No. 815,623. PATENTED MAR. 20, 1906.

A. McMEEKIN.

SPINNING YARN FROM FLAX, COTTON, &c.

APPLICATION FILED MAR. 21, 1904.

3 SHEETS—SHEET 1

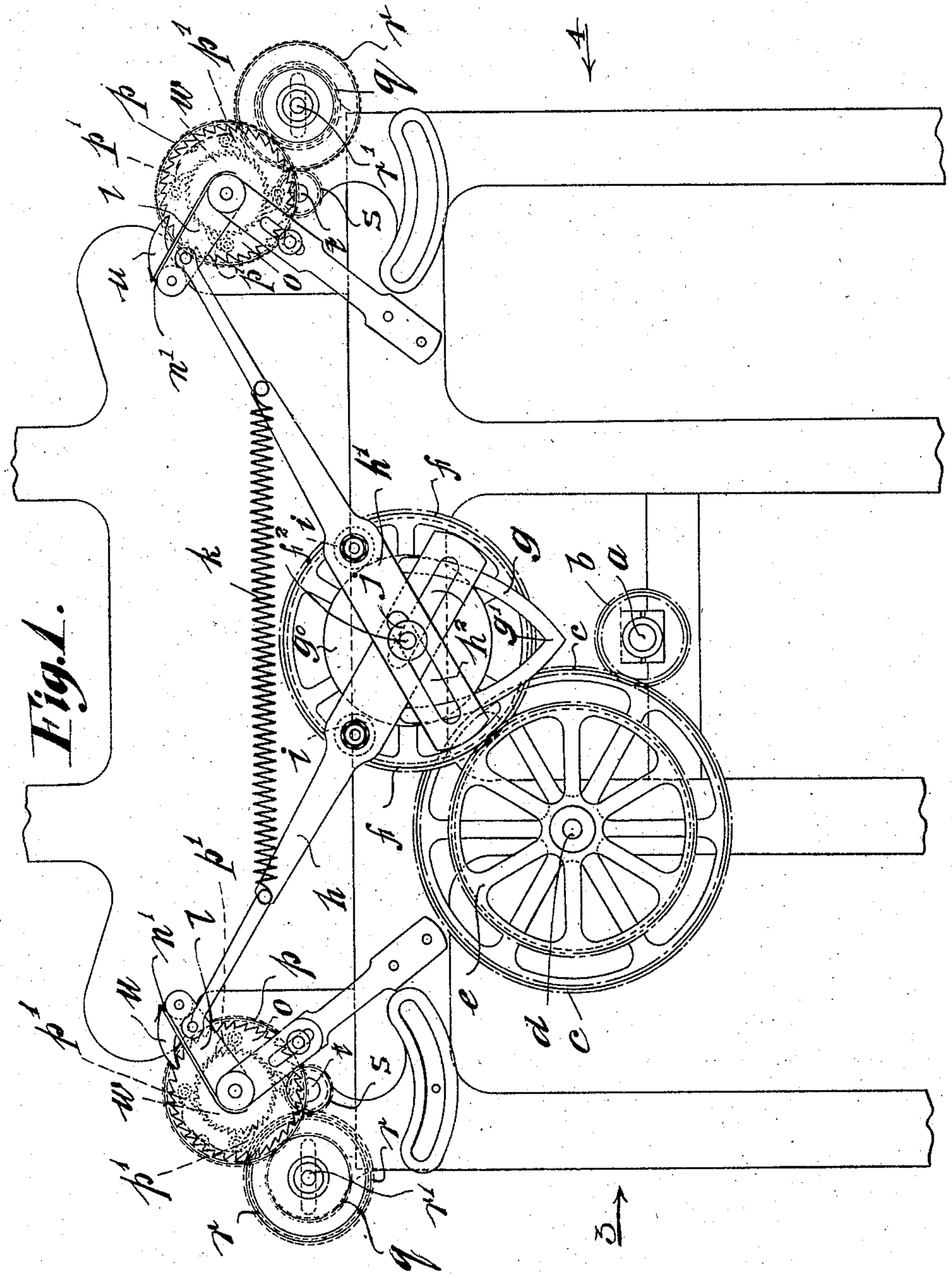


Fig. 1.

Witnesses.

Inventor

Adam McMeekin

by B. Singer atty.

