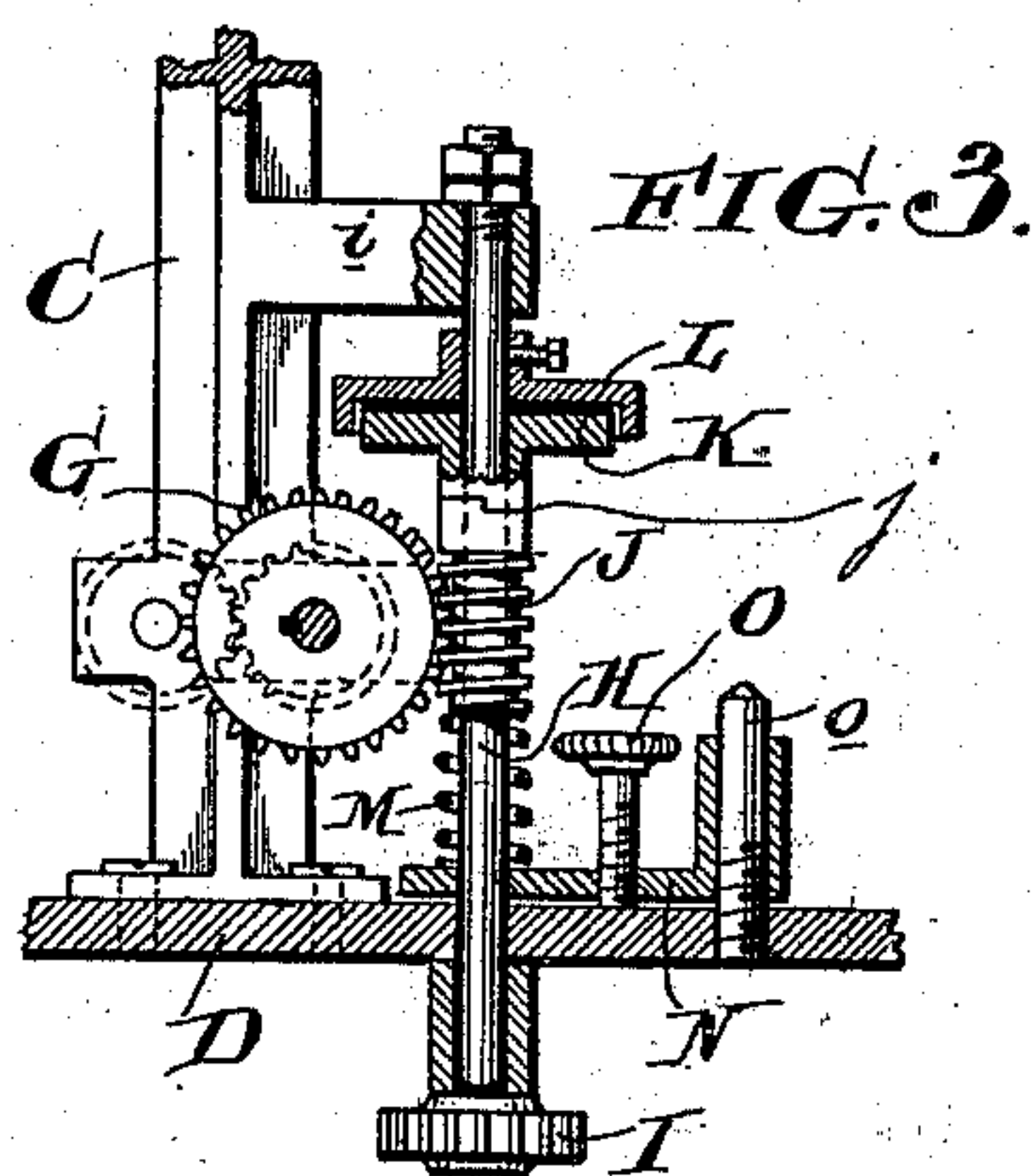
