No. 640,874. Patented Jan. 9, 1900.

M. CAMPBELL.

ROVING MACHINE.

(Application filed Feb. 20, 1899.)

(No Model.) 4 Sheets—Sheet 1.

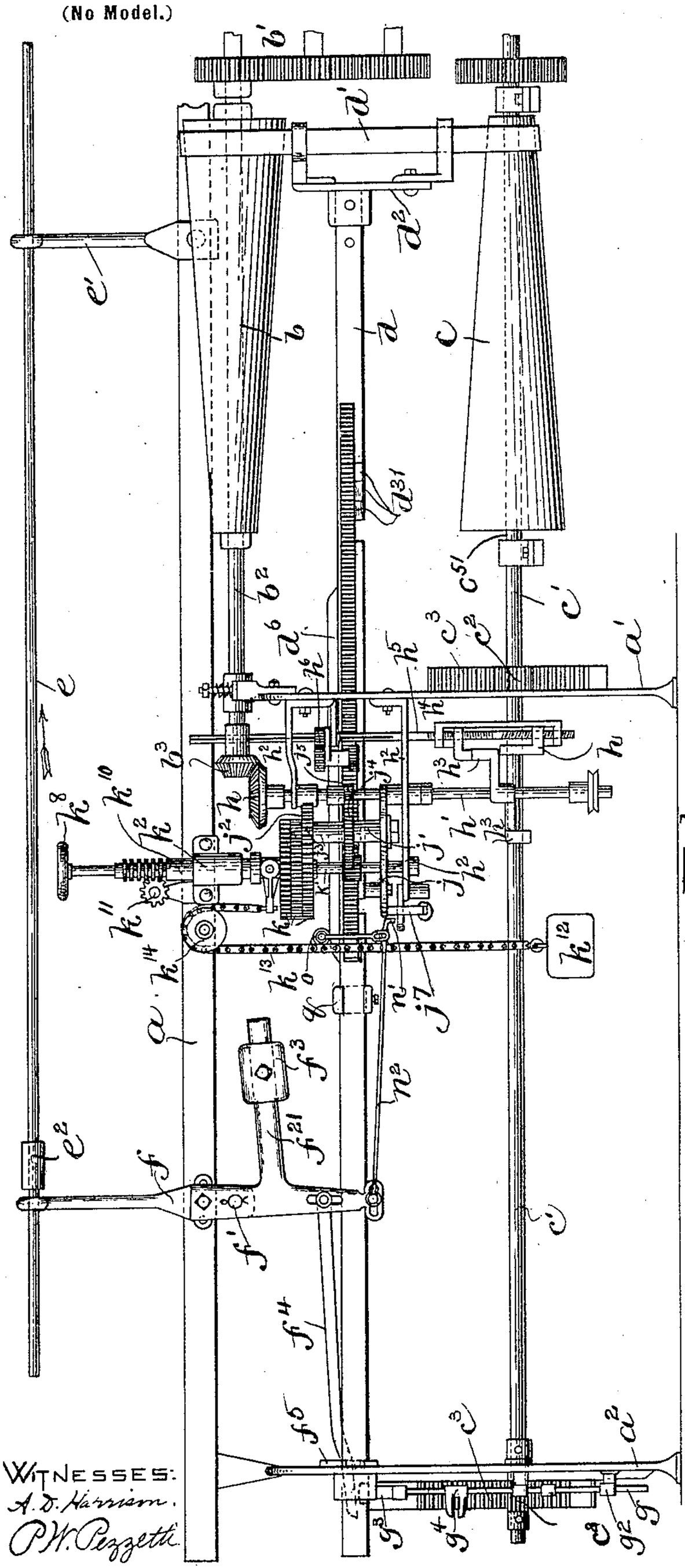


FIG. 1.

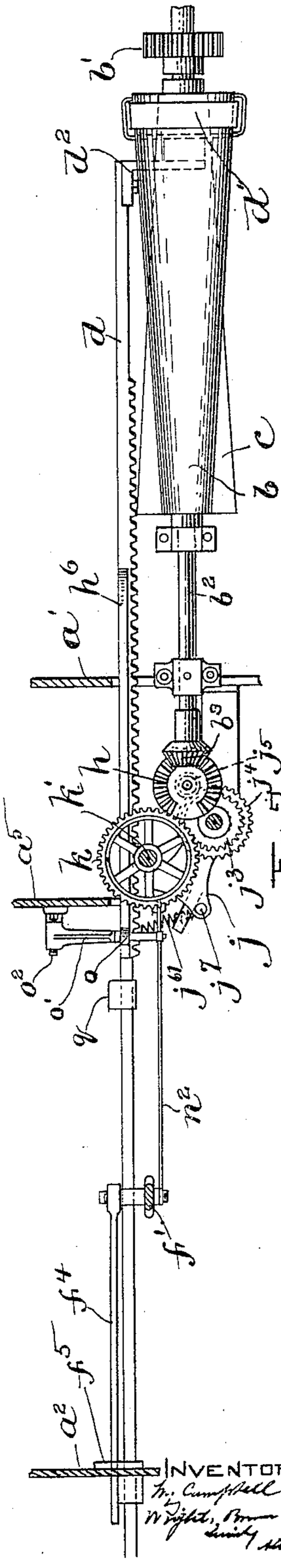


FIG. 2.

WITNESSES:
A. D. Harrison.
P. W. Pezzetti.

INVENTOR:
M. Campbell
by Wright, Brown & Quinby Attys

No. 640,874. Patented Jan. 9, 1900.