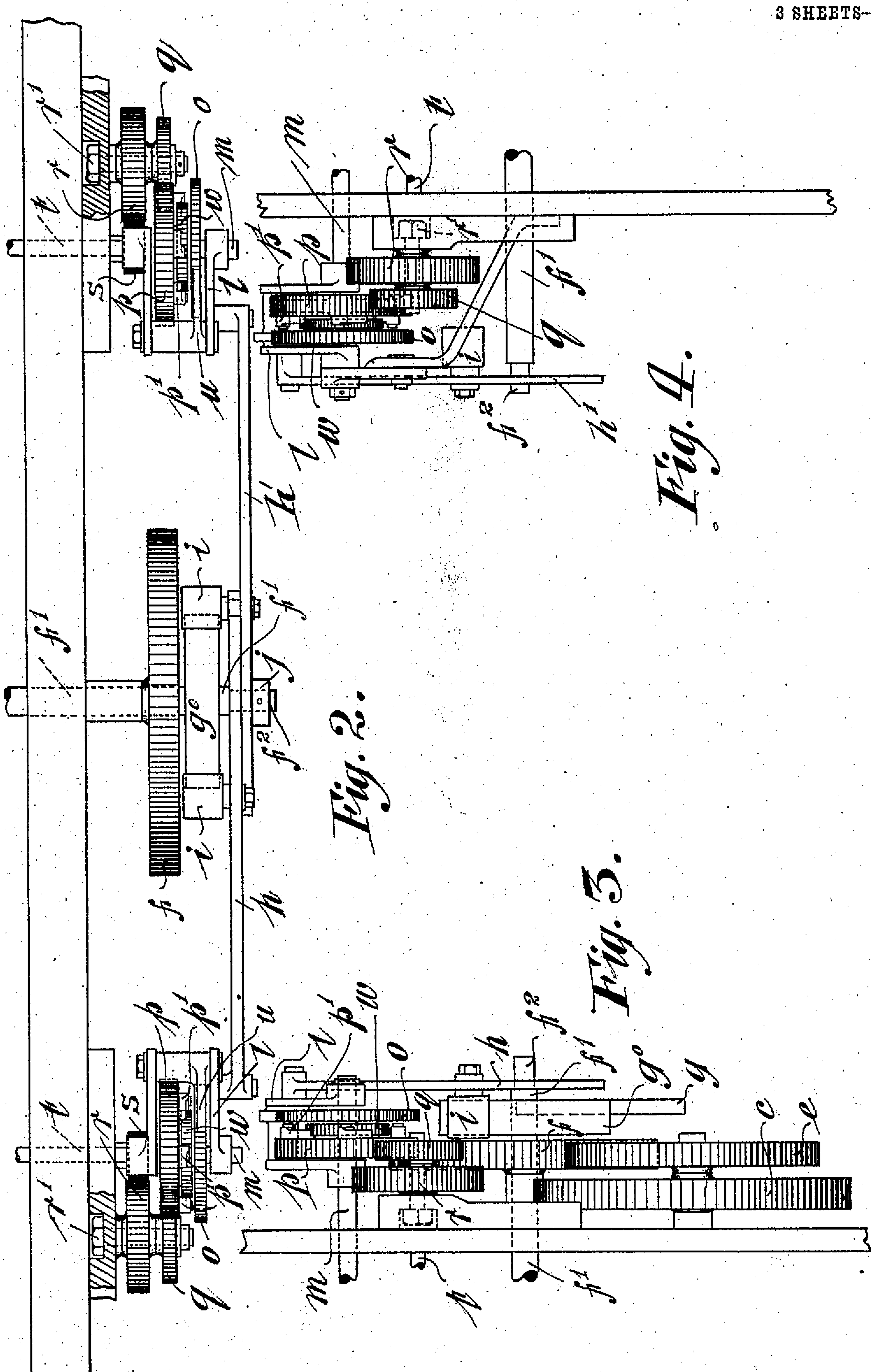
No. 815,623. PATENTED MAR. 20, 1906.

A. McMEEKIN.

SPINNING YARN FROM FLAX, COTTON, &c.

APPLICATION FILED MAR. 21, 1904.

3 SHEETS—SHEET 2.



Witnesses.
F. Heeren
Franz Ebner

Inventor
Adam McMeekin
by B. Singer atty.

No. 815,623. PATENTED MAR. 20, 1906.