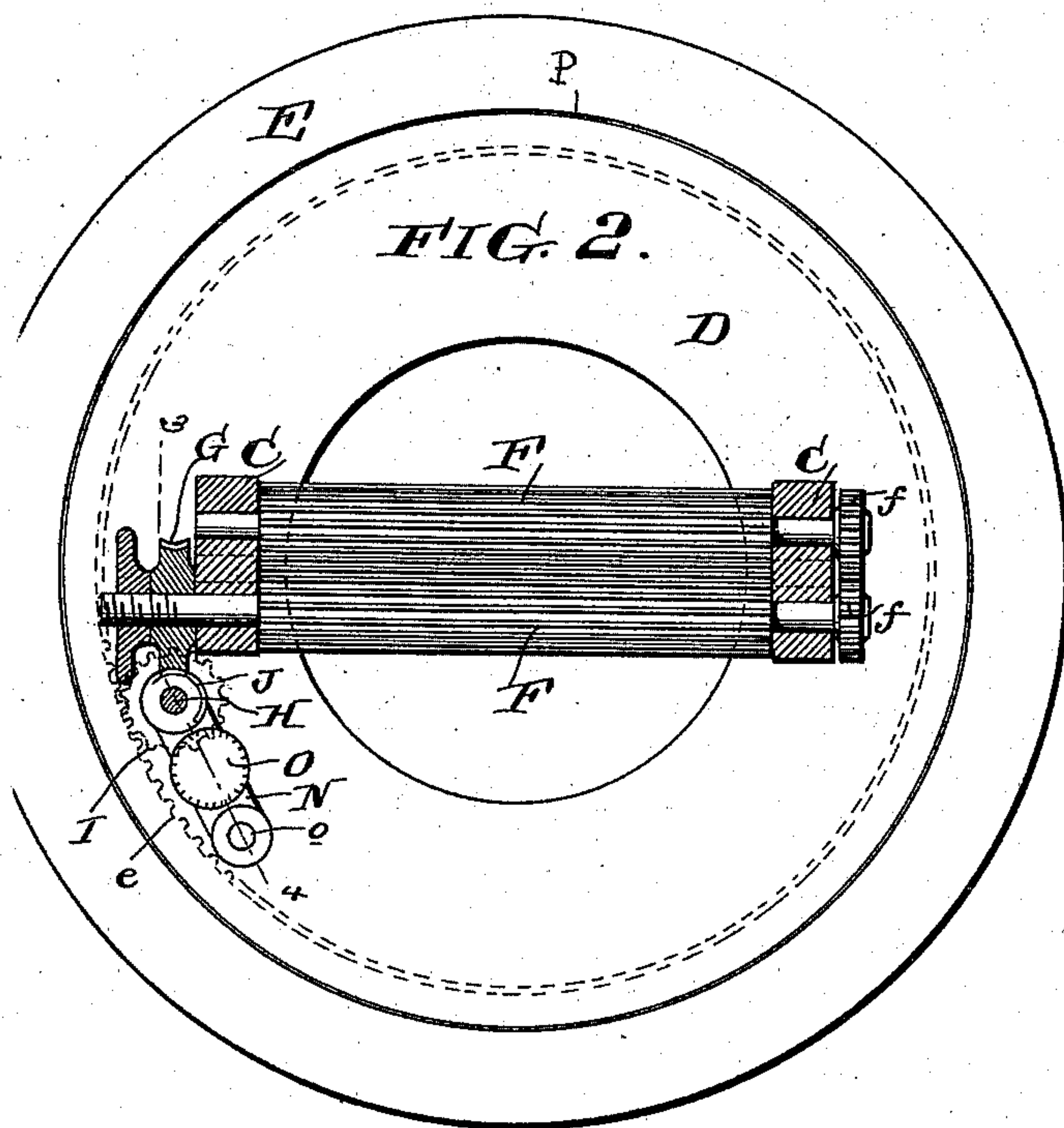
