

No. 881,812.

PATENTED MAR. 10, 1908.

R. E. MANLEY.

APPARATUS FOR MAINTAINING THE TENSION OF A MOVING WIRE.

APPLICATION FILED JUNE 22, 1907.

2 SHEETS—SHEET 1

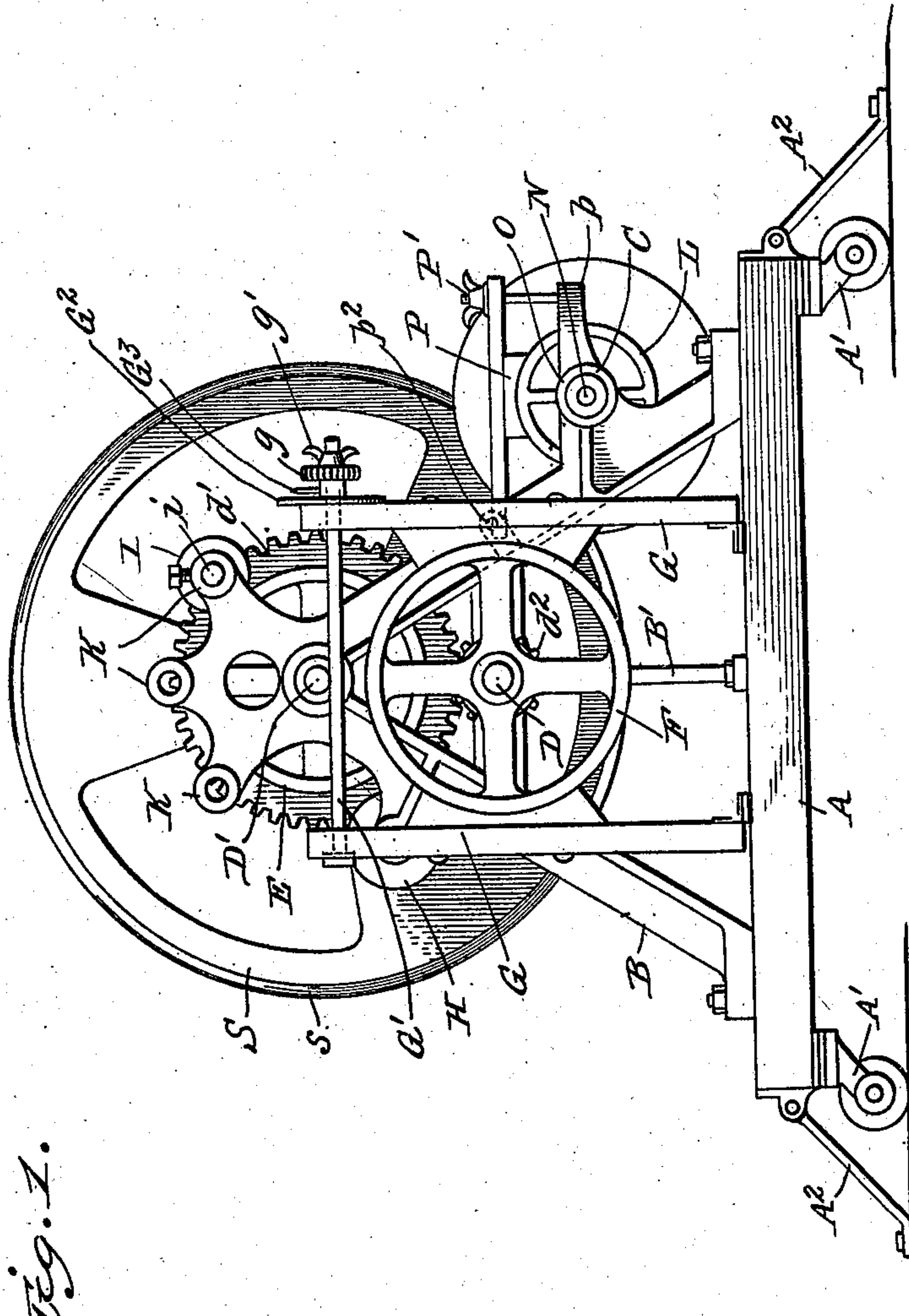


Fig. 1.