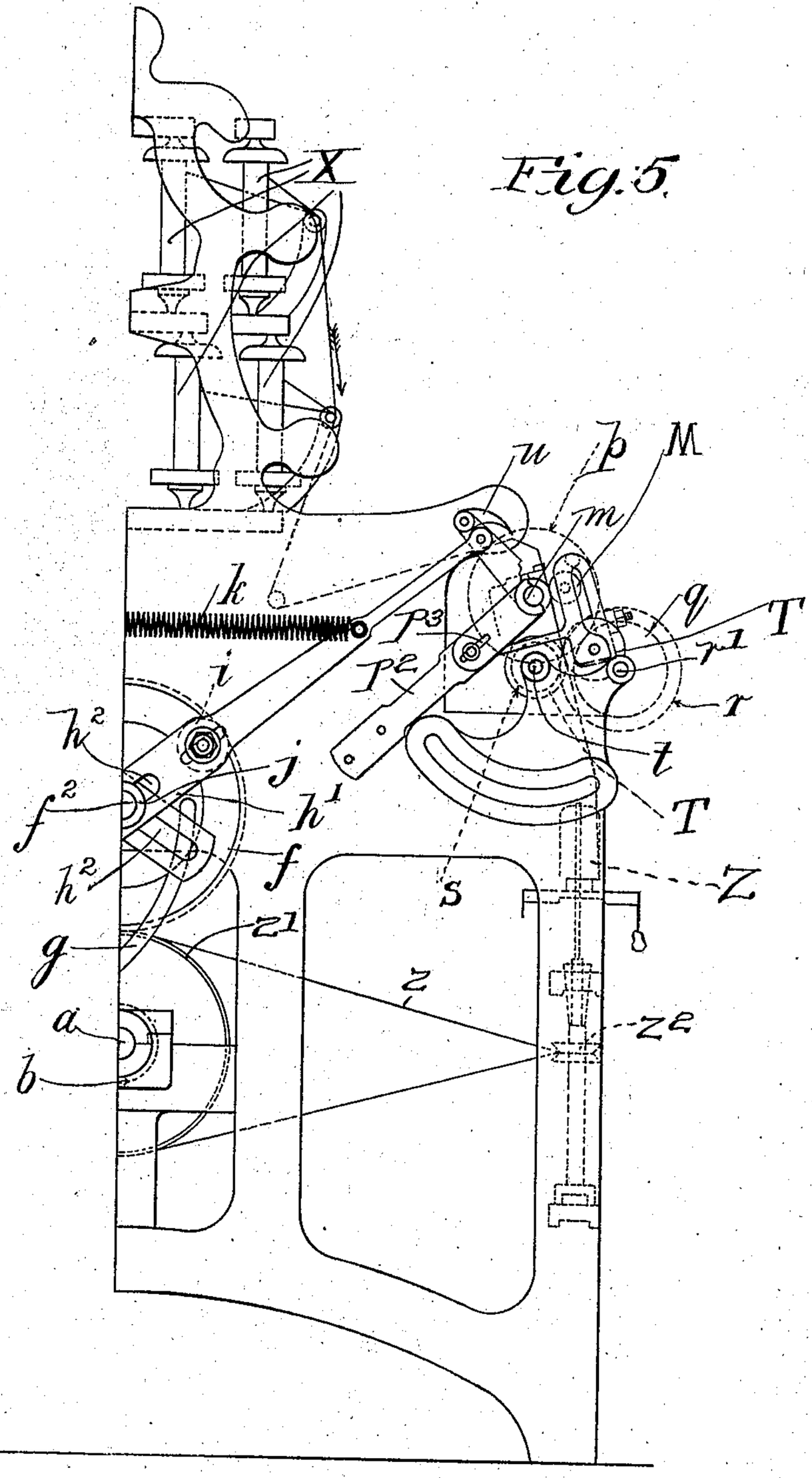
A. McMEEKIN.

SPINNING YARN FROM FLAX, COTTON, &c.

APPLICATION FILED MAR. 21, 1904.

3 SHEETS—SHEET 3.

Fig. 5.



Witnesses:-
C. H. Crawford
John Schuelldorf

Inventor:
Adam McMeekin
by B. Singer
Attorney

UNITED STATES PATENT OFFICE.

ADAM McMEEKIN, OF DOAGH, IRELAND.

SPINNING YARN FROM FLAX, COTTON, &c.

No. 815,623. Specification of Letters Patent. Patented March 20, 1906.