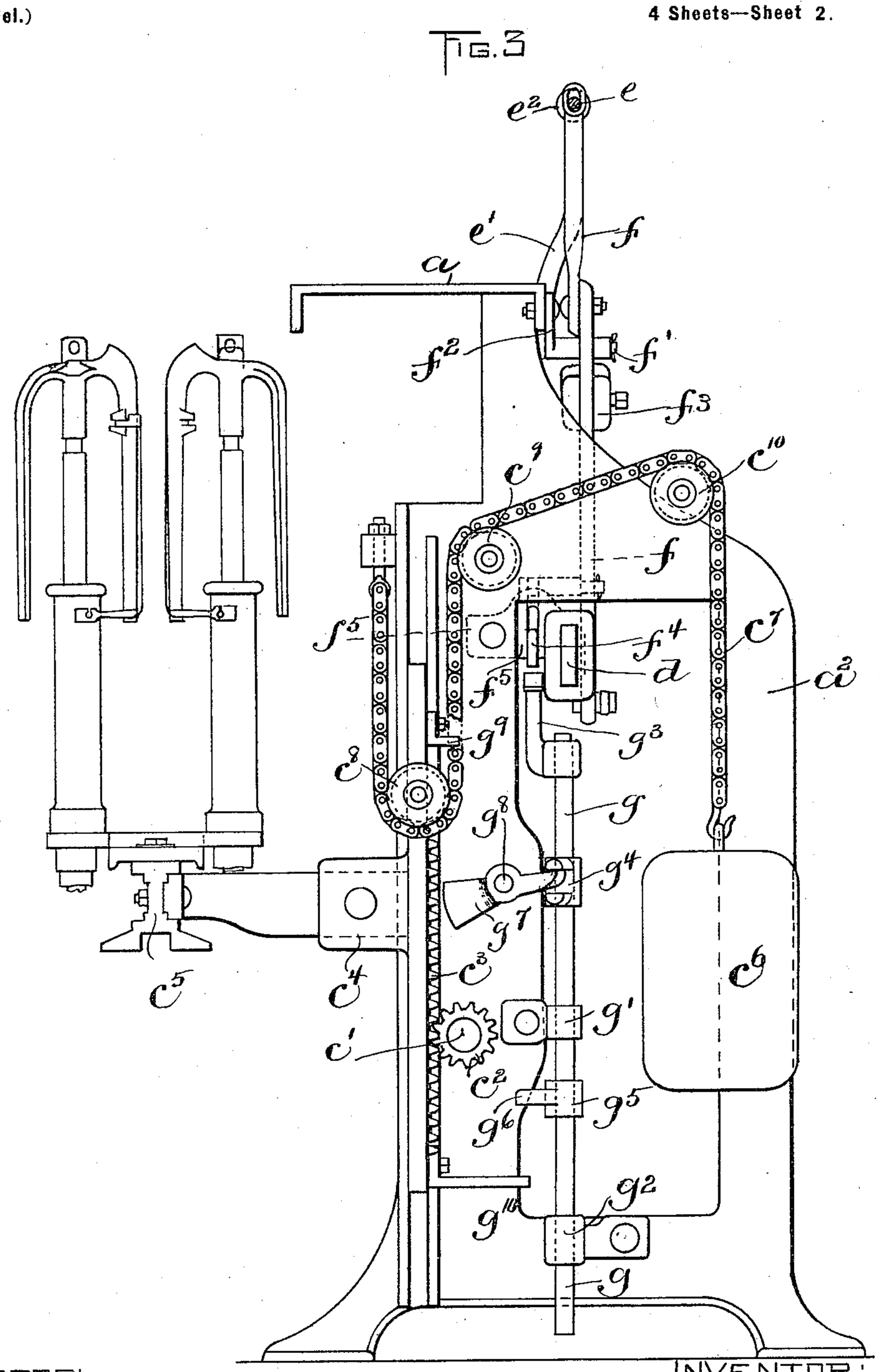
M. CAMPBELL.

ROVING MACHINE.

(Application filed Feb. 20, 1899.)

(No Model.) 4 Sheets—Sheet 2.

FIG. 3



WITNESSES:
A. D. Harrison.
P. W. Pezzetti.

INVENTOR:
Malcolm Campbell
by Wright, Brown & Quinby.
Atty.

No. 640,874. Patented Jan. 9, 1900.

M. CAMPBELL.

ROVING MACHINE.

(Application filed Feb. 20, 1899.)

(No Model.) 4 Sheets—Sheet 3.