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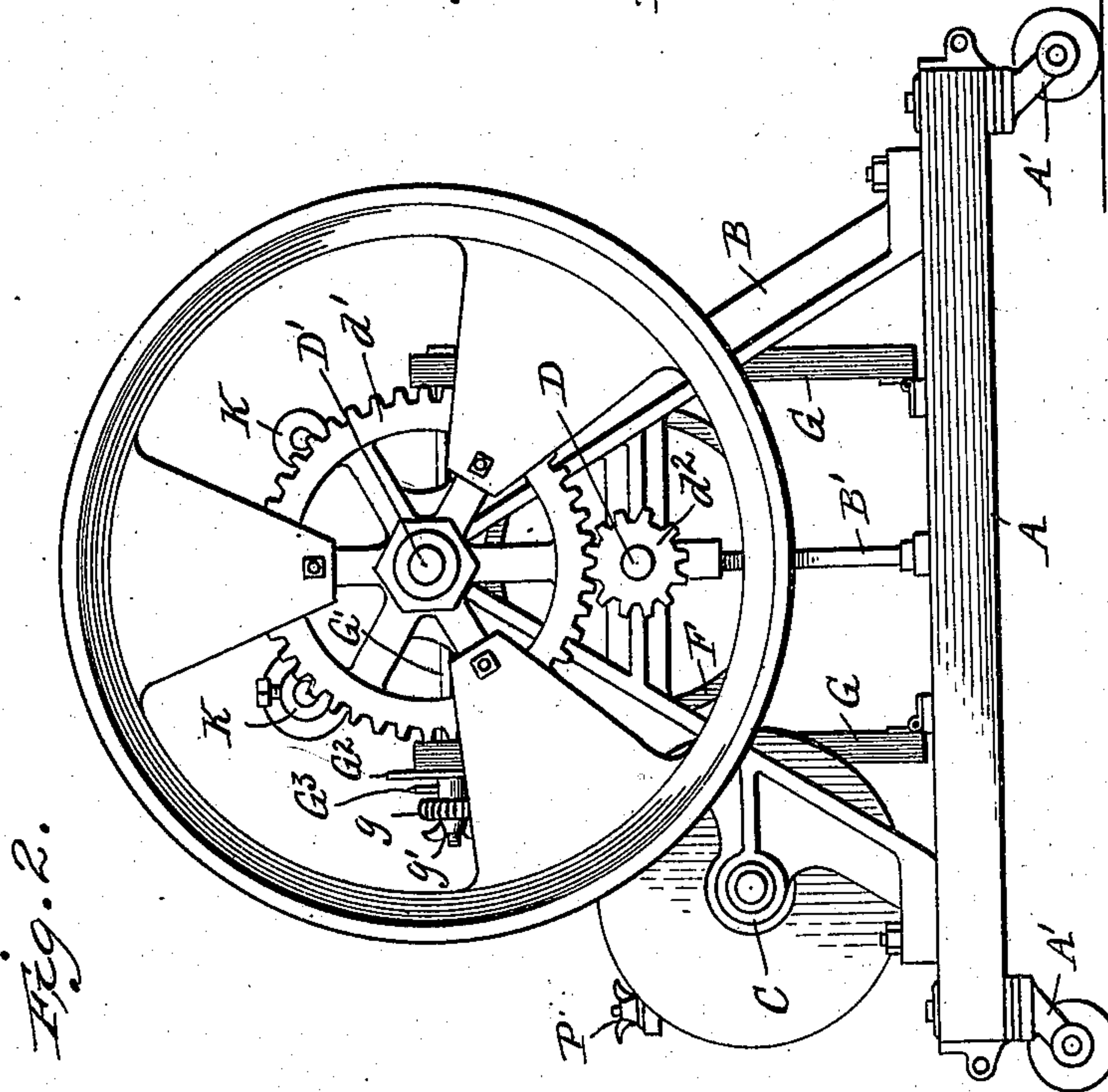
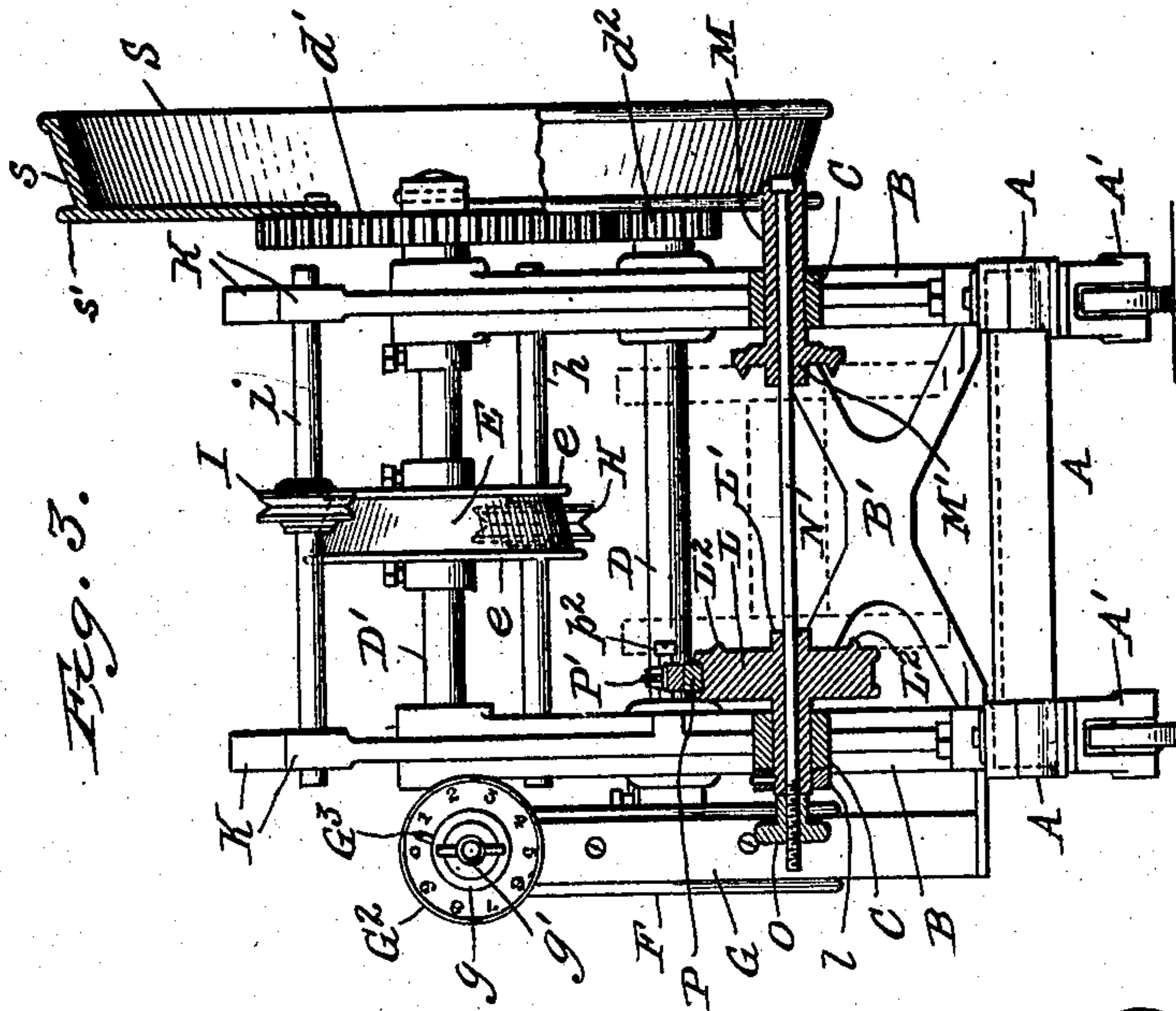
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APPARATUS FOR MAINTAINING THE TENSION OF A MOVING WIRE.