Application filed March 21, 1904. Serial No. 199,101.

To all whom it may concern:

Be it known that I, ADAM McMEEKIN, a subject of the King of Great Britain, residing at Cogry Mills, Doagh, county of Antrim, Ireland, have invented certain new and useful Improvements in Spinning Yarn from Flax, Cotton, or other Fibers and in the Machinery for the Same, of which the following is a specification.

My invention relates to improvements in spinning-machines.

One of the well-known methods of reducing rove to yarn is to provide adjacent pairs of coacting rollers between which the material is passed and driving the rollers at an unequal rate of speed. The rove is first fed to a pair of rollers driven at a relatively slow speed, called "retaining-rollers," and from thence to a pair of rollers driven at a relatively higher speed, which are called drawing-rollers." By this means the rove is stretched in the direction of its length, thereby reducing its size, the same being delivered from the drawing-roller as yarn. The difference in speed of the pairs of rollers whereby various sizes of yarn are produced is called "draft." If a considerable amount of draft is employed, or, in other words, if there is a great variance of the speed between the retaining and drawing rollers, the yarn produced will be of a relatively small size, whereas if a very slight draft is employed the decrease in size from the rove to the yarn will be correspondingly less. Heretofore the difference in speed of the pairs of rollers after once being determined has been constant and regular, thereby serving to stretch the material between the retaining and drawing rollers a definite increased length and discharging yarn of uniform size adapted for making goods of uniform thickness and even surfaces.

In making novelty goods of certain styles wherein a rough and uneven surface is desired the spinners have heretofore used yarn having enlargements or lumps at points throughout its length and being of a generally unequal size. The difficulty, however, in using yarn of this nature has been to secure a prescribed distribution of the lumpy parts in the goods. The lumps in yarn of this nature being irregular in size and spaced apart unequal distances very often make up into goods wherein the lumps appear in groups, leaving intervening lengths of smooth surface. While it is not always desirable in these novelty goods to have an absolutely-uniform distribution of the lumps in the yarn, it is highly desirable to have a general distribution, and in some cases it is desirable to have the lumps evenly and uniformly distributed throughout the goods. Furthermore, it is desirable in some classes of goods to have the lumpy or uneven surfaces somewhat prominent, necessitating correspondingly great inequalities in the yarn, whereas if it is desired that the lumps in the goods should not be prominent the irregularities of the yarn must be correspondingly less.

The object of the present invention is to provide a drafting mechanism for reducing rove to yarn wherein the lumps or irregularities may not only be spaced apart at prescribed and definite distances throughout the length of the yarn, but may be accurately regulated as to size.

My invention, therefore, consists in the provision of a drafting mechanism for reducing rove to yarn comprising separate pairs of coacting retaining and drawing rollers, between which the material passes, mechanism for constantly driving said pair of rollers at uniformly unequal speeds, and an auxiliary mechanism whereby the speed of one pair of rollers may be intermittently changed.

My invention will be more fully described in connection with the accompanying drawings and will be more particularly pointed out in the appended claims.

In the drawings, Figure 1 represents in side elevation one of the end frame members of a spinning or spooling machine, showing mechanism for driving the drafting-rollers. Fig. 2 is a view in elevation of the parts shown in Fig. 1. Fig. 3 is an end elevation of the parts shown in Fig. 1 looking in the direction of the arrow 3. Fig. 4 is an end elevation looking in the direction of arrow 4 of Fig. 1. Fig. 5 is an end elevation of a spooling-machine, showing the drafting mechanism in full lines and the manner in which the rove travels therethrough from the bobbins and is discharged in the form of yarn.

Like characters of reference designate similar parts throughout the different figures of the drawings.

I will describe the application of the device of my invention to a double spinning or spooling machine having complete drafting

mechanisms on either side thereof and wherein a single auxiliary driving mechanism is employed for operating the same.

