

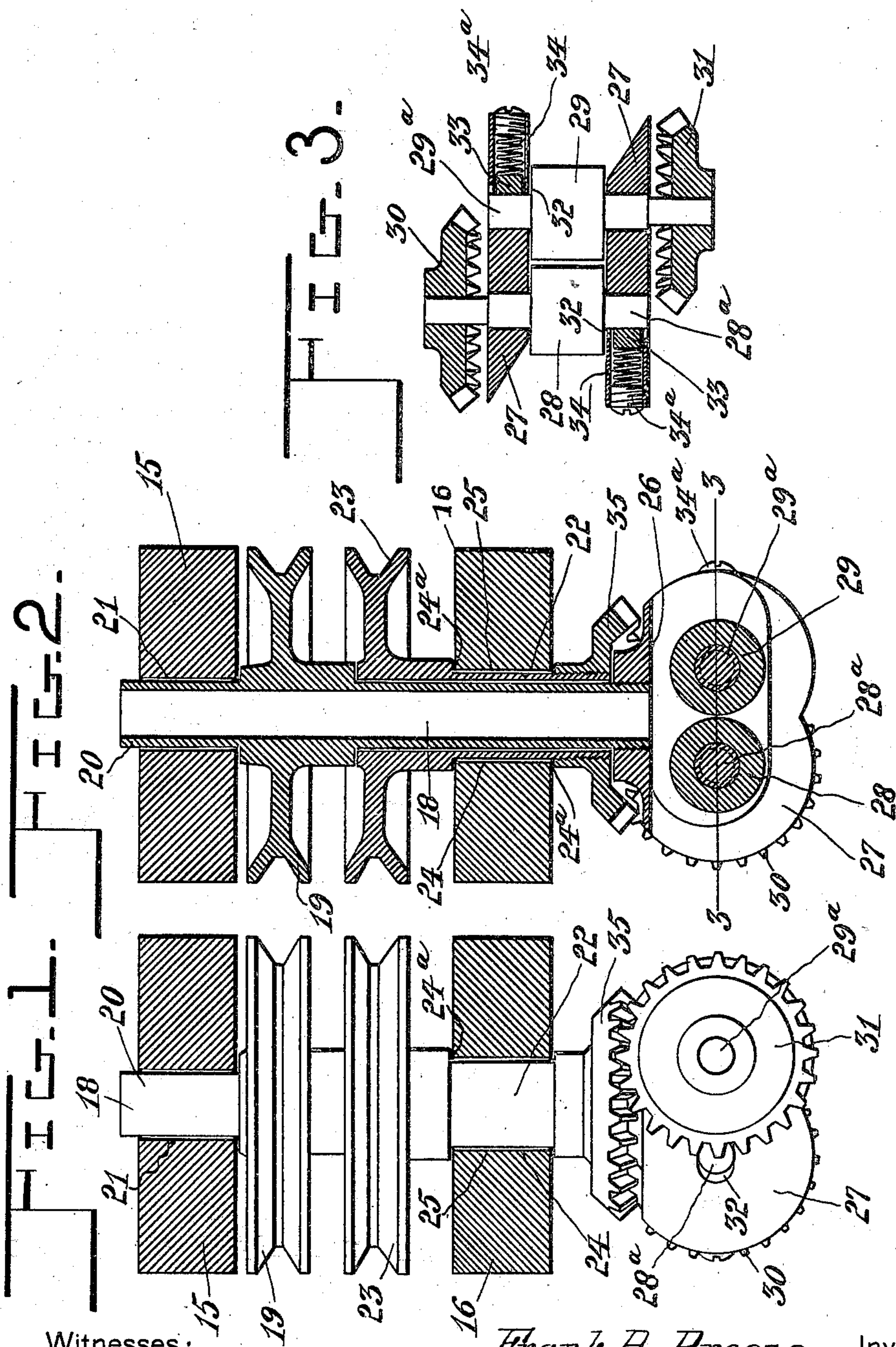
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F. A. BREEZE.
SPINNING HEAD.

(Application filed Jan. 6, 1902.)

(No Model.)



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SPINNING-HEAD.

SPECIFICATION forming part of Letters Patent No. 708,458, dated September 2, 1902.

Original application filed November 7, 1900, Serial No. 35,777. Divided and this application filed January 6, 1902. Serial No. 88,479. (No model.)

