No. 670,135. Patented Mar. 19, 1901.

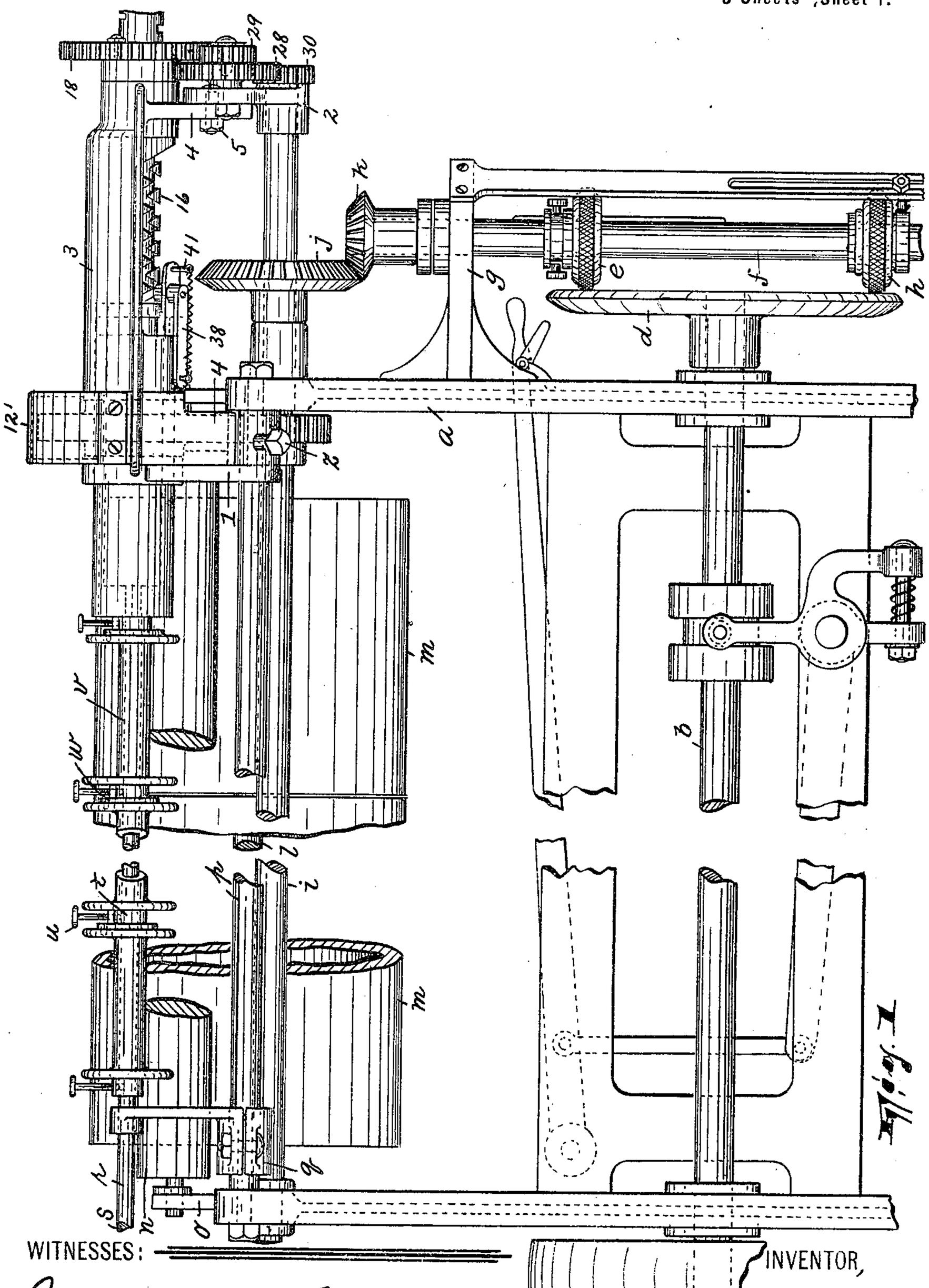
C. H. KNAPP.

WARPING MACHINE.

(Application filed May 26, 1900.

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

Wm. D. Bell.

Robert J. Pollitt.

INVENTOR,

Charles H. Knapp.

BY

Parker & Stewart,

ATTORNEYS.

No. 670,135. Patented Mar. 19, 1901.

C. H. KNAPP.

WARPING-MACHINE.

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(No Model.) 3 Sheets—Sheet 2.

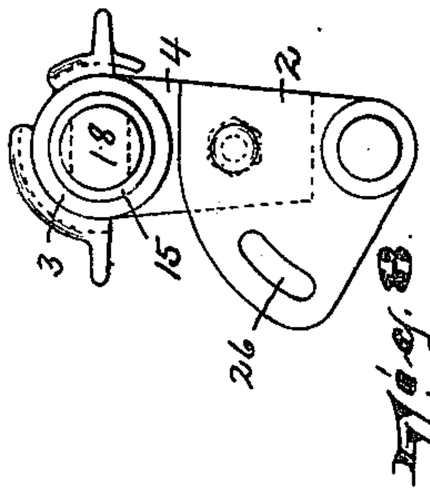
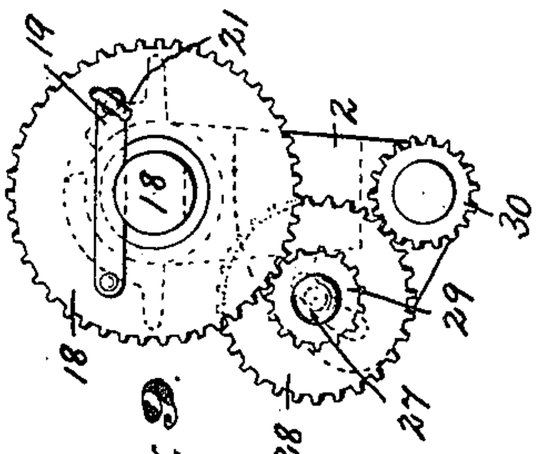


Fig. 8.