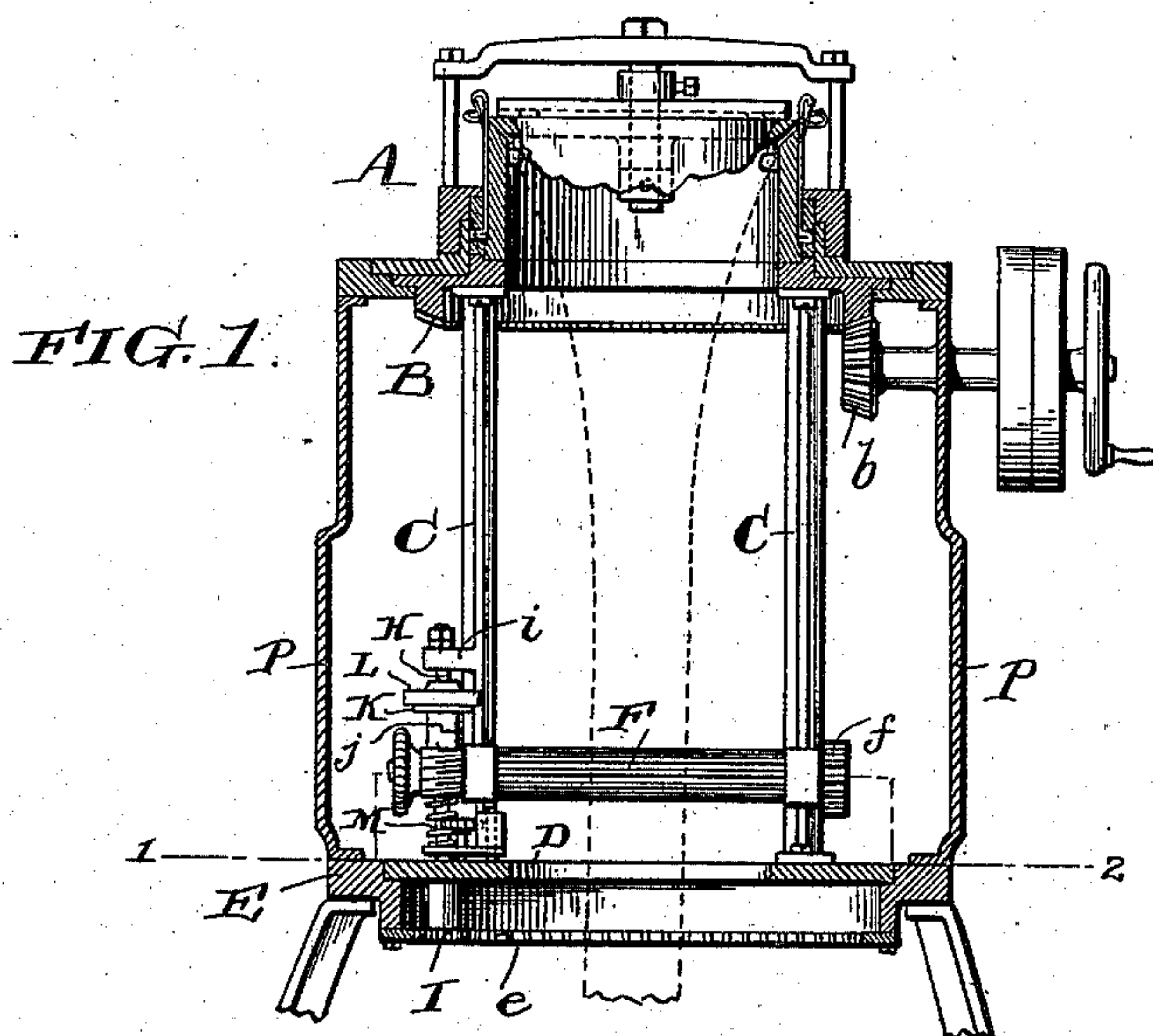