To all whom it may concern:

Be it known that I, FRANK ALEXANDER BREEZE, a subject of His Majesty the King of Great Britain, residing at Forest Mills, county of Lennox, Province of Ontario, Canada, have invented certain new and useful Improvements in Spinning-Heads; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

One important feature of my invention is a series of rotatory spinning-heads, each of which comprises an interior tubular spindle having a pulley at its upper end, a foot fast with the lower end of said spindle, a pair of coacting drawing-rolls journaled in said foot and carried thereby, so as to rotate around a vertical axis with the foot and said interior spindle, a revoluble sleeve fitted loosely on the spindle and provided with a pulley and with a skew-bevel gear, the latter having intermeshing engagement with similar gears on said drawing-rolls, and means for rotating said interior spindle and said sleeve in the same direction and adapted to drive the sleeve at a higher rate of speed than the spindle, whereby the drawing-rolls will rotate around a vertical axis with the spindle, and said drawing-rolls will also be driven to rotate on their own axes by the gearing between the rolls and the sleeve, thus making said rolls positively draw on the sliver, which is supplied through the tubular spindle, and also making the rolls twist the sliver at the same time that it is attenuated by the drawing action, and hence causing the roving to be made of increased length and of the proper twist.

Further objects and advantages of the invention will appear in the course of the subjoined description, and particularly brought out in the claims.

The new and improved spinning-head forming the subject of this application was originally disclosed and described in my application for a spinning-frame filed November 7, 1900, Serial No. 35,777, of which this application is a division.

In the drawings hereto annexed, forming a part of this specification, Figure 1 is a view in side elevation of one of my new and improved spinning-heads, showing the parallel journal-rails in cross-section. Fig. 2 is a vertical central sectional view of the spinning-head. Fig. 3 is a horizontal section in the plane of the dotted line 3 3 in Fig. 2.

The same numerals of reference denote like parts in all the figures of the drawings.

15 16 designate a pair of parallel journal-rails which are arranged at the upper front side of the machine-frame, the latter being of any suitable construction to sustain the operating parts of my spinning-frame. These journal-rails are arranged one below the other and provided with suitable openings 21 25 in the rails 15 16, respectively, the series of openings in each rail being spaced apart at suitable intervals and also arranged to aline or coincide vertically with the openings of the other rail, whereby said parallel rails are adapted to support a series of spinning-heads, which form an essential part of the machine of my invention. The spinning-heads of the series are mounted individually in the parallel rails, so as to operate therein independently of each other, and each spinning-head is constructed with a tubular spindle 18, which carries a footpiece 26, in which is journaled a pair of rollers 28 29, which are geared to the lower end of a vertical sleeve 22, the latter surrounding the tubular spindle and adapted to be driven positively in the same direction as and at a higher rate of speed than said tubular spindle, whereby the pair of rolls are adapted to rotate with the footpiece and the tubular spindle around a vertical axis, and said rolls are furthermore driven positively by the rotary sleeve 22. The interior spindle 18 is provided at a point beyond the sleeve 22 with a pulley 19, and the upper portion of said tubular spindle is extended, as at 20, so as to fit in the opening 21 of the upper rail 15 and to extend through said opening 21 in order to expose the upper extremity of the interior spindle above the rail, and thus enable the sliver to be easily passed through the spinning-

head. The sleeve 22 loosely surrounds the tubular spindle, so as to extend from the pulley 19 down to the foot 26, said sleeve being provided at its upper portion with a pulley 5 23, that lies contiguous to the pulley 19 of the interior spindle. The sleeve is furthermore formed with an annular groove 24, which is equal in length to the length of the bearing-opening 25 in the lower journal-rail 10 16, as will be understood by reference to Figs. 1 and 2, the upper end of said grooved portion of the sleeve forming a shoulder 24^a, while a similar shoulder 24^a is formed at the bottom of the groove by the attachment of 15 the hub of a skew-gear 35 to the lower end of the sleeve, said shoulder being adapted to abut against the rail 16, so as to hold the sleeve against endwise movement therein. From this description it will be seen that the 20 pulleys 19 23 of the spindle and the sleeve, respectively, are disposed between the journal-rails 15 16 and, furthermore, that the sleeve 22 is mounted directly in the lower rail 16, while the spindle has its upper portion 25 journaled in the rail 15 and its lower portion is contained in the sleeve, whereby the parts are disposed concentric one with the other, so as to be capable of rotating independently when driven by suitable gear appliances in 30 the form of driving-belts adapted to be individually engaged with the pulleys 19 23 of the spindle and the sleeve, respectively.