Referring more especially to Figs. 1, 2, 3, and 4, there is shown a main driving-shaft *a*, provided with a gear-pinion *b*. A pinion *c*, mounted on a stud *d*, is provided, which meshes with pinoin *b* and transmits motion to pinion *e*. A cam-gear *f*, mounted on shaft f^2, meshes with pinion *e*. The speed of the pinion *f* may be regulated by using different-sized pinions in the place of those marked *b* and *c*. A cam *g* is provided which is rotated by the pinion *f* and actuates a pair of accelerating-arms *h h'*, having their adjacent ends slotted at h^2. Said arms are slidably mounted on shaft f^2, which carries a nut *j*, serving to hold said arms in operating proximity to the cam *g*. A spring *k* is connected at its opposite ends to the arms *h h'* to maintain the cam-rollers *i i* at all times in engagement with the periphery of the cam *g*. The outer ends of said arms *h h'* are connected with and operate auxiliary speed-accelerating mechanism, which in the preferred embodiment consists of the following parts: The parts of said mechanism are designated by similar characters of reference and are similar in all respects. Therefore I will describe only one of the same. Upon shaft *m* is rigidly mounted a driving ratchet-pinion *w*, which is driven by means of a loosely-mounted pinion *p*, carrying spring-actuated ratchet-pawls *p'*, engaging said ratchet-wheel *w*. Said pinion *p* drives the pinion *w* positively in one direction, the pawls *p'* permitting the speed of said ratchet-pinion *w* to be intermittently increased. Said pinion *p* is constantly driven through the medium of a reducing train of gears consisting of pinions *q* and *r*, mounted on stud *r'*, which are driven by a pinion *s*, mounted on a constantly-driven shaft *t*. The stud *r'* is adjustable horizontally to permit substitution of various-sized pinions *r* and *q* when it is desired to secure variance of speed between the pairs of drafting-rollers. The gearing just described imparts to the retaining and drawing rollers, respectively, relatively low and high speeds, the drawing-rollers being driven from shaft *t*, while the retaining-rollers are driven from shaft *m*. I will now describe the means whereby the speed of the ratchet-pinion *w* is momentarily accelerated. A ratchet-pinion *o* is provided, which is rigidly mounted on shaft *m*. A rocking arm *l*, of U-shaped construction, carries at its outer end a pawl *u*, adapted for engagement with the ratchet-wheel *o*, which is held in engagement with said wheel by a spring *n'*. Arms *h h'* are pivotally secured at their outer ends to the arms *l*.

The operation of the driving mechanism thus far described is as follows: The shafts *m* are constantly driven through the medium of the trains of gear above described. When the cam *g* rotates, the arms *h h'* will be alternately reciprocated in opposite directions by engagement of the rollers *i* with the cam proper, *g g'*. When, for instance, the arm *h* is moved outwardly to the left, it will cause a correspondingly-outward movement of the rocking arm *l*, thereby effecting a sudden contra-clockwise movement of ratchet-pinion *o*. This sudden rotation of the pinion *o* is communicated directly to the shaft *m*, resulting in a momentary acceleration of pinion *w* beyond the speed at which it is constantly driven by pinion *p* and pawls *p'*. This momentary acceleration is permitted by the spring-pressed ratchet-pawls *p'*, which slide over the teeth of the pinion *w* when the arm *l* is being swung outwardly on its mounting.

I will next refer to the reducing or drafting mechanism operated by the driving mechanism just described, the same being preferably of the following construction, Fig. 5: On shaft *m* is mounted one of the retaining-rollers M, said rollers being held tightly in contact. Immediately below the rollers M are mounted the drawing-rollers T, which are held in contact with each other, one of said rollers being mounted on the constantly-driven shaft *t*. The said rollers M are positively driven at a constant speed, which is relatively less than the speed of the rollers T. The material from the bobbins X travels downwardly in the direction of the arrow and passes between the rollers M. From thence it passes between rollers T and is received upon a rotating bobbin Z, positively driven through the medium of a belt *z*, trained about wheels *z' z²*. It will be obvious that as the surface travel of the rollers M is less than the travel of the rollers T and as each pair of rollers is constantly driven the material passing therebetween will be drawn or stretched in accordance with the difference in speed of the respective rollers. If the rollers T are driven at a greatly-increased rate of speed with respect to the rollers M, the draft or stretch to which the material is subjected will be correspondingly increased and the yarn delivered from the rollers T will be relatively reduced in size with respect to the rove which is delivered to the rollers M, and vice versa. It will therefore be apparent that if the respective retaining and drawing rollers are driven at an unequal and constant speed the yarn will be substantially uniform in size throughout its length, whereas if the difference of speed between the two sets of rollers is not maintained there will be a consequent lack of uniformity in the yarn produced. If the speed of the retaining-rollers is momentarily accelerated, the stretch or draft between the retaining and drawing rollers will be temporarily lessened, and to this extent an enlargement or lump will be formed in the yarn which at that time is passing from the retain-

