No. 679,428. Patented July 30, 1901.

A. W. METCALFE.

YARN WINDING MACHINE.

(Application filed May 27, 1898.)

(No Model.) 5 Sheets—Sheet 1.

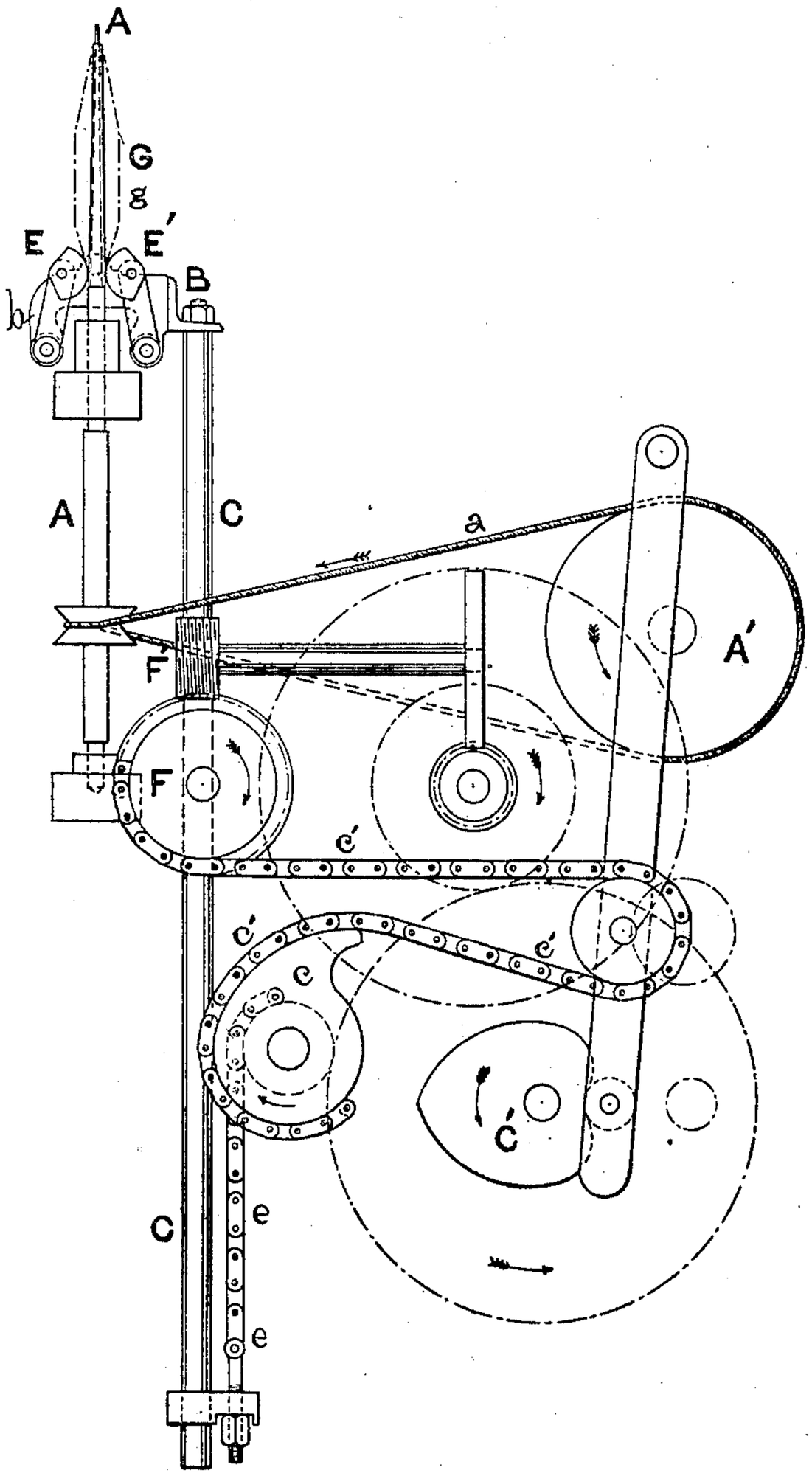

FIG. 1.

WITNESSES.

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No. 679,428. Patented July 30, 1901.

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YARN WINDING MACHINE.

(Application filed May 27, 1898.)

(No Model.) 5 Sheets—Sheet 2.