The foot 26 consists of a top plate and a pair of parallel side plates 27, (see Figs. 2 and 35 3,) which side plates depend from the top plate 26, and the latter is secured firmly to the lower end of the tubular spindle 18. (See Fig. 2.) In the side plates of this foot are journaled the arbors 28^a 29^a of the two coacting rolls 28 29, respectively. (See Fig. 3.) 40 The roll 28 has one end of its arbor extended beyond one side plate of the foot for the reception of a skew gear-pinion 30, and the other roll 29 has the other end of its arbor extended beyond the opposite side plate of the 45 foot for the reception of another skew gear-pinion 31. The two gear-pinions 30 31 are thus disposed on opposite sides of the foot, so that their teeth will face in opposite directions, and the gear-pinions are adapted to 50 have intermeshing engagement with a single skew-gear 35, which is secured firmly and detachably to the lower extremity of the sleeve 22, whereby the gear 35 may be removed and 55 the sleeve may be mounted in its bearings in the rail 16 or be dismounted therefrom. It will be observed that this gear-wheel 35 is disposed between the oppositely-facing gear-pinions on the coacting rolls, and said sleeve 60 with its skew-gear are revoluble on a vertical axis in the same direction as the direction of rotation of the foot, but at a faster rate of speed than the coacting rolls journaled therein and the tubular spindle, whereby the gear 65 35 in connection with the gear-pinions 30 31 positively rotate the coacting rolls on their

axes at the same time that said coacting rolls are rotated on the vertical axis of the tubular spindle. In connection with the described operation of the parts it is to be observed 70 that I employ mechanism for driving the pulley of the tubular spindle at a slower rate of speed than the pulley of the external sleeve, which driving mechanism will be hereinafter described, and this results in the proper at- 75 tenuation and twisting of the sliver, so as to produce a higher grade of roving, because the rotation of the coacting rolls on their axes serves to draw out or attenuate the sliver, and the rotation of the tubular spindle with the 80 drawing-rolls mounted therein serves to properly twist the sliver simultaneously with its attenuation. I prefer to mount each roll of the pair of coacting rolls in the foot of the tubular spindle, so that one end portion of 85 the roll-arbor is loosely fitted in the opening of one foot-plate, while the other end of said roll-arbor is slidably fitted in a slot 32 of the other foot-plate. A tubular aperture extends 90 rectangulary from the slot 32 to the outside of the foot-plate, as shown, in which aperture is a slidable block 33, which is acted upon by a spring 34, the latter being held in place by a threaded plug 34^a, which is screwed 95 into the aperture, as shown by Fig. 3. This construction insures the maintenance of the pair of rolls in coacting relation, so as to properly engage with the sliver under necessary tension to draw said sliver in a down- 100 ward direction, the yielding pressure devices of the rolls permitting the latter to give somewhat when a knot or other obstruction in the sliver is encountered.

I desire to call especial attention to the fact that in my improved twisting and drawing 105 head the pair of coöperating rolls are both positively driven, and they are so mounted and driven as to utilize the centrifugal force developed by the high speed of rotation in a 110 manner to press the drawing-rolls 28 and 29 together, notwithstanding the fact that the improved head is driven at a much higher rate of speed than can ordinarily be obtained by prior constructions known to me. This 115 effect is obtained by giving the gear-pinions 30 and 31 sufficient excess of weight over the rolls 28 29 to enable the centrifugal energy acting upon them to more than counterbalance that acting on the rolls 28 29, which latter would tend to force the rolls 28 29 apart; 120 but the superior force of the gears 30 31 presses them together. Practical experiments which I have conducted disclose the fact that the improved spinning-head having the positively-driven rolls can be advanta- 125 geously operated at a speed of five thousand revolutions per minute, whereas prior constructions known to me are limited to a speed not over one thousand revolutions per minute. It is to be understood that each draw- 130 ing-roll has one end mounted in a sliding spring-pressed bearing which combines with

the centrifugal force before referred to to press the rolls together, the other end of the roll being disposed in a loose bearing of a relatively stationary part of the head, so that it cannot have any longitudinal motion. Furthermore, the gears are arranged on opposite ends of the rolls and likewise the spring-pressed bearings at opposite ends, whereby the slight transverse movement caused by the centrifugal force and the springs 34 will always keep the rolls in strict parallelism with one another. By this means the rolls will always be kept in the necessary engagement with each other to hold the sliver or roving, so as to draw and twist it to the desired extent. Furthermore, all the parts of the improved head are carried by a spindle of small diameter, which may be mounted so as to turn with a minimum of friction. All the parts may be lubricated by feeding oil through the sleeve and spindle, and easy access to the rolls can be obtained to tie up broken threads. The parts of the improved head are, moreover, few in number and simple in construction.