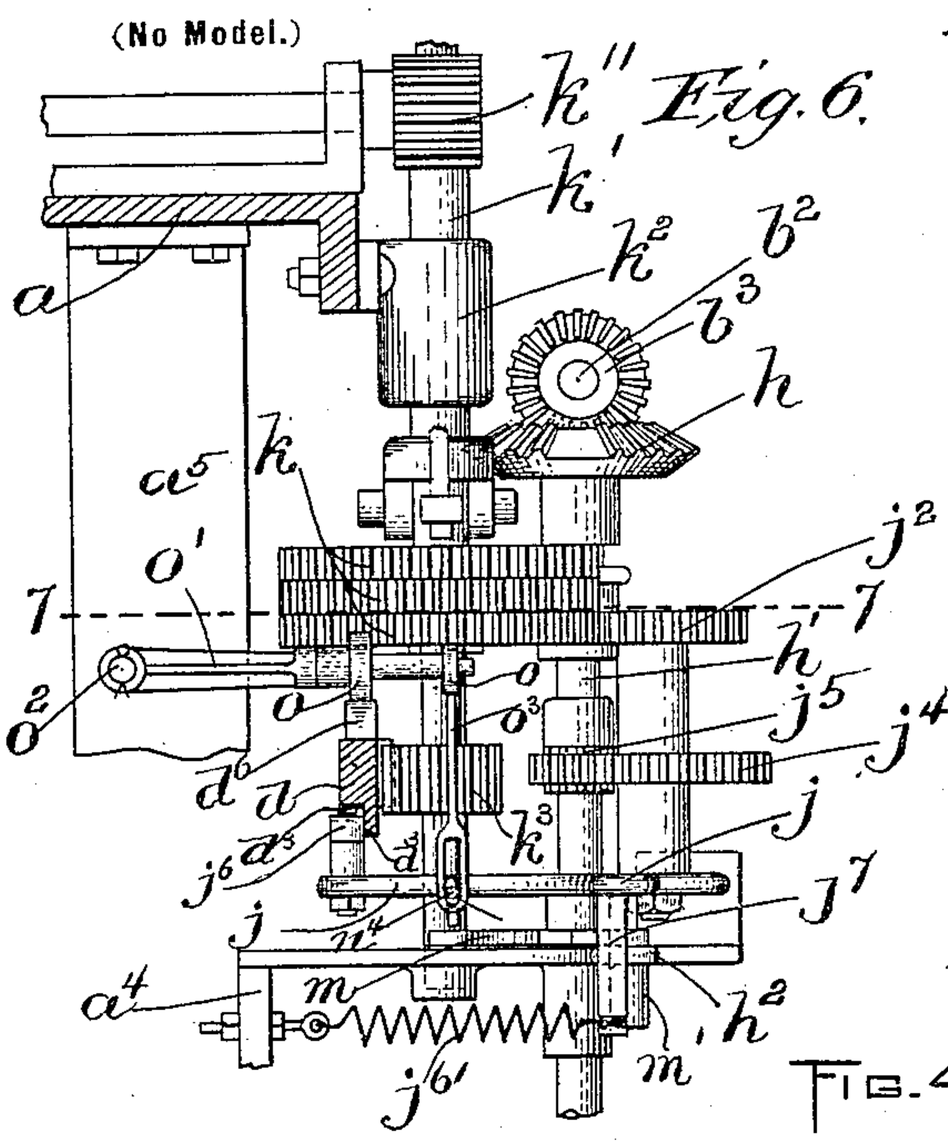


FIG. 4.

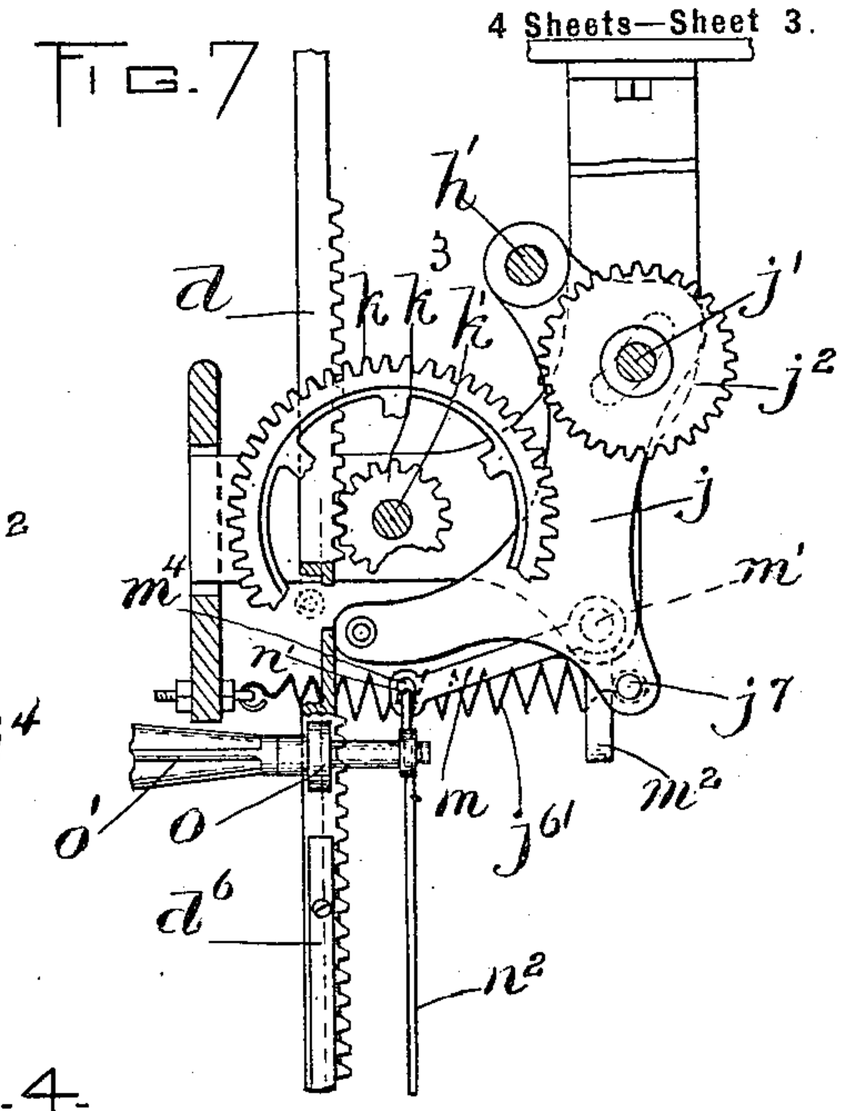
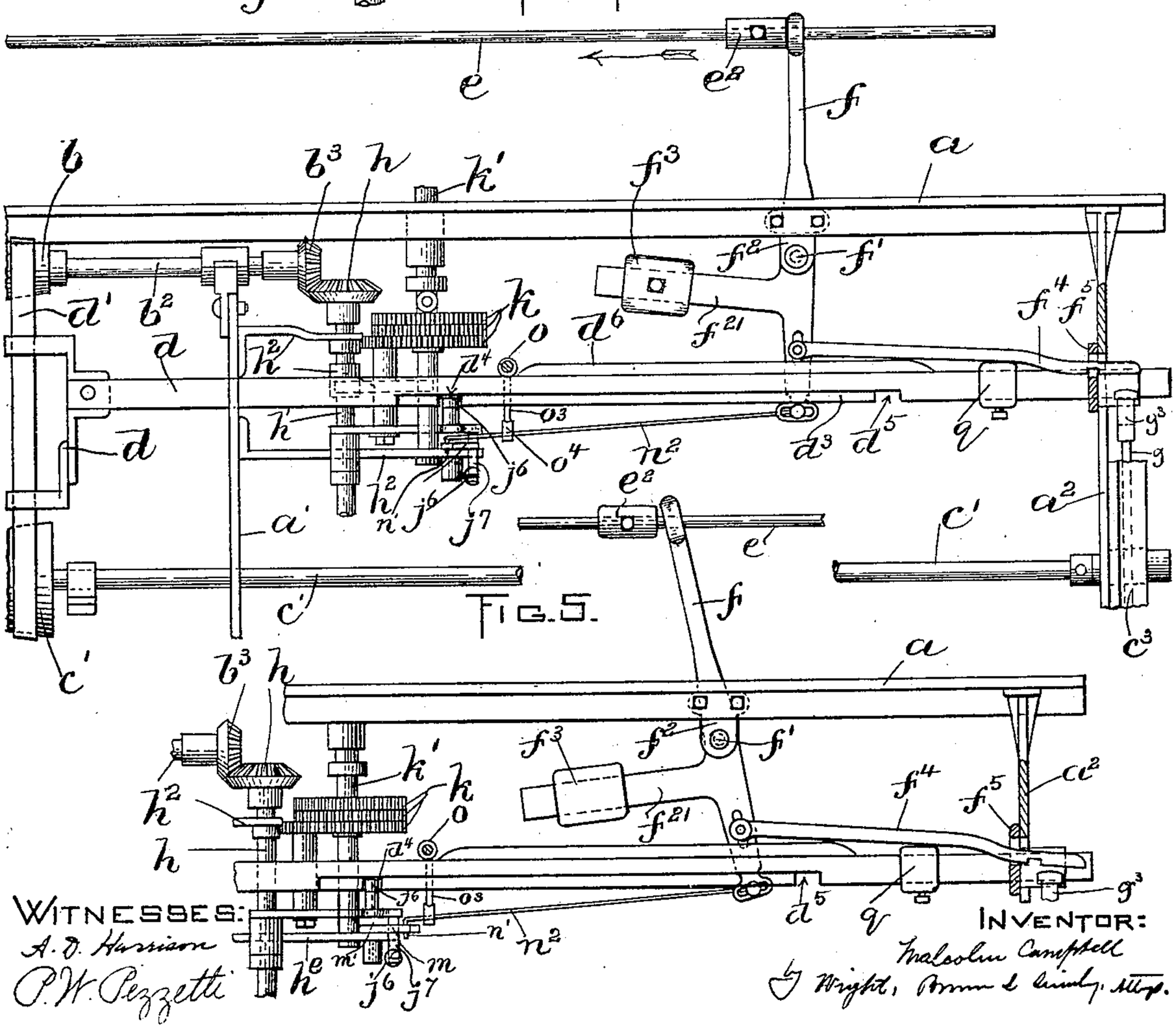