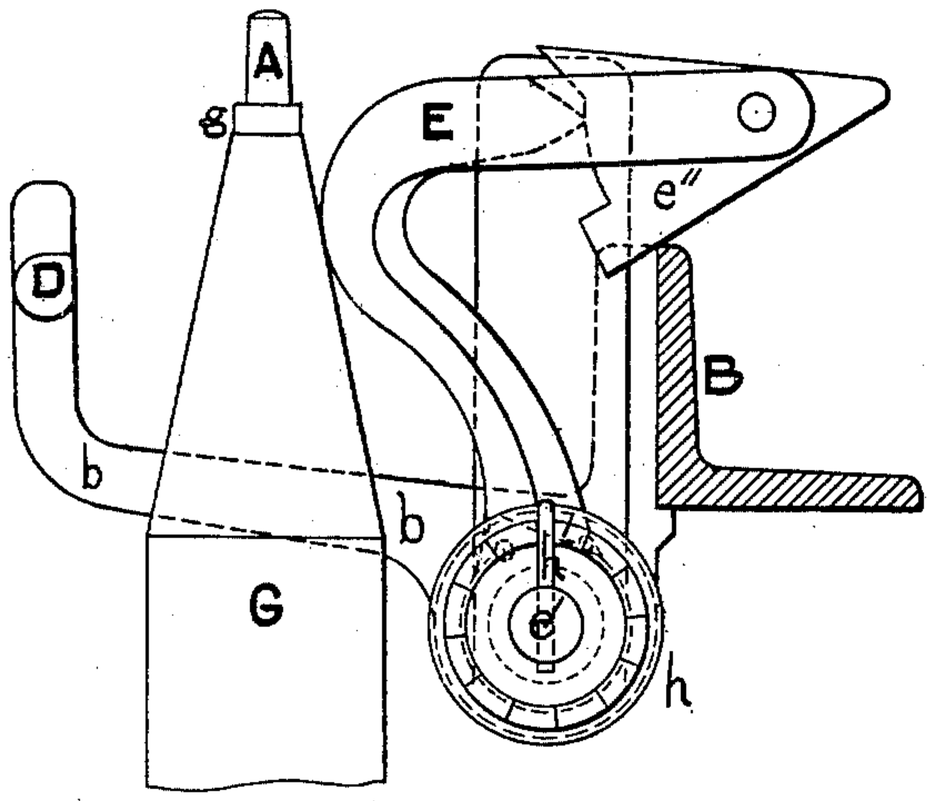
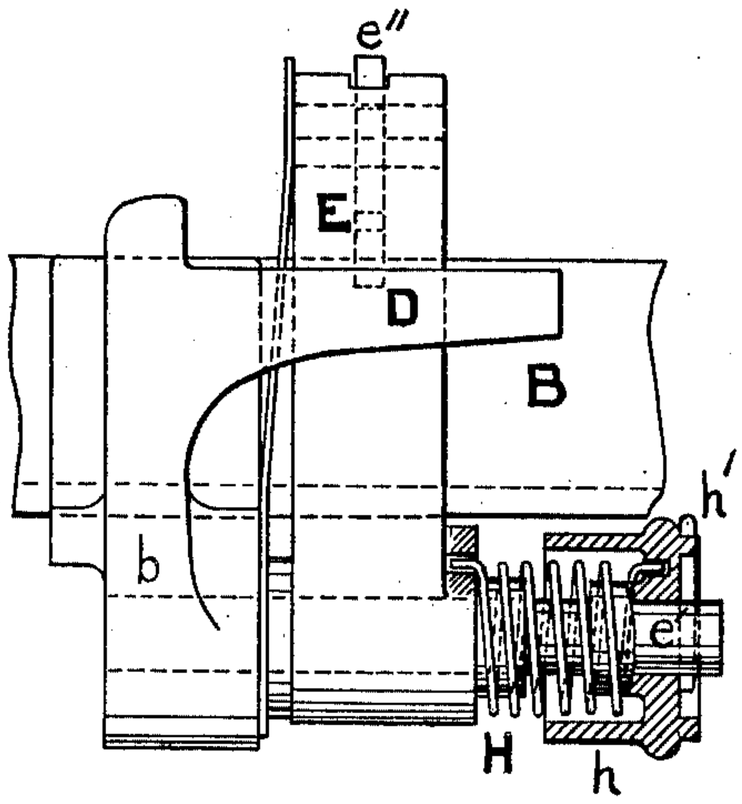


FIG. 2.



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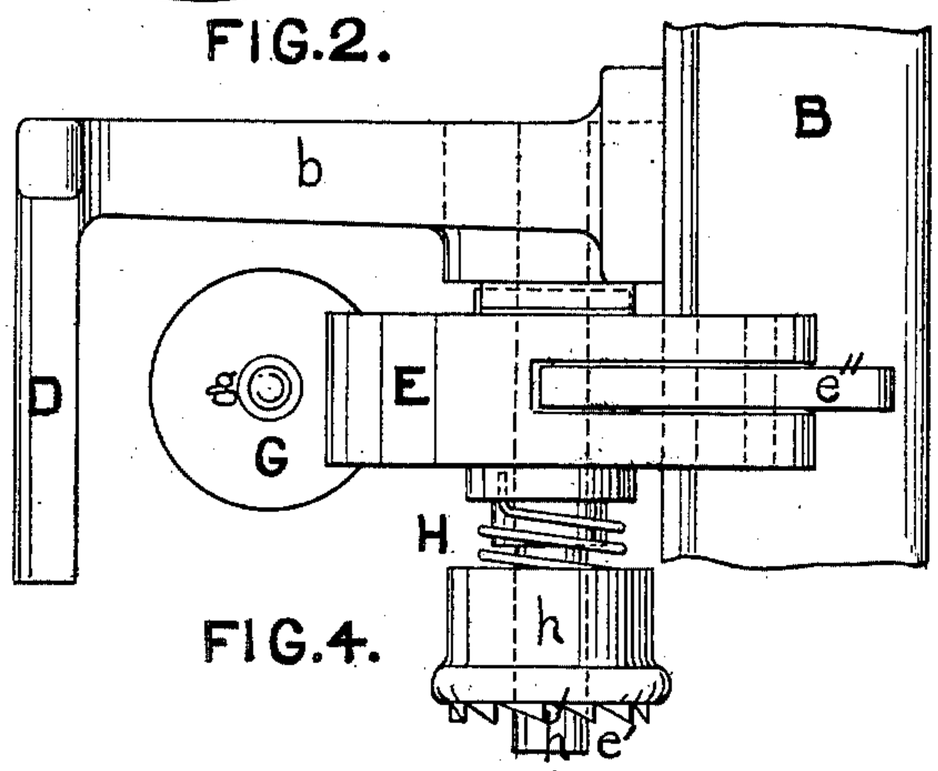