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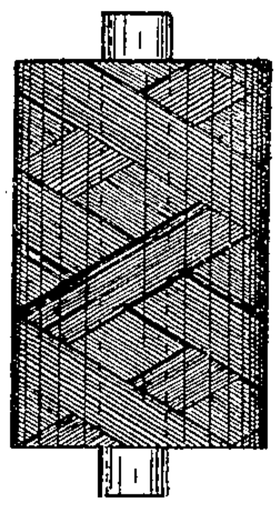

Fig. 10.

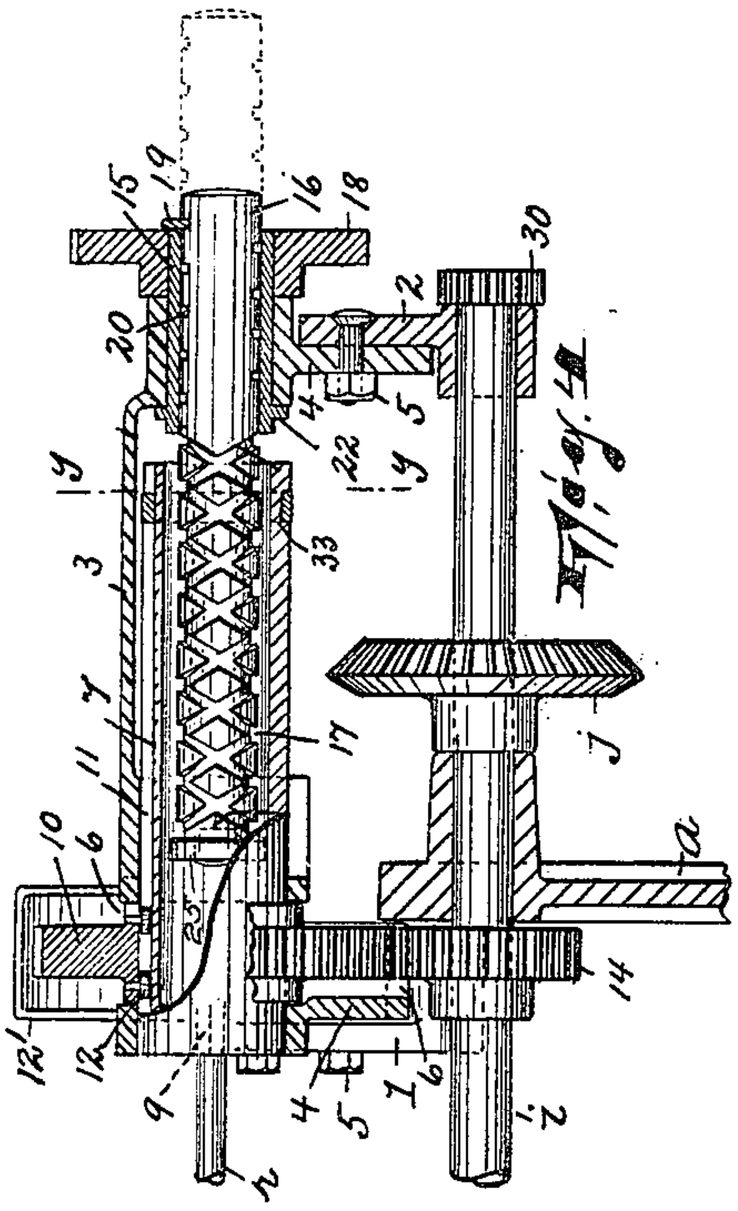

Fig. 4.

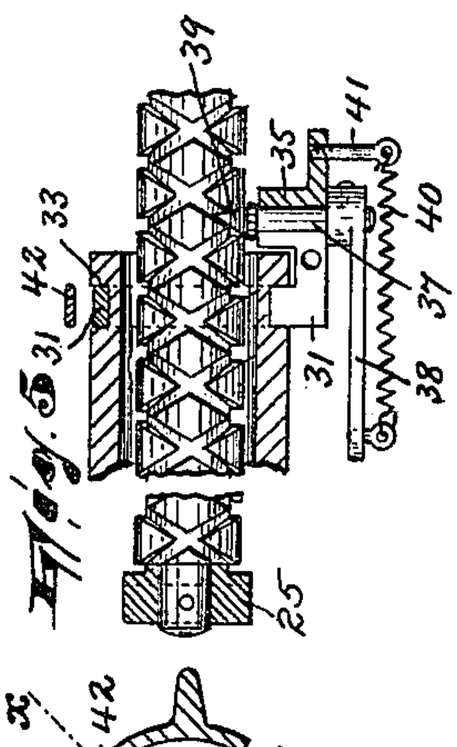

Fig. 5.

Fig. 7.