FIG. 7.



WITNESSES:
A. D. Harrison
P. W. Pezzetti

INVENTOR:
Malcolm Campbell
by Wright, Brown & Quinby, Attys.

No. 640,874. Patented Jan. 9, 1900.

M. CAMPBELL.

ROVING MACHINE.

(Application filed Feb. 20, 1899.)

(No Model.) 4 Sheets—Sheet 4.

FIG. 8.

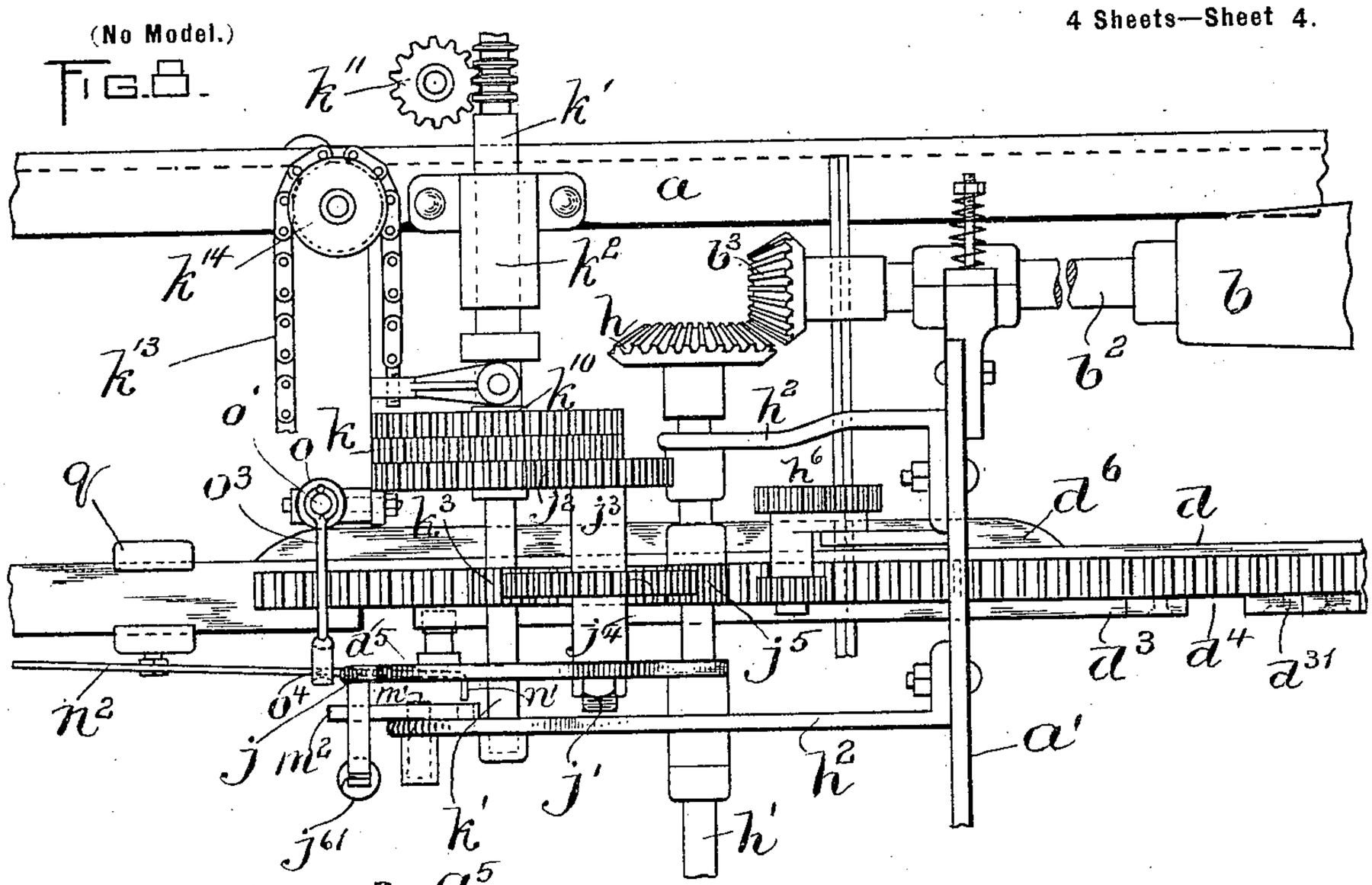


FIG. 9.