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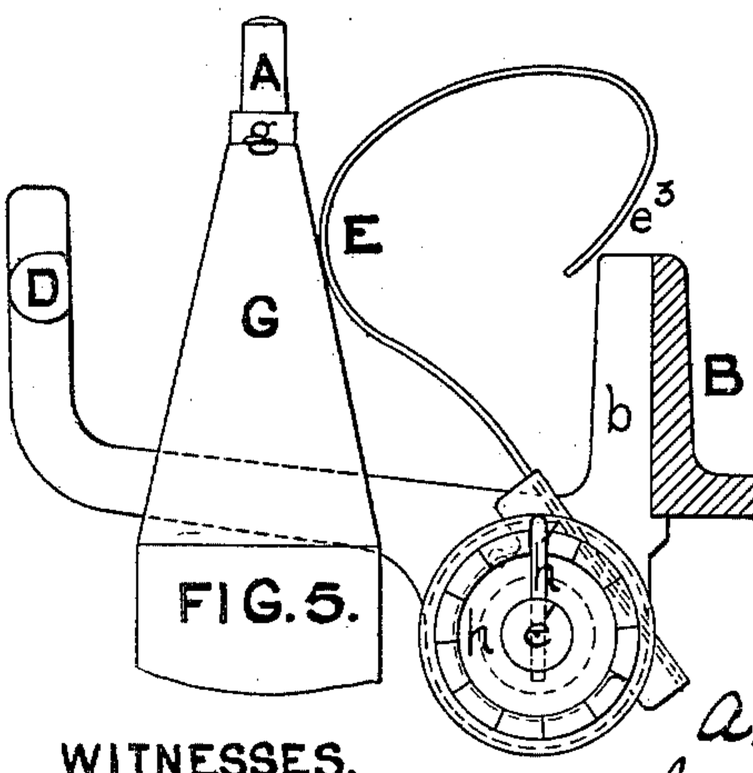

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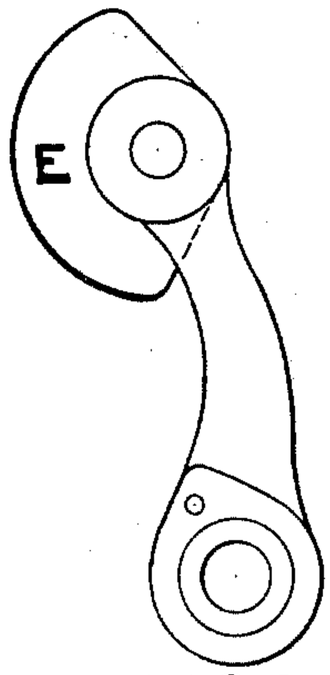

FIG. 6.

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No. 679,428. Patented July 30, 1901.

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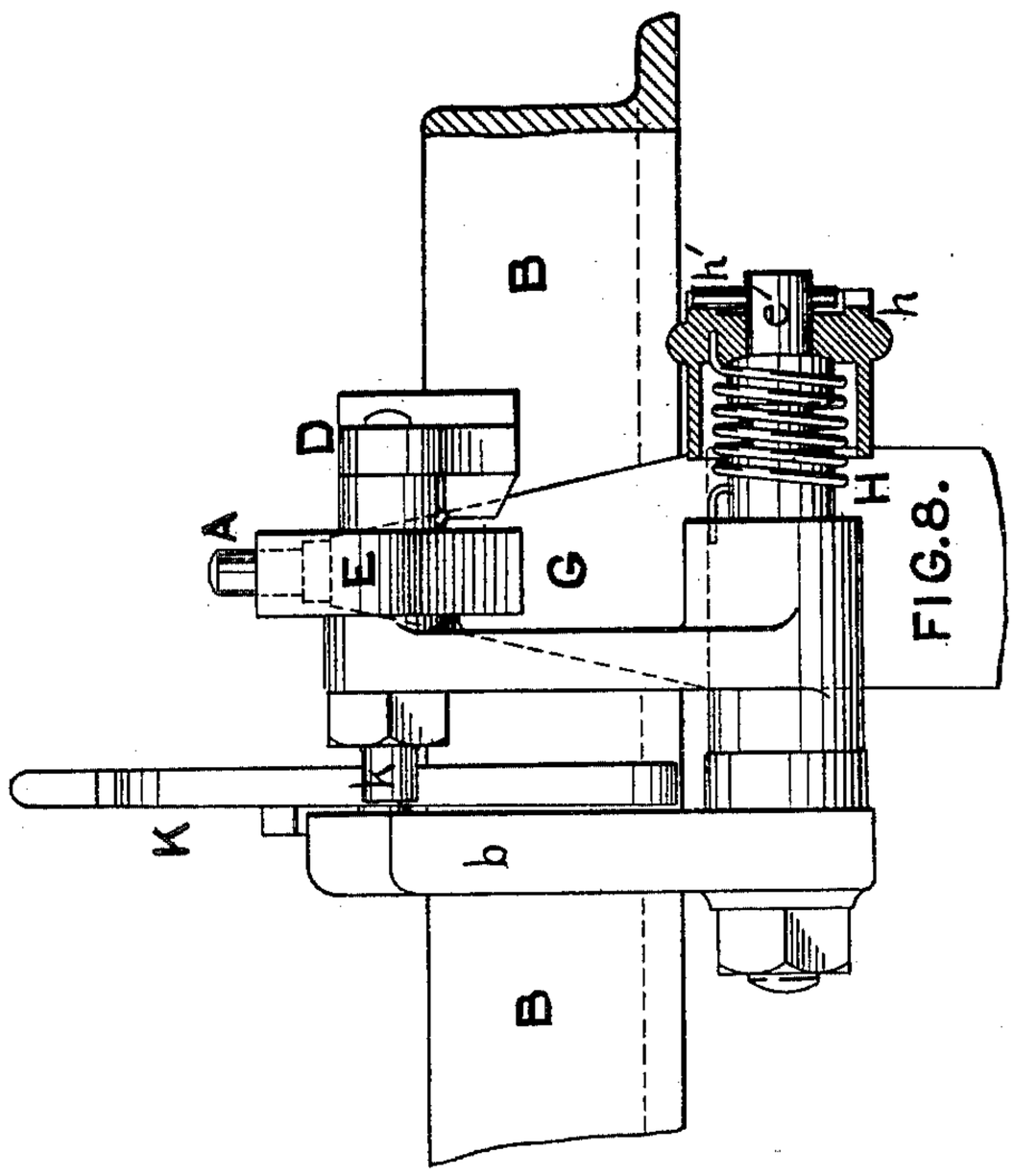
YARN WINDING MACHINE.

(Application filed May 27, 1898.)

(No Model.) 5 Sheets—Sheet 3.