ing to the drawing rollers. It will further be obvious that the size of the lump or enlargement formed in the yarn will be entirely dependent upon the degree of acceleration imparted to the rollers M and to the length of intervals of time elapsing between said accelerations. In order to vary the diameter of enlargements or lumps formed in the yarn, the length of stroke of the arm *l* may be varied by elongating the supporting member p^2 by means of the slotted connection p^3. By this arrangement the pawl *u* will pass over one or more teeth of the ratchet-wheel *o* at the beginning of its movement before effecting engagement. If it is desired to increase the length of the lump or enlargement, the cam *g* may be supported by one which will impart to the rods *h h'* a relatively greater movement, maintaining the same speed acceleration.

While I have herein shown and described a single embodiment of my improved device, I do not wish to be limited to the precise construction shown, as the same may be materially altered without departing from the spirit of the invention.

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

1. The combination in a spinning-frame of a retaining-roller, means for driving the roller at the ordinary speed and means for periodically accelerating the speed of the roller so as to form lumps or spots in the yarn.

2. The combination, in a spinning-frame, of a retaining-roller, a ratchet-wheel for driving the roller, a pawl gearing with the ratchet, a lever carrying the pawl, an arm connected with the lever and having a slot at its end which works on a pin, a roller secured to the arm, a cam acting on the roller, and toothed gearing for rotating the cam, said toothed gearing being operated from the cylinder-axle *a* of the machine, substantially as described.

3. The combination, in a spinning-frame, of a retaining-roller, a free wheel on the axle of the roller, a ratchet-wheel on the axle of the roller, pawls on the free wheel, means for driving the free wheel, a second ratchet-wheel for driving the roller, a pawl gearing with the ratchet-wheel, a lever carrying the pawl, an arm connected with the lever, means for moving the arm forward intermittently and means for retracting the arm after each forward movement, substantially as described.

4. The combination in a spinning-frame, of two retaining-rollers, free wheel and ratchet mechanism for driving the rollers, ratchet-wheels for driving the rollers, pawls gearing with the ratchet-wheels, rocking levers carrying the pawls, slotted arms connected with the levers, a pin fixed to the frame of the machine and projecting through the slots, a cam for operating both arms, a spring acting on both arms, and means for driving the cam, substantially as described.

5. A drafting device for spinning-machines comprising a pair of coacting retaining-rollers and a pair of coacting drawing-rollers between which the material to be drawn is passed, mechanism for constantly driving the respective pairs of rollers at unequal rates of speed, and auxiliary means for intermittently accelerating the speed of the retaining-rollers.

6. A drafting device for spinning-machines comprising a pair of coacting retaining-rollers and a pair of coacting drawing-rollers between which the material to be drawn is passed, mechanism for constantly driving the respective pairs of rollers at unequal rates of speed, and auxiliary means for intermittently changing the speed of one pair of rollers.

7. A drafting device for spinning-machines comprising a pair of coacting retaining-rollers and a pair of coacting drawing-rollers between which the material to be drawn is passed, one of said retaining-rollers having two ratchet-wheels rigidly mounted, and a gear-pinion loosely mounted, ratchet-pawls connecting said pinion and one of said ratchet-wheels, means for constantly driving said gear-pinion, and means engaging the other ratchet-wheel for intermittently accelerating the speed of said retaining-rollers.

8. A drafting device for spinning-machines comprising a pair of coating retaining-rollers and a pair of coacting drawing-rollers between which the material to be drawn is passed, means for constantly driving one of said retaining-rollers at a given speed, and means for intermittently increasing the speed thereof.

9. A drafting device for spinning-machines comprising a pair of coacting retaining-rollers and a pair of coacting drawing-rollers between which the material to be drawn is passed, one of said retaining-rollers having two ratchet-wheels rigidly mounted and a pinion loosely mounted, ratchet-pawls connecting said pinion and one of said ratchet-wheels, means for constantly driving said pinion, a rocking arm carrying a spring-pressed pawl adapted for engagement with the other ratchet-wheel, and cam-actuated mechanism for rocking said arm to intermittently accelerate the speed of said retaining-rollers.

Signed at Belfast, Ireland, this 4th day of March, 1904.

ADAM McMEEKIN.

Witnesses:
JAS. A. WEIR,
NORA MOORE