(No Model.)

A. McMICHAEL & F. B. WILDMAN.
TENSION TAKE-UP DEVICE FOR KNITTING MACHINES.

No. 535,392.

Patented Mar. 12, 1895.



Witnesses:
Henry Dwyer
S. J. Yerkes.

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Abner McMichael &
Frank B. Wildman
By their atty
[Signature]

UNITED STATES PATENT OFFICE.

ABNER McMICHAEL AND FRANK B. WILDMAN, OF NORRISTOWN, PENNSYLVANIA.

TENSION TAKE-UP DEVICE FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 535,392, dated March 12, 1895.

Application filed April 5, 1892. Renewed January 20, 1894. Serial No. 497,558. (No model.)

To all whom it may concern:

Be it known that we, ABNER McMICHAEL and FRANK B. WILDMAN, of Norristown, in the county of Montgomery and State of Pennsylvania, have invented an Improvement in Tension Take-Up Devices for Knitting-Machines, of which the following is a specification.

Our invention relates to tension take up devices for knitting machines, and consists of certain improvements which are fully set forth in the following specification and are shown in the accompanying drawings which form a part thereof.

It is the object of our invention to provide a knitting machine with automatic take up devices for taking up the knitted fabric as it passes from the knitting head so as to hold it taut and exert a uniform tension upon it, and thus dispense with the weights usually employed.

It is also the object of our invention to have these take up devices operate positively and uniformly with the operation of the knitting machine in making the fabric, so that the speed of the take up device corresponds with the speed of the machine in knitting, and also to provide devices for automatically relieving the tension of the take up whenever it becomes excessive and tends to exert too great a pull upon the fabric.

Our invention also contemplates the employment of devices for adjusting the degree of the tension or pull which may be exerted by take up devices upon the fabric before it is automatically relieved as heretofore described.

In carrying out our invention we employ the apparatus illustrated in the drawings, in which—

Figure 1 is a sectional side elevation of a knitting machine having our improved take up devices applied thereto. Fig. 2 is a sectional plan view of the same on an enlarged scale taken on the line 1—2 of Fig. 1; and Fig. 3 is a vertical sectional view of a portion of the apparatus on the line 3—4 of Fig. 2.

A is the knitting head which may be of any well known construction.

Our invention does not relate in any way to the particular form or type of knitting ma-

chine employed, and the particular construction of knitting machine shown is taken merely as illustrating a well known form of knitting machine to which our invention may be applied.

B is the rotating driving gear or rotary plate by which the knitting machine is operated through the bevel pinion *b* in the manner well known.

C, C, are vertical rods carried by the driving gear B or other part of the knitting machine rotated by it, constituting a frame for supporting the take up rollers and the mechanism for driving them.

D is a disk carried by the lower ends of the rods C, C, and supported and guided in an annular plate E below which is a stationary annular gear *e*.

F, F, are two transversely arranged rollers preferably corrugated or grooved, journaled in bearings in the rods C, C, between which the knitted fabric is fed as shown in dotted lines in Fig. 1. These rollers are geared together at one end by gears *f, f*, so as to rotate together and at uniform speed.

G is a worm wheel carried by the shaft of one of the rollers F.

H is a vertical shaft journaled in a bracket *i* of one of the rods C and having its lower end projecting below the disk D.

I is a pinion on the end of the shaft H engaging with the teeth of the stationary gear *e*.

J is a worm loose upon the shaft H and engaging the worm wheel G.

K is one member of a friction clutch loose upon the shaft H and connected with the worm J preferably through a clutch *j*.

L is a disk constituting the fixed member of the friction clutch carried fast upon the shaft H.

M is a spring acting upon the worm J to force the disk K upon the fixed disk L so that the worm will rotate with the shaft H.

N is an adjustable plate upon which this spring M bears. The plate N is free to move upon a pin *o* and may be adjusted to change the tension of the spring M upon the worm J and disk K by the adjusting screw O.

P is an outer casing which may be employed to cover and protect the take up mechanism.

From the foregoing description of the con-

struction and arrangement of the parts, the operation of the apparatus will be readily understood.