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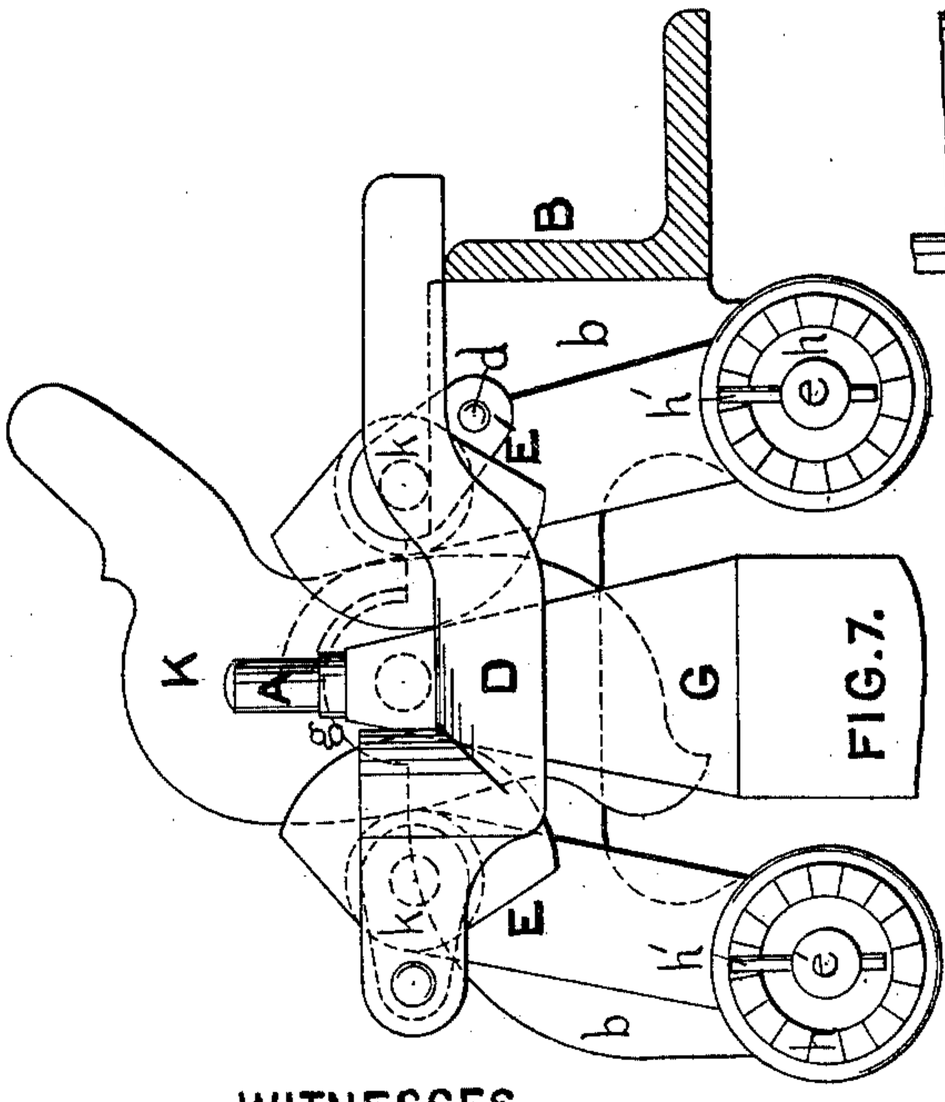

FIG.7.

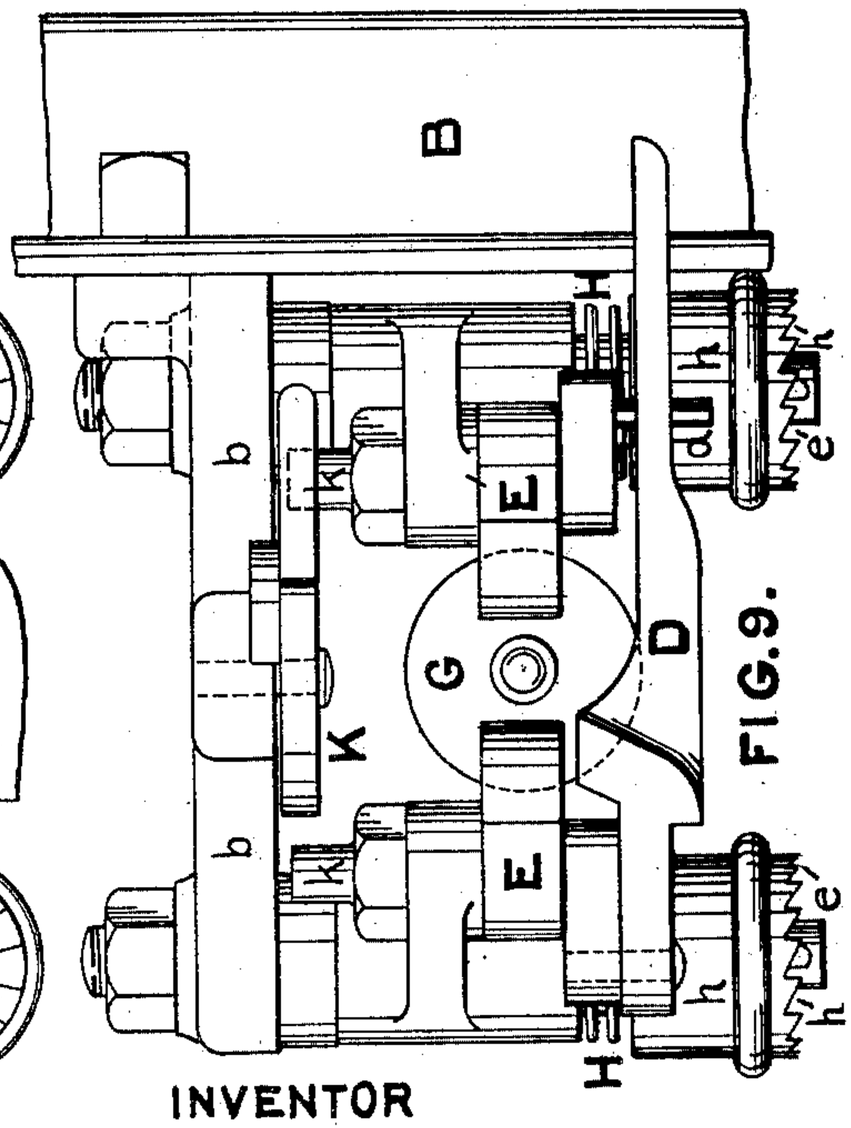

FIG.9.