It is to be remarked that the spinning-head will ordinarily be mounted in the spinning-frame in long rows upon the longitudinal rails 15 and 16 at proper intervals from each other, so as to extend across the front portion of the machine, and each spinning-head of the series is associated with a duplicate driving mechanism operating the pulleys 19 23, this mechanism being common to all of the spinning-heads and arranged to drive the spindles and the sleeves of the series of spinning-heads simultaneously in the same direction and at the same required variable rates of speed. This general construction being common in spinning-heads and specifically illustrated in my pending application hereinabove referred to need not be further illustrated, as it will be well understood.

Changes within the scope of the appended claims may be made in the form and proportion of some of the parts, while their essential features are retained and the spirit of the invention is embodied. Hence I do not desire to be limited to the precise form of all the parts as shown, reserving the right to vary therefrom.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a spinning-frame, a spinning-head comprising revoluble members driven in the same direction at different speeds, a gear carried by one of said members, a pair of drawing-rolls mounted in the other member and said rolls provided at their opposite ends respectively with gears which counterpoise the weight of the rolls and both of said gears having intermeshing engagement with the gear on said other member to be driven positively thereby, and tension devices in coöperative

relation to the otherwise free ends of said rolls and adapted to normally force the same toward each other; the arrangement of the rolls and the gears mounted thereon being such that centrifugal energy developed by high speed of the spinning-head tends to normally force the rolls together and to exert proper drawing and twisting action on the sliver or roving, as set forth.

2. In a spinning-frame, a twisting and drawing head comprising concentric members revoluble in the same direction and at different speeds, a pair of coacting rolls mounted in one member to rotate therewith and each roll provided at one end with a yieldable bearing, said bearings being located at opposite ends of the respective rolls, and gearing connecting both of said rolls operatively with the other member and adapted to positively rotate both rolls on their axes at equal angular velocity, whereby centrifugal force of the rolls developed by high speed of the spinning-head tends to normally force the rolls into co-operative relation, substantially as described.

3. In a spinning-head, a twisting and drawing head comprising concentric members revoluble in the same direction and at different speeds, a slotted foot-block fast with one of said members, a pair of rolls each having one end journaled in a stationary bearing in the foot-block and its other end loosely fitted in a slot of the foot-block, the loosely-mounted portions of said rolls lying at opposite ends of the rolls respectively, springs in coöperative relation to the loosely-mounted ends of said rolls and tending to normally force them together, and gears between the rolls and the other head member for positively rotating both rolls on their axes, as and for the purposes described.

4. In a spinning-frame, a twisting and drawing head comprising concentric members revoluble in the same direction and at different speeds, a foot-block fast with one of said members and provided with plates having slots at their opposite ends, spring-actuated bearings in said slots of the plates, a pair of coacting rolls each having one end engaged by said bearings and its other end mounted in an opening of one plate, said spring-actuated bearings tending to move the rolls normally toward each other, a bevel-gear secured to the stationary supported end of each roll, and a driving-gear fast with one head member and engaging with the gears of both rolls to positively drive the latter, substantially as described.

5. In a spinning-frame, a twisting and drawing head comprising a tubular spindle, a sleeve concentric with the spindle and provided with a driving bevel-gear, a foot-block secured fast to the spindle, spring-actuated bearings supported by the foot-block, a pair of coacting rolls carried by the foot-block and each roll having one end engaged by one of

said bearings and its other end mounted in a stationary bearing, said bearings engaging with opposite ends of the respective rolls and tending to normally hold the latter in cooperative relation, and bevel-gears made fast with the rolls at the ends thereof which are in stationary bearings and said gears intermeshing with the driving-gear to positively

propel both of the rolls, substantially as described. 10

In witness whereof I have hereunto set my hand in the presence of two witnesses.

FRANK ALEXANDER BREEZE.

Witnesses:

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