No. 881,812.

Specification of Letters Patent.

Patented March 10, 1908.

Application filed June 22, 1907. Serial No. 380,353.

To all whom it may concern:

Be it known that I, ROBERT EARLY MANLEY, of Hanover, in the county of York and State of Pennsylvania, have invented a certain new and useful Improvement in Apparatus for Maintaining the Tension of a Moving Wire; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

This invention relates to improvements in apparatus for maintaining the tension of wire while permitting the same to render to the object to which the wire is to be applied or onto which it is to be wound, the apparatus adopted for illustrating the invention being particularly designed for use in applying the wire retaining bands to electric motor and generator armatures and winding field coils.

The objects of the invention are to provide a convenient simple and strong apparatus adapted for use in street railway shops, etc., by workmen who do not possess the skill and knowledge of the workmen in electrical manufacturing establishments, although the apparatus may be used with great advantage by even the most skilled workmen.

Further objects of the invention are to provide an apparatus with which the tension on the wire may be regulated with precision and any desired tension maintained without causing sharp bends or irregular strains in the wire at any point.

The invention consists in certain novel details of construction and combinations and arrangements of parts all as will be hereinafter described and pointed out particularly in the appended claims.

Referring to the accompanying drawings: Figures 1 and 2 are views looking at opposite sides of an apparatus embodying the present improvements. Fig. 3 is an end elevation partly in section.

Like letters of reference in the several figures indicate the same parts.

The apparatus illustrated is designed to be portable for ready positioning in front of a lathe or other winder for rotating the armature to which the wire bands are applied or for rotating the field coil form, and for this purpose a base frame A, preferably formed of angle irons, mounted on casters A' and having braces A² adapted to be fixed to the

floor or bench on which the tension apparatus is located, is provided.

The body framing of the apparatus consists essentially of side frames B preferably of substantially A-shape secured rigidly to the base and braced by a central cross frame B'; and the supports for the supply spool of wire, to be presently specifically described, are mounted in bearings C in said side frames.

Shafts D D' are journaled in the side frames and connected by gearing preferably consisting of a large gear wheel *d'* on the shaft D' and a small gear wheel or pinion *d*² on the shaft D. Within the frames, the shaft D' carries a taper drum E about which the wire is passed one or more times and to prevent any possibility of the wire running off, the drum is preferably provided with edge flanges *e*. Shaft D also carries a drum F preferably located at the end of the shaft opposite the gear wheel and to this drum a brake is applied for resisting the rotation of the drum E, the gearing between the shafts serving not only to greatly increase the power of the brake but also to insure an even and uniform resistance without undue wear and friction on the brake drum and shoes. Any preferred type of brake shoe having a capacity for adjustment may be employed, but in the preferred arrangement the drum is clamped between two brake members G hinged to the base frame and connected at their upper ends by a tie rod G' having a hand wheel *g* at one end and a jam-nut *g'* whereby the hand wheel may be locked in place after having been adjusted to give the desired pressure on the brake drum, an index G² on the frame and a pointer G³ on the hand wheel serving to indicate the tension and enabling any predetermined tension to be reestablished with precision.

A grooved sheave H mounted on a shaft *h* guides the wire from the spool to the tapered wire drum; and a second grooved sheave I on the shaft *i* serves to guide the wire as it leaves the drum and renders to the armature or other article to which the band is being applied.

Inasmuch as it is desirable that the wire may render from the tension apparatus at a proper angle with relation to the work a series of bearings K for the shaft *i* are provided, such bearings being preferably located concentrically around the axis of the wire drum whereby the guide sheave I may occupy

practically the same relation to the periphery of the drum with the shaft in any one of the bearings.

Tension on the wire between the supply spool and wire drum is maintained by resisting the rotation of the spool itself, and in order to accomplish this and at the same time permit the spool to be readily removed and a new one substituted, a brake drum L having a shaft integral or rigid therewith is journaled in one of the bearings C, said shaft being held against inward movement by a collar l ; and on the inner face of the brake drum is a projection L' to center the spool and wings or spurs L^2 to enter the end of the spool for locking the spool and drum against independent rotation. The opposite bearing C carries a sliding shaft M having a disk head and spool centering projection M' on its inner end. A rod N passing longitudinally through the shaft M and brake drum and having a hand wheel O threaded on one end serves to draw the parts together to clamp the spool firmly and insures the rotation of the parts all together.

The brake shoe P for coöperation with the drum L is drawn down against the drum by a bolt and thumb nut P' at the outer end, coöperating with an arm p on the frame, and at its inner end said shoe rests under a stud or projection p^2 on the side frame, but it is obvious that any usual arrangement of brake shoe may be employed in lieu of that shown.

The wire drum E is made tapering in order to compensate for or counteract the tendency of the wire to creep or travel axially of the drum and the taper or inclination is preferably made sufficient to cause counter pressure or slippage equal to the normal axial movement of the wire due to its spiral arrangement on the drum.