WITNESSES.

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No. 679,428. Patented July 30, 1901.

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YARN WINDING MACHINE.

(Application filed May 27, 1898.)

(No Model.) 5 Sheets—Sheet 4.

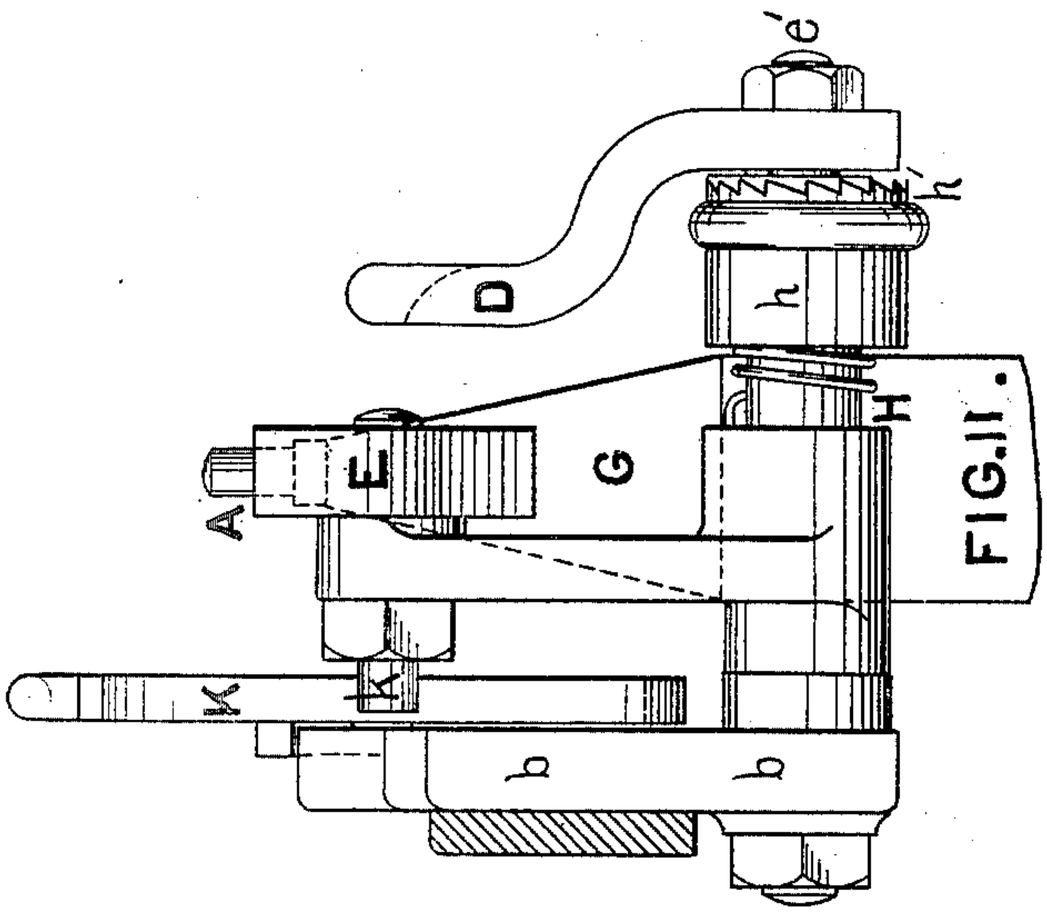

FIG. 11.