The knitted fabric extends down from the needles through the cylinder of the machine and the end is passed between the rollers F, F, which hold it firmly. As the machine operates to knit the fabric the rods C, C, and the disk D turn with the turning of the gear plate or part operated thereby and the pinion I is moved around the gear *e* and is rotated. By this means the shaft H is rotated and this, through the clutch K, L and clutch *j* operates the worm J and worm wheel G and rotates the rollers F, F, which take up the fabric as it is knitted. It will be seen that the speed of the rotation of the rollers F, F, is governed by the speed of the knitting head in operating the needles. To prevent too great tension being put upon the fabric by the rollers F, F, to the injury of the fabric or interference with the knitting operation, we employ the clutch device L, K. As will be seen this clutch device operates through the friction between the disks L and K produced by the tension of the spring M upon the loose disk K, and whenever the tension of the fabric upon the rollers F, F, becomes so great as to prevent their ready rotation the worm J is moved down upon the shaft H by the wheel G and thus moves the disk K out of contact with the disk L, thereby stopping the driving of the take up rollers. This occurs whenever the tension or upward pull upon the rollers F, F, is greater than the tension of the spring M, and by adjusting the spring M through the plate N and screw O its tension may be regulated. As soon as the excessive upward pull of the fabric upon the rollers F, F, is relieved the tension of the spring M again comes into play and raises the worm J upon the shaft H until the disk K is again brought into contact with the fast disk L.

As the slightest movement of the worm is sufficient to separate the disks K and L, it will be seen that the tension take up may be made very sensitive and the degree of sensitivity may be readily regulated by the adjustment of the spring M.

While we prefer the minor details of construction that have been shown we do not limit ourselves to them as they may be varied without departing from the invention.

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

1. In a knitting machine, the combination with the rotary driven plate of the knitting head, of a depending frame carried thereby, take up rollers carried by the depending frame, a stationary guide frame E, a disk D, carried by the depending frame, and supported and guided in the stationary guide

frame E, a stationary annular gear carried by the frame E, the shaft H carried by the depending frame, the pinion I carried by the shaft H and engaging with the stationary annular gear, and power transmitting connections between the shaft H and the take up rollers.

2. In a knitting machine, the combination of the rotary plate of the knitting head, a frame carried thereby, take up rollers carried by said frame, a stationary gear, a pinion engaging said stationary gear and carried by the frame carried by the rotary plate of the knitting head, a spring pressed worm loose on the pinion shaft, a worm wheel on the shaft of one of the take up rollers engaging the worm, a friction disk fast on the pinion shaft, and a second friction disk loose on the pinion shaft and controlled by the spring pressed worm.

3. In a knitting machine, the combination of the rotary plate of the knitting head, a frame carried thereby, take up rollers carried by said frame, a stationary gear, a pinion engaging said stationary gear and carried by the frame carried by the rotary plate of the knitting head, a worm loose on the pinion shaft, a worm wheel on the shaft of one of the take up rollers engaging the worm, a friction disk fast on the pinion shaft, a second friction disk loose on the pinion shaft and controlled by the worm, a spring acting upon the worm to hold the loose friction disk in contact with the fast friction disk, and means to adjust the tension of the spring.

4. In a knitting machine, the combination of the rotary plate of the knitting head, a frame carried thereby, take up rollers journaled in said frame, a stationary gear, a pinion engaging the stationary gear and having its shaft journaled in the frame carried by the rotary plate of the knitting head, a friction disk fast upon the pinion shaft, a second disk loose upon the pinion shaft, a worm loose on the pinion shaft and connected with the loose friction disk thereon, a spring bearing upon the worm and holding the loose disk in frictional contact with the first disk on the pinion shaft, a worm wheel on the shaft of one of the take up rollers engaging the worm on the pinion shaft, and means to adjust the tension of the spring bearing upon the worm, consisting of the plate N guided on the pinion shaft and the adjusting screw O.

In testimony of which invention we have hereunto set our hands.

ABNER McMICHAEL.
FRANK B. WILDMAN.

Witnesses:

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C. M. DIETTERICH.