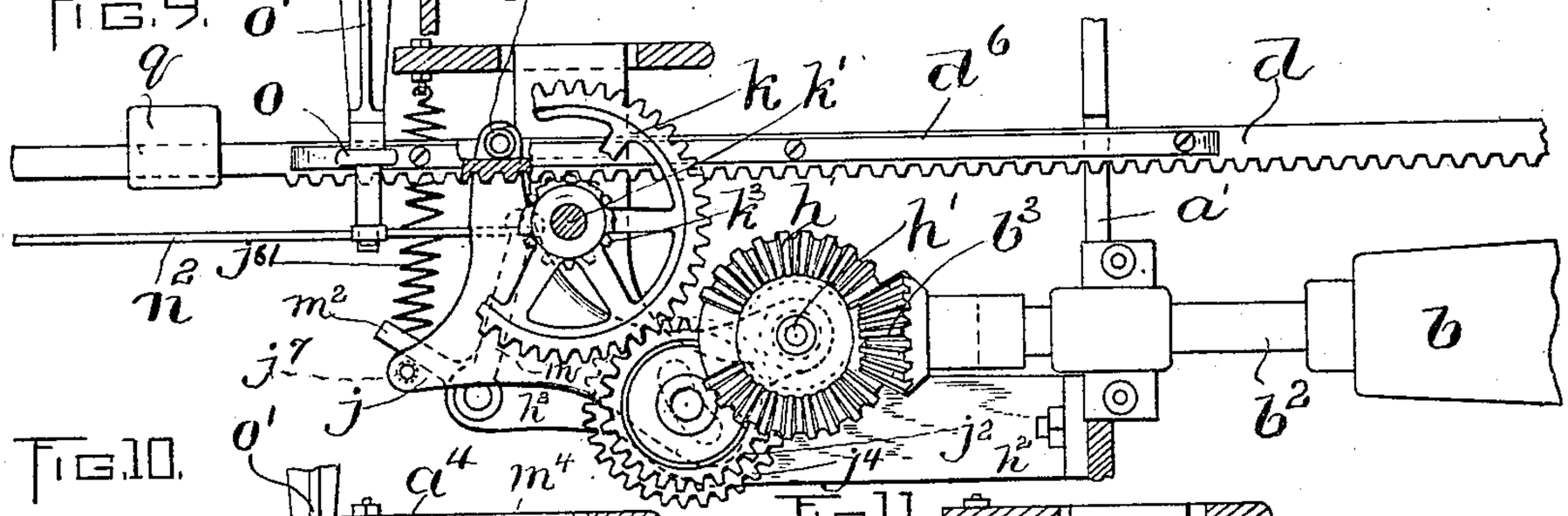


FIG. 10.

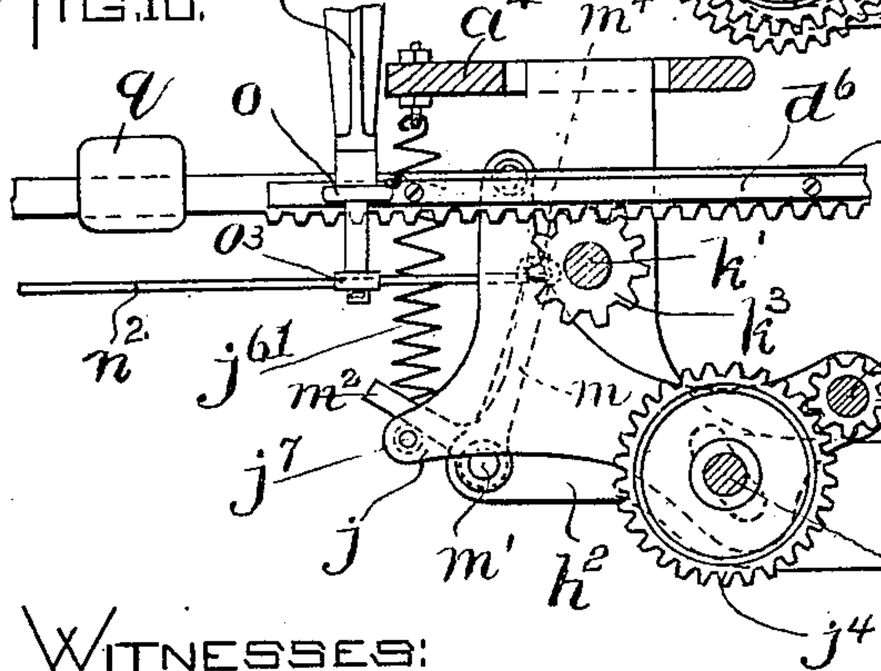
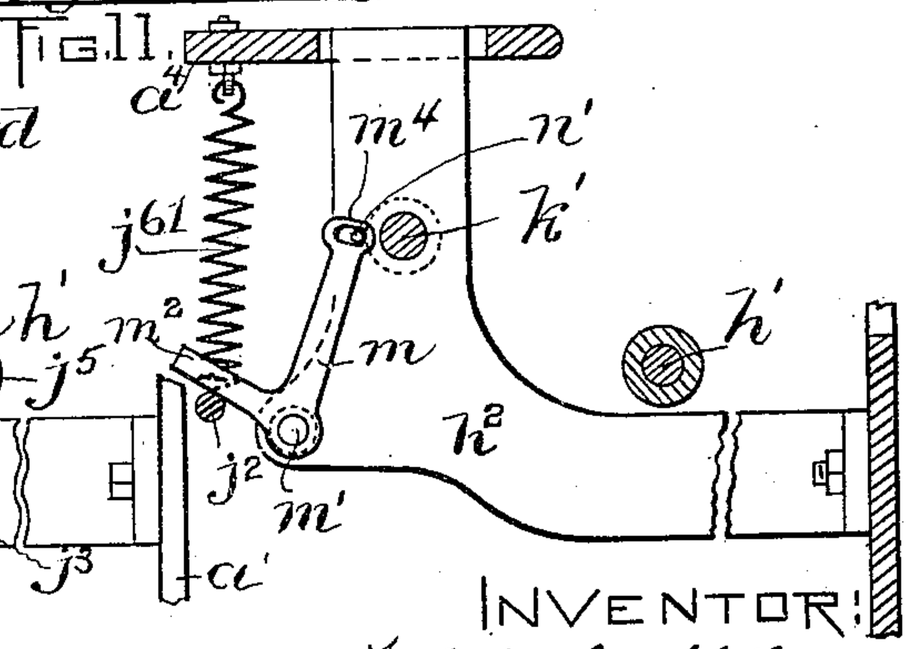