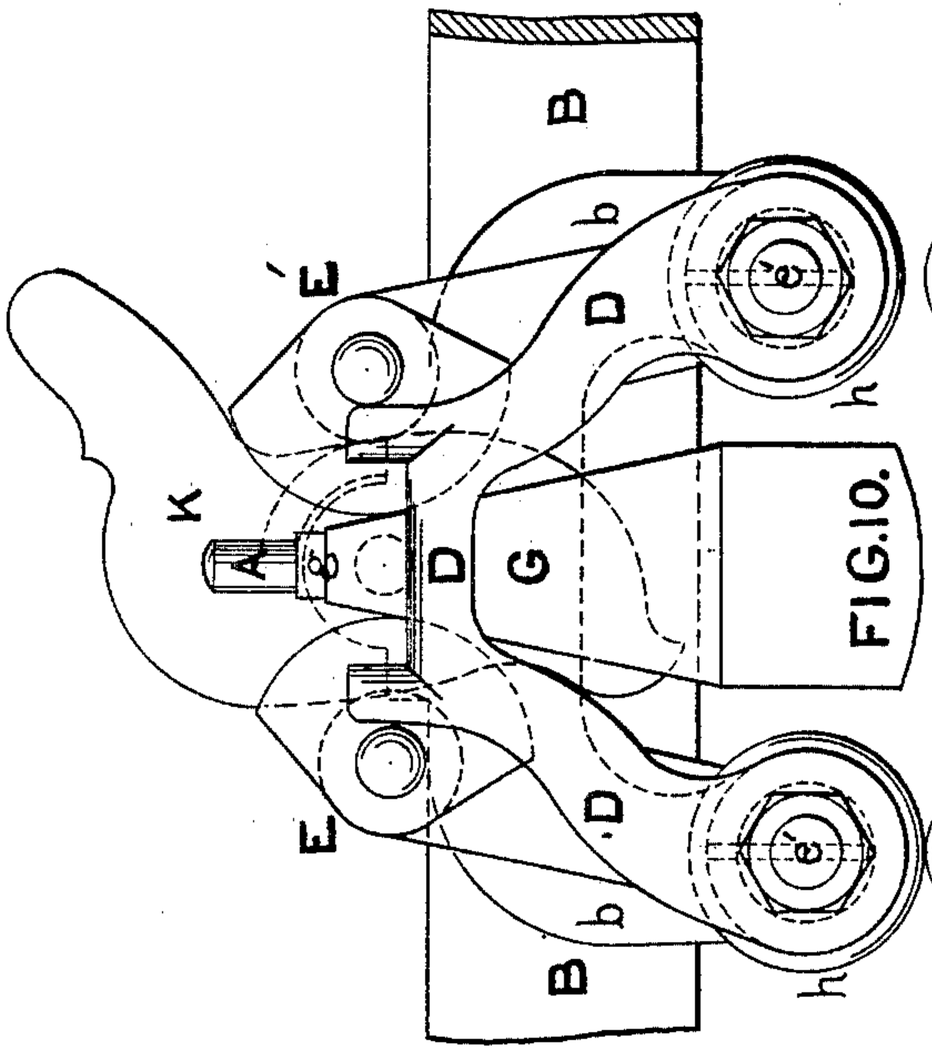

FIG. 10.

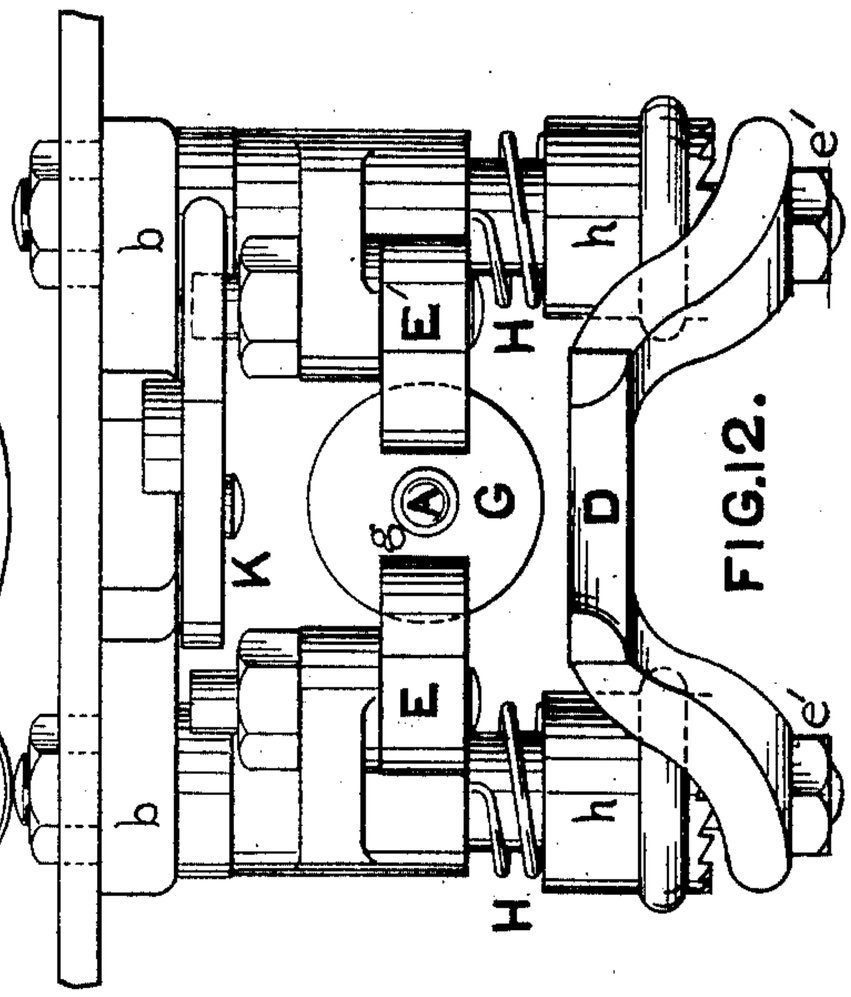

FIG. 12.

WITNESSES.

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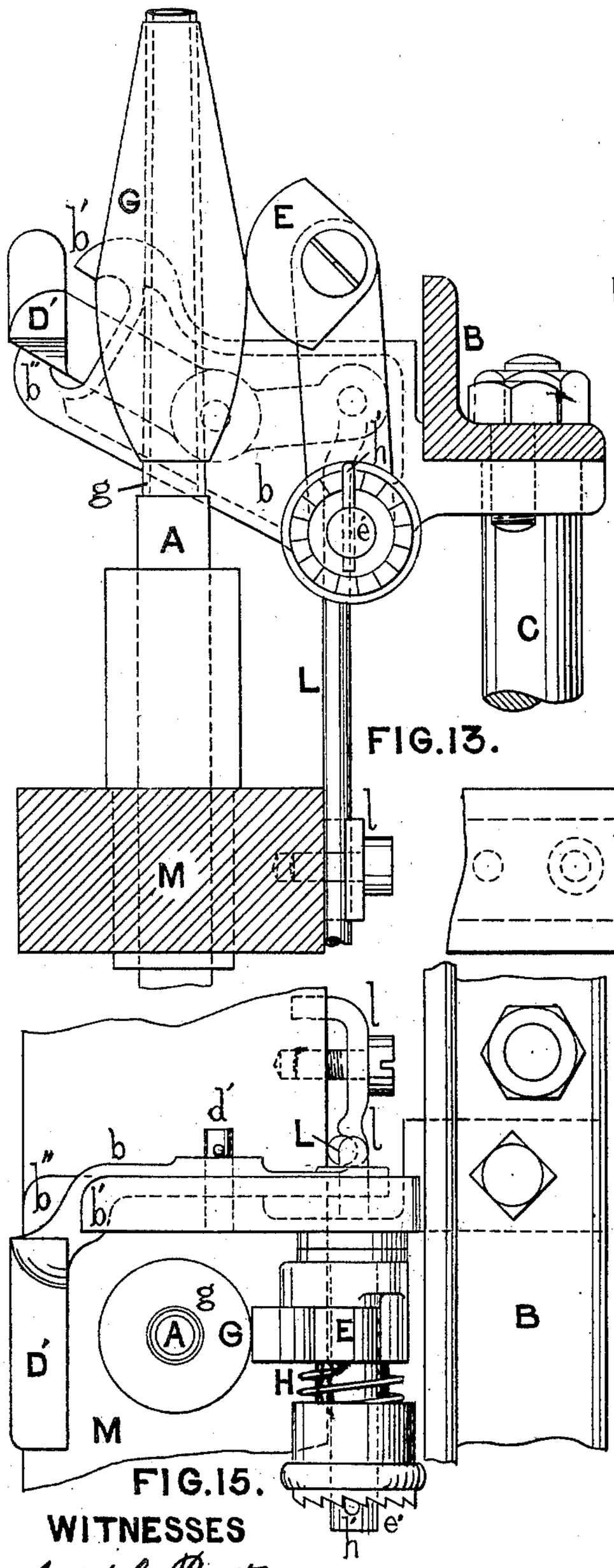
No. 679,428. Patented July 30, 1901.

