm-wheel, casing, and shaft, rotate in unison.



The springs, however, although powerful, are of course capable of yielding slightly, whence it results that when the turret, in starting or stopping, or when jolted by the 5 concussion of a discharging gun, or otherwise, moves when the engine is still, or fails to start or stop synchronously with the engine, said wheel and shaft will have slight movement the one with respect to the other, thus tak- 10 ing up, or arresting, so to speak, the motion communicated to the gearing by the turret, and preventing its reaching or being transmitted to and injuring the motor.

In the drawings, I have illustrated my ap- 15 paratus, in so far as its essentials are concerned, quite fully; the details of shaft supports and bearings, and of parts of the apparatus, the construction of which has no direct bearing on the subject-matter of the in- 20 vention, are however, omitted as being within the province of the constructor and well known to those familiar with the art.

It will be understood that the details of the apparatus may be varied indefinitely, and re- 25 arranged in many different forms without departure from the spirit of my invention.

I am aware that yielding connections *per se*, of the general character of the typical connection hereinbefore described, have hereto- 30 fore been employed in connection with a motor or driving mechanism and a driven machine, for the purpose of protecting, or, so to speak, "cushioning," the machine against the initial impetus, thrust, or strain, of the 35 motor.

To such an application as the foregoing, I, however, lay no claim, as the organization in

which my improvements are embodied is not one in which the driven device requires protection from the normal operation of the driv- 40 ing device, but, upon the contrary, one in which the driving device, or motor, requires protection from the abnormal and consequently unpreventable operation of the driven device, or turret. 45

Having thus described my invention, I claim—

1. In combination, a rotatable turret, spur-gearing for rotating said turret, a motor, a connective gearing between said motor and 50 said turret, and a yielding connection applied to said connective gearing intermediate of said turret and motor which protects both the motor and the connective gearing from injury arising from the abnormal rotation of 55 the turret, substantially as set forth.

2. In combination, a rotatable turret, spur-gearing for rotating said turret, a motor, a connective gearing between said motor and said turret, a yielding connection applied to 60 said connective gearing intermediate of said turret and motor which protects both the motor and the connective gearing from injury arising from the abnormal rotation of the turret, and a locking device applied to said yield- 65 ing connection for at will positively locking it out of action, substantially as set forth.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 24th day of July, A. D. 1897.

NATHAN P. TOWNE.

In presence of—

J. BONSALE TAYLOR,  
F. NORMAN DIXON.