The wire drum E is especially adapted for applying the bands to armatures and as such bands are usually of relatively fine wire the drum may be made small but where heavy or insulated wire is to be handled the drum should be of large diameter. To avoid the necessity of changing drums a second and larger drum may be mounted on the same shaft, thus as shown in the drawings, the large drum S is mounted at the end of the shaft D' and may be conveniently detachably secured to the gear wheel d' . The large drum is made as light as is consistent with the necessary strength to avoid the effect of momentum and inertia and its periphery is tapered as shown at s to counteract the tendency of the wire to creep and a flange s' is provided to prevent the wire from escaping from the periphery of the drum.

In operation, the wire passes from the spool to the sheave H, thence around the wire drum E any number of times found necessary to insure the desired grip for preventing slipping and thence to the sheave I from

which it renders to the armature on which the band is being wound.

The wire drum brake and the spool brake are both adjusted, the former to give the desired tension on the wire and the latter to primarily insure a grip on the wire drum and prevent any overrunning of the spool although it will in a measure augment the tension on the wire as it leaves the machine and it may be adjusted to greatly increase such tension, this, however, being undesirable as it may operate injuriously on the wire on the spool.

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

1. In an apparatus for maintaining the tension of a moving wire, the combination with a drum around which an intermediate portion of the wire is wound, of a brake drum, reducing gearing intermediate said drums, and an adjustable brake shoe co-operating with the brake drum.

2. In an apparatus for maintaining the tension of a moving wire, the combination with a drum around which an intermediate portion of the wire is wound and a relatively large gear wheel connected therewith, of a brake drum, an adjustable brake shoe co-operating with the brake drum, and a relatively small gear wheel connected with the brake drum and meshing with the relatively large gear wheel.

3. In an apparatus for maintaining the tension of a moving wire, the combination with the drum about which an intermediate portion of the wire is wound, and a friction brake for resisting the rotation of said drum, of a holder for the wire spool from which the wire passes to the drum, and a friction brake for the wire spool holder; substantially as described.

4. In an apparatus for maintaining the tension of a moving wire, the combination with the wire drum around which an intermediate portion of the wire is wound, an adjustable friction brake and gearing intermediate said brake and drum, of a holder for the wire spool from which the wire passes to the drum, and an adjustable friction brake for the wire spool holder; substantially as described.

5. In an apparatus for maintaining the tension of a moving wire, the combination with the drum around which an intermediate portion of the wire is wound, grooved sheaves over which the wire renders to and from the drum and an adjustable friction brake connected with said drum through reducing gearing, of a holder for the wire spool from which the wire passes to the drum and an adjustable friction brake for the wire spool holder; substantially as described.

6. In an apparatus for maintaining the tension of a moving wire, the combination with the drum around which an inter-

mediate portion of the wire is passed, a grooved sheave over which the wire renders from the drum and a plurality of bearings for said sheave arranged concentrically around the axis of the drum, of a holder for the wire spool and friction brakes for the drum and spool holder respectively; substantially as described.

7. In an apparatus for maintaining the tension of a moving wire, the combination with the base frame, A-shaped side frames, and shafts journaled in the side frames, of the wire drum and sheaves mounted between said frames, the friction brake located at one side of said frames, and gear wheels at the opposite side of said frames for transmitting motion from the drum to the brake; substantially as described.

8. In an apparatus for maintaining the tension of a moving wire, the combination with the side frames, wire drum journaled in the frame, and friction brake for resisting the rotation of said drum, of the spool holder embodying a friction brake drum journaled in one side frame, a longitudinally movable shaft journaled in the opposite side frame, and means for moving said shaft and brake drum toward each other for clamping a wire spool between them.

9. In an apparatus for maintaining the tension of a moving wire, the combination with a friction brake, of a drum controlled thereby and having a tapered periphery around which an intermediate portion of the wire is passed spirally whereby creeping of the wire axially of the drum is counteracted.

10. In an apparatus for maintaining the tension of a moving wire, the combination with a friction brake, of a drum controlled thereby and having a tapered periphery around which an intermediate portion of the wire is passed spirally, and a flange for preventing the escape of the wire axially of the drum.

11. In apparatus for maintaining the tension of a moving wire, the combination with a friction brake drum and shaft, a frame in which it is journaled, and a brake cooperating with the drum, of a longitudinally movable shaft journaled in the frame in axial alinement with the drum, spool holders carried by the shafts, and a clamping rod passing axially through the shafts; substantially as described.

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