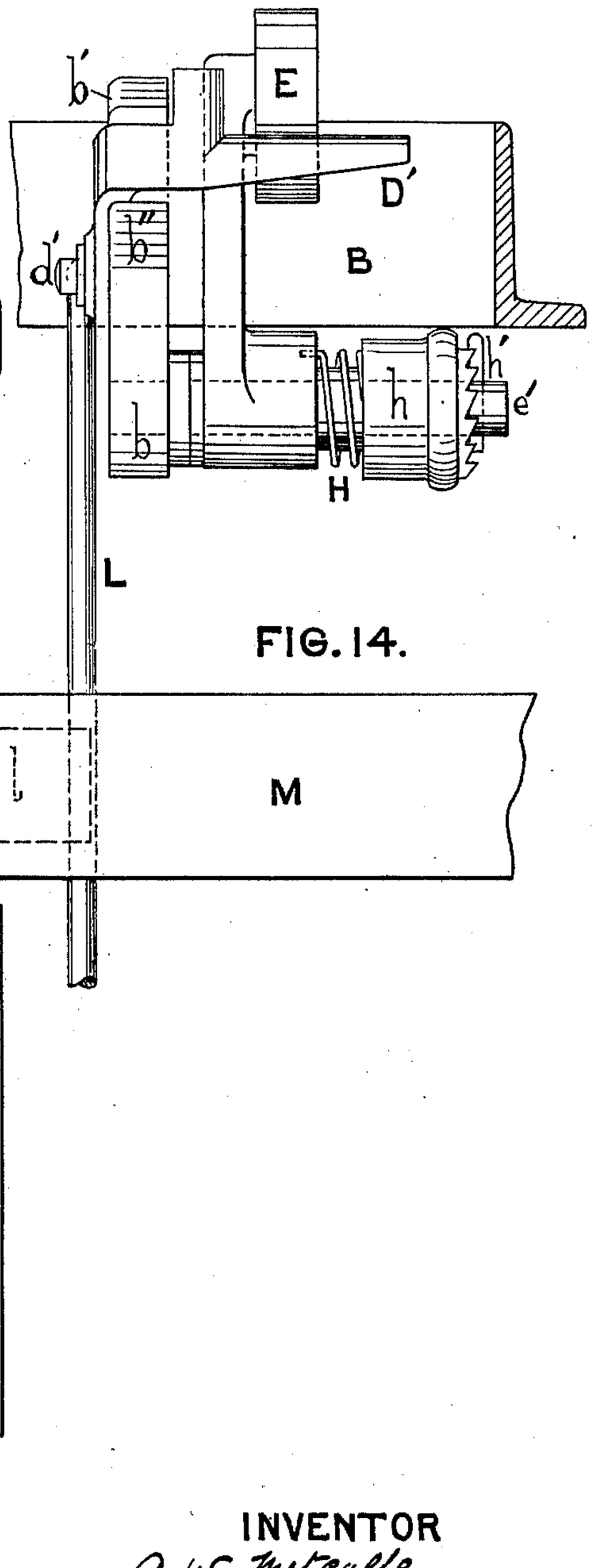
A. W. METCALFE.

YARN WINDING MACHINE.

(Application filed May 27, 1898.)

(No Model.) 5 Sheets—Sheet 5.





WITNESSES

Joseph Bates

E. Howard

INVENTOR

A. W. Metcalfe

by Dowell & O'Brien

Atty.

UNITED STATES PATENT OFFICE.

ARTHUR WILSON METCALFE, OF BELFAST, IRELAND.

YARN-WINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 679,428, dated July 30, 1901.

Application filed May 27, 1898. Serial No. 681,925. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR WILSON METCALFE, of Belfast, in the county of Down, Ireland, have invented certain new and useful Improvements in Yarn-Winding Machines, of which the following is a description.

This invention relates to the winding of yarn or thread upon tubes or pirns for purposes of weaving and the like, and is designed especially for building the yarn upon plain tubes instead of the wooden pirns with conical base, as usually employed.

It will be fully described with reference to the accompanying drawings, in which sufficient of a winding-frame is shown to illustrate my invention.

Figure 1 is an end elevation, partly in section, showing the relative position of the invention with the spindle driving and operating mechanism. Fig. 2 is a side elevation of one arrangement of yarn guide and presser. Fig. 3 is a front elevation of same, partly in section. Fig. 4 is a plan of same. Fig. 5 is a side elevation of another construction of yarn-presser. Fig. 6 is a side elevation of presser-arm, showing a modified arrangement. Fig. 7 is a side elevation of arrangement of yarn-guide with two pressers, one on each side of the cop. Fig. 8 is a front elevation of same, partly in section. Fig. 9 is a plan of same, Fig. 7. Fig. 10 is a side elevation of another arrangement of yarn-guide and two pressers. Fig. 11 is a front elevation of same. Fig. 12 is a plan of same, Fig. 10. Fig. 13 is a side elevation of an arrangement of adjustable yarn-guide with single presser. Fig. 14 is a front elevation of same. Fig. 15 is a plan of same, Fig. 13.