FIG. 11.



WITNESSES:
A. D. Harrison.
P. W. Pezzetti.

INVENTOR:
Malcolm Campbell
by Wright, Brown & Quinby,
Attys.

UNITED STATES PATENT OFFICE.

MALCOLM CAMPBELL, OF BOSTON, MASSACHUSETTS.

ROVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 640,874, dated January 9, 1900.

Application filed February 20, 1899. Serial No. 706,118. (No model.)

To all whom it may concern:

Be it known that I, MALCOLM CAMPBELL, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Roving-Machines, of which the following is a specification.

This invention has relation to roving-machines, slubbers, speeders, and other machines for drawing and winding yarn and thread.

In machines of the class mentioned it has heretofore been possible for the operator or attendant to shift the cone-belt so as to expedite the winding of a plurality of bobbins, and as this is greatly detrimental to the yarn or thread by reason of its changing the tension thereof the present invention has for its object the provision of mechanism for preventing such practices on the part of the operator. The regulation of the tension of the yarn or thread between the drawing-rolls and the bobbins is a delicate matter, requiring considerable technical knowledge or skill, and hence, besides preventing a dishonest operator from meddling with his machine, the object of the invention is to prevent an ignorant or unskillful one from attempting even in good faith to change or adjust the relation of the parts and the tension of the yarn or thread. It has been proposed or attempted to prevent the operator from interfering with the machine by providing a lock for the shipper to hold it against movement except when the cone-rack was at either end of its movement; but to those familiar with textile machines it will be apparent that such a device is dangerous and impractical. Usually in such machines as speeders and the like a stop-motion is used to shift the shipper in case the traveling frame passes above or below its proper extremes of movement for any reason whatsoever, said stop-motion being connected to the shipper. The shipper is also connected to the contact-gear, so that when the shipper is operated to stop the machine the contact-gear is moved into an inoperative position. Therefore when a lock is employed to prevent the actuation of the shipper during the entire operation of filling a bobbin the stop-motion is locked also, and consequently it would be prevented from operating should the frame travel upward or downward beyond its proper limit and some of the parts of the machine would be broken and deranged.

The present invention therefore consists of a speeder, roving-machine, or other similar machine having provisions for preventing the operator from meddling with the cone-rack without interfering with the operation of the stop-motion mechanism, all as illustrated upon the drawings, described in the following specification, and pointed out in the claims hereto appended.

Reference is to be had to the accompanying drawings, and to the letters marked thereon, forming a part of this specification, the same letters designating the same parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 represents in rear elevation a portion of a speeder or roving-machine sufficient to illustrate my invention. Fig. 2 is a plan view of the same. Fig. 3 represents the third sampson of the speeder with the parts that are mounted thereon. Fig. 4 represents a front elevation of a portion of the mechanism shown in Fig. 1. Fig. 5 represents the same immediately after the operation of the stop-motion. Fig. 6 represents in detail contact-gears and the parts immediately adjacent thereto. Fig. 7 represents a horizontal section on the line 7 7 of Fig. 6. Fig. 8 represents an enlarged view of the portion of the mechanism shown in Fig. 1. Fig. 9 represents the same in horizontal section. Fig. 10 represents a horizontal sectional view of the parts shown in Fig. 9 in a lower plane. Fig. 11 shows the lever for throwing the contact-gear out of operation.

Before proceeding to describe the mechanism illustrated upon the drawings I desire to have it understood that my invention is not limited to the details of construction which the drawings show and which I shall proceed to describe, as it may be embodied in machines possessing other features of construction and arrangement of parts.

Referring to the said drawings, a indicates a portion of the framework, usually termed the "roll-beam," the second sampson being indicated by a' and the third sampson by a^2. The head end of the machine is not shown in detail; but it will be understood that it may be similar to those of the machines now commonly in use.

b c indicate the two oppositely-disposed top and bottom cones which are usually employed in speeders, slubbers, and other similar machines and which are connected by a belt d'. The longitudinal traveling rack d is provided with a fork d^2, which embraces the belt, so that as the rack is moved the belt is caused to travel longitudinally of the cones to vary the speed of the spindle. The cone b is driven by any suitable means, as by the gearing b', (indicated in Fig. 1,) and its shaft b^2 is journaled in bearings in the sampson a' and also in the first sampson. (Not shown.) The cone c is secured upon a shaft c^{51}, suitably journaled, as shown. The rock-shaft c' is driven in the usual way and is equipped with pinions c^2 c^2, engaging with lifter-racks c^3 c^3, formed on the vertically-movable frame c^4, which carries the bolster-rail c^5, as indicated in Fig. 3. Said racks slide in guides formed on the sampsons and are raised and lowered by the pinions c^2 as the shaft is rotated in one direction or the other, there being counterbalancing-weights c^6 attached to chains c^7, passing over sheaves c^8 c^{10} c^{10}. The end of each chain is attached to a sampson, and the sheave c^8 is journaled on the rack in the ordinary way.

The shipper-rod is indicated at e, and it is mounted to slide in one or more guides e', secured to the frame of the machine. At its end it is connected to a shipper-lever, (not shown,) by means of which the belt is passed from the loose pulley to the fast pulley, and vice versa. Upon the rod is the stop or tappet e^2, adapted to be engaged by the end of a swing-lever f, fulcrumed upon the stud f', projecting from a bracket f^2, secured to the beam a. The lever is formed in two parts adjustably secured together, the lower part having a lateral arm f^{21}, on which is adjustably secured a weight f^3, sufficient to force the shipper-rod e longitudinally and throw the belt from the fast to the loose pulley. To the lower end of the lever f is adjustably secured a latch f^4, whose notched or hooked end projects through an aperture in a stop-plate f^5, secured to the sampson a^2. When the machine is in operation, the notched end of the latch engages the plate, as shown in Fig. 4, to prevent the lever f from being operated by the weight f^3 and shifting the shipper-rod e, and consequently to effect an automatic stopping of the machine in case the frame c^4 passes beyond its proper limit of movement for any cause there is a vertically-movable rod g, mounted in guides g' g^2, carried by the sampson a^2, as shown in Fig. 3, and having upon its upper end a bunter g^3 to engage the end of the latch which projects through the plate f^5 and release it from the plate. On the rod g are two tappets g^4 g^5, the former being engaged by a central pivoted weighted dog or lever g^7, fulcrumed at g^8 on the sampson, said rod being supported by said weighted lever. The tappet g^5 is formed with a lug g^6. The lifter-rack c^4 is provided with two stops or projections g^9 g^{10}, the former of which engages the lever g^7 when the frame reaches a predetermined point in its downward movement and the latter of which engages the lug g^6 when the frame reaches a predetermined point in its upward movement. When either of these projections engages its respective part g^7 or g^6, the rod g' is lifted to cause the bunter g^3 to engage the latch f^4 and lift it out of engagement with the latch-plate and permit the weight f^3 to throw the swing-lever f about its fulcrum, and said lever in turn moves the shipper-rod longitudinally and stops the machine.

On the cone-rack is the tappet or knock-off q, which engages the latch when the cone-rack reaches the end of its movement and releases it from the stop or plate, whereupon the swing-lever is enabled to shift the shipper-rod to stop the machine.

The cone-shaft b^2 is provided with a bevel-gear b^3, intermeshing with the bevel skip-gear h on a vertical contact-shaft h', journaled in brackets h^2, extending longitudinally from the sampson a'. This vertical shaft h' is but partially shown, and it is connected to the rod (not shown) which operates the reversing-gear. (Likewise not shown.) The said shaft h' is provided with escapement-arms or contact-dogs h^3, which engage the screw motion or builder h^4 alternately as the frame is raised and lowered. The builder-shaft h^5 is rotated step by step by the gearing indicated at h^6. Fulcrumed on the shaft h' is an arm j, which carries the vertical stud-shaft j', equipped with the contact-gear j^2. The latter is upon a sleeve j^3, on which there is a gear j^4 in engagement with a gear j^5 on the shaft h'.

When the cone-rack is at the extreme of its movement, the arm j is turned on its fulcrum to remove the contact-gear j^2 from engagement with the change-gears k on the shaft k', which, as shown in Fig. 8, is stepped in the lower bracket h^2 and is journaled in the bearing k^2 on the roll-beam a.

The change-gears are each feathered on a sleeve k^{10}, splined to the shaft, and either may be brought into the plane of the contact-gear by means of a manually-operated pinion k^{11}, supported by the roll-beam and engaging teeth on the sleeve. The gears k are counterbalanced by a weight k^{12} on the end of a chain k^{13}, connected to the sleeve and passing over a sheave k^{14}, journaled on the roll-beam.

On the shaft k' is a pinion k^3, which intermeshes with teeth on the rack d to advance said rack each time the shaft h' is rotated, and in order to return the cone-rack after the bobbins are full there is a hand-wheel k^8 on the shaft k', by means of which the latter may be turned.

Heretofore the operator or machine-attendant could at any time during the forward travel of the cone-rack move the contact-gear out of engagement with the change or tension gears and with the hand-wheel advance the cone-rack, and thereby change the tension of

the yarn between the top rolls and the bobbins, and consequently I provide a lock for holding the contact-gear in engagement with the rack during the entire winding operation and until the rack has completed its advancing movement. I further provide devices for automatically connecting the swinging arm or support for the contact-gear with the swing-lever of the stop-motion, so that when the cone-rack reaches the end of its movement, so as to operate the stop-motion and stop the machine, the contact-gear is simultaneously thrown out of gear with the change-gears.

On the end of the arm j is a roll j^6, which engages a rib, cam, or guide d^3 on the lower edge of the rack, said rib having a removable sectional end d^{31}. When the rack is advanced, the roll j^6 engages the front portion of the cam (rear portion as viewed in Fig. 1, *et seq.*) to hold the contact-gear in engagement with one of the gears k, and when the rack reaches the end of its movement the roll rides down the end of the cam through an aperture d^4, so that as the rack is returned to original position the roll rides along the rear edge of the cam and passes through an aperture d^5 in the rack at the other end of the cam. A spring j^{61} connects a pin j^7 with a stationary part a^4 of the frame and normally draws the arm j into operative position with the roll j^6 in front of the cam d^3 on the rack.

In order to throw the arm rearward to carry the contact-gear away from the gears k when the roll j^6 reaches the end of the cam d^3, I employ a bell-crank m, fulcrumed upon a stud m', arising from the lower bracket h^2. One arm, m^2, of the bell-crank engages the pin j^7, which projects downwardly from the arm j. In the end of the other arm, m^3, is a slot m^4, adapted to receive the hooked end n' of a latch n^2, which is adjustably secured at its other end to the lower end of the swing-lever f, so that when the shipper-rod is moved in the direction of the arrow in Fig. 1 to stop the machine the latch n^2 draws upon the bell-crank and causes the arm m^2 of the latter to engage the pin j^2 of the lever j and, throwing the latter about its fulcrum, move the contact-gear away from the gears k.

It is evident that if the lever f were always connected to the bell-crank m it would be impossible to operate the stop-motion except when the rack reaches the end of its movement by reason of the lever j being held against rearward movement by the cam d^3 on the cone-rack, and therefore I hold the latch n^2 out of engagement with the bell-crank except when the rack is at the extremes of its movement and the roll j^6 is beyond the ends of the cam d^3.

It will be seen by referring to the several figures of the drawings that the rack d is provided upon its upper edge with a second cam d^6 and that resting upon the cam is a roller o, journaled upon the end of an arm o', loosely fulcrumed upon a stud o^2, projecting from one of the stationary parts a^5 of the machine. To the end of the arm o is connected a link o^3, with a hooked lower end o^4, in which the latch n^2 rests.

Prior to the time that the rack begins its movement the roll o rests upon the top of the rack, with the latch n^2 engaging the bell-crank n^3, and as soon as the rack begins to travel said roll rides up on the cam d^6 and draws the latch out of engagement with the bell-crank m^3. Therefore at any time during the travel of the rack the stop-motion is free to operate. When, however, the rack reaches the end of its movement, the roll o rides down from the cam d^6 and the hooked end of the latch n^2 drops into the slot m^4 in the bell-crank, and consequently when the shipper is operated it not only stops the machine, but throws the contact-gear out of engagement with the gears k.

The operation of the machine will be clearly understood from the foregoing description without further explanation, and it will now be obvious to those familiar with machines of the type herein referred to that although the contact-gear is automatically locked in engagement during the forward travel of the cone-rack to prevent the operative from changing the tension of the roving or yarn yet the stop-motion is freely operable in case the bobbin-frame passes beyond its proper limits of travel to prevent the machine from being broken, and yet while the contact-gear is disconnected from the swing-lever and the stop-motion during the forward travel of the cone-rack it is automatically attached thereto when the rack reaches the end of its forward movement to cause the contact-gear to be automatically withdrawn from engagement with the change or tension gears simultaneously with the operation of the stop-motion caused by the knock-off engaging the latch. The contact-gear is also locked out of engagement with the change-gears during the retrograde movement of the cone-rack and is automatically released and thrown into mesh with the rack when the cone-rack reaches its initial or starting position.

It is evident that many changes may be made in the apparatus as I have shown and described it without departing from the spirit and scope of the invention.

Having thus explained the nature of the invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is—

1. A machine of the character specified comprising a cone-belt-shifting device, an automatic stop-motion, and mechanism for preventing a manual operation of said device during the operation of the machine, said mechanism being independent of and operable without interfering with the stop-motion.

2. A machine of the character specified comprising a reciprocatory frame for carrying the bobbins; a stop-motion operable au-

tomatically by said frame; a cone-belt-shifting device including a longitudinally-movable bar, and a lock for preventing tampering with said device, said stop-motion being operable independently of said belt-shifting device except at predetermined points in the travel of said bar.

3. A machine of the character specified comprising a reciprocatory frame for carrying the bobbins, a stop-motion controlled by said frame, a cone-belt-shifting device comprising a traveling rack, and a contact-gear, and means for automatically locking said gear in mesh with said rack.

4. A machine of the character specified comprising a reciprocating frame for carrying the bobbins, a stop-motion controlled by said frame, a cone-belt-shifting device comprising a traveling rack, and a contact-gear; means for automatically locking said gear in mesh with said rack, and connections between said gear and said stop-motion.

5. A machine of the character specified, comprising a reciprocatory frame for carrying the bobbins, a stop-motion controlled by said frame, a cone-belt-shifting device comprising a traveling rack, and a contact-gear, and means controlled by said rack for automatically locking said gear in mesh with said rack.

6. A machine of the character specified comprising a reciprocatory frame for carrying the bobbins, a stop-motion controlled by said frame, a cone-belt-shifting device comprising a traveling rack, a contact-gear, and a swinging support for said gear; and means for automatically connecting said support with said stop-motion.

7. A machine of the character specified comprising a reciprocatory frame for carrying the bobbins, a stop-motion controlled by said frame, a cone-belt-shifting device comprising a traveling rack, a contact-gear, and a swinging support for said gear; and means including a latch normally disconnected from said support, for automatically connecting said support with said stop-motion.

8. A machine of the character specified comprising a reciprocating frame for carrying the bobbins; a stop-motion; means operable by said frame to control the operation of said stop-motion when said frame passes beyond its normal extreme of movement; a cone-belt-shifting device including a swinging contact-gear, a cone-belt rack, and a cam on said rack for automatically locking said gear in and releasing it from mesh with said rack; and means for automatically connecting said gear with said stop-motion while the latter is out of mesh with said rack.

9. A machine of the character specified comprising a cone-belt rack, a contact-gear, means independent of the stop-motion for holding said gear in mesh with said rack, said means having provisions for automatically releasing said gear from said rack.

10. A machine of the character specified comprising a cone-belt rack, a contact-gear, and means coacting with said rack for holding the gear in contact therewith.

11. A machine of the character specified comprising a cone-belt rack, a contact-gear, a swinging support having a roller, and a cam on said rack, said parts being combined whereby said gear is automatically moved into and out of engagement with said rack.

12. A machine of the character specified comprising a stop-motion; a belt-shifting device, and means for automatically connecting said device to and disconnecting it from said stop-motion.

13. A machine of the character specified comprising a stop-motion; a belt-shifting device; and means controlled by the last-mentioned device for automatically connecting it to and disconnecting it from said stop-motion.

14. A machine of the character specified comprising a stop-motion; a belt-shifting device, including a rack and a swinging contact-gear; and means for automatically connecting said contact-gear with said stop-motion.

15. A machine of the character specified comprising a stop-motion; a belt-shifting device including a rack and a swinging contact-gear; and a latch controlled by said rack for automatically connecting said gear to and disconnecting it from said stop-motion.

16. A machine of the character specified comprising a stop-motion including a weighted swing-lever; a cone-belt-shifting device including a movable contact-gear and a rack; a lever for throwing said gear out of contact with said rack; a latch connected to said swing-lever and adapted to operatively engage said gear-throwing lever, and means for automatically operating said latch.

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

MALCOLM CAMPBELL.

Witnesses:
MARCUS B. MAY,
PETER W. PEZZETTI.