The spindle A is of ordinary construction, mounted upon a suitable frame and driven by a band *a* from the drum A′. The builder-rail B, upon which the yarn or thread guides D and pressers E E′ are mounted, is raised and lowered by rods or pokers C, the traverse of which is effected by the heart-shaped cam C′ and chain *e*, and the shaping of the cop is effected by the shortening of the chain *c*′ around the chain-pulley F. The pulley F is rotated by the worm F′ and slowly takes up the chain *c*′, rotates the cam or wheel *c*, and takes up the chain *e* thereon, thus altering the height of the traverse of the builder-rail B at each lift. The cop G is wound upon a paper tube or base *g*, tightly fitting upon the spindle A.

To the builder-rail B, in front of or beside each spindle, is mounted on a suitable bracket *b* a yarn-guide D, over which the yarn to be wound is passed and by which it is caused to be traversed through a distance equal to the chase of the pirn by the builder-rail B. The builder-rail B also carries for each spindle A a presser or pressers E E′ to lay or build the yarn or thread firmly onto the cop G upon the tube or pirn *g* as it is delivered from the guide D. This effects the laying of the yarn closely together without putting any undue strain upon it. The guide D and presser or pressers E E′ being carried by the builder-rail B traverse and operate in conjunction with each other.

The guide D forms part of the bracket *b* or may be pivoted to it or to the presser E, and the presser E is pivoted upon a stud or pin *e*′ and held with sufficient pressure against the yarn on the cop G by a spring. The pressure is preferably exerted by a spiral spring H, wound around the axis, one end being attached to the arm of the presser and the other to an adjustable washer or collar *h*, capable of being rotated to adjust the tension of the spring and held by a pin *h*′, engaging in notches in the face.

The presser E (or E′) is formed or curved to such a shape that in all positions in the build or traverse of the cop the presser is touching the new yarn as it is wound on. The presser may be made of cast-iron of bent or curved shape, as in Figs. 2 to 4, or it may be formed of a blade or spring of steel, as in Fig. 5, or of a hardened steel block adjustable to compensate for wear carried, as in Fig. 6, at the end of an arm or lever pivoted on the pin or stud *e*′.

The pressers E E′ are held back out of position for the purpose of piecing a broken end or for doffing the full cops by a catch e^2, pivoted thereto, or by the end e^3 engaging with the traverse-rail B, or by an eccentric or other device.

While the builder and guide D are moving up and down the pirn the line of the yarn-bearing laid on the cop G lags somewhat behind the guide, and to insure the presser act-

ing as required upon the new thread of yarn I may pivot the guide D to the presser E, as in Figs. 7 to 9, or employ two pressers E E′, set at different levels, as in Figs. 10 to 12, or I may give an adjustable movement to the guide D, as in Figs. 13 to 15.

In Figs. 7 to 9 two pressers E E′ are pivoted to the bracket *b*, and the yarn-guide D is pivoted to the presser E and carried to and fro with it, so that the line of delivery of the yarn and the line of pressure of the pressers remain relatively constant. The free end of the pivoted yarn-guide D may rest upon the builder-rail B, or a pin, such as *d*, may be provided in the other presser for it to rest upon. The pressers are held out of contact with the cop when required by the eccentric lever K, engaging with the pins *k*.

In Figs. 10 to 12 the two pressers E E′ are pivoted in a position at right angles to that shown in the preceding figures. The yarn-guide D is fixed or mounted upon the studs *e′*, which carry the pressers E E′, and so remains stationary relatively to the bracket *b*, while the position of the pressers varies with the diameter of the cop. To insure that the pressure should come upon the new yarn as it is wound on, the pressers may be set one slightly above the other, one for the upstroke and the other for the downstroke, so that each in turn presses upon the new yarn.

In Figs. 13 to 15 a single presser E is shown pivoted upon the pin *e′*, as before described. The yarn-guide D′ is pivoted to the bracket *b*, so as to be movable within certain limits, moving up and down at each change of traverse to bring the line of delivery of the thread above or below the pressure-line of the presser E to allow for the lag or trailing of the yarn when traversing. The bracket *b* is provided with two jaws *b′ b″*, between which the yarn-guide D′ passes. The guide is pivoted to the bracket on the pin *d′* and carries at its free end a rod L, reaching downward and engaging with a spring-clip *l* on the spindle-rail M, so arranged as to exert a slight frictional pressure upon the rod. The builder-rail B is shown at the bottom of the traverse; but when it commences to rise the rod L is held by the spring-clip *l* until the yarn-guide D′ is raised into contact with the upper jaw *b′* of the bracket *b*, thus raising the point of delivery of the yarn above the pressure-line of the presser. When the builder reverses at the top of the traverse and begins to move down, the reverse action takes place and the rod L is retained by the clip *l* until the yarn-guide comes into contact with the lower jaw *b″*, thus bringing the point of delivery of the yarn below the pressure-line of the presser. The whole movement amounts to from about one thirty-second to one-sixteenth of an inch.

What I claim as my invention, and desire to protect by Letters Patent, is—

1. In yarn or thread winding machines the combination with the vertical spindle A and horizontal builder-rail B, of the bracket *b* affixed to the rail, the shaped yarn-guide D carried by the fixed bracket, a vertical presser pivoted upon the fixed bracket capable of applying pressure to the yarn as it is freely wound on while adapting its position to the shape of the base from plain to conical, a horizontal pin fixed to the bracket to carry the presser, and a spiral spring H upon the pin to hold the presser with force against the yarn, substantially as described.

2. In yarn or thread winding machines the combination of the spindles A, builder-rail B, brackets *b* affixed to the rail, yarn-guides D carried by the brackets, pressers E E′ pivoted to the bracket capable of applying pressure to the yarn as it is freely wound on while adapting their position to the shape of the base from plain to conical, pins *e′* upon which the pressers are pivoted, springs H for actuating the pressers, notched washers *h* for adjusting the springs, and pins *h′* engaging the notches of the washers, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ARTHUR WILSON METCALFE.

Witnesses:
MALCOLM T. BRICE,
EDWARD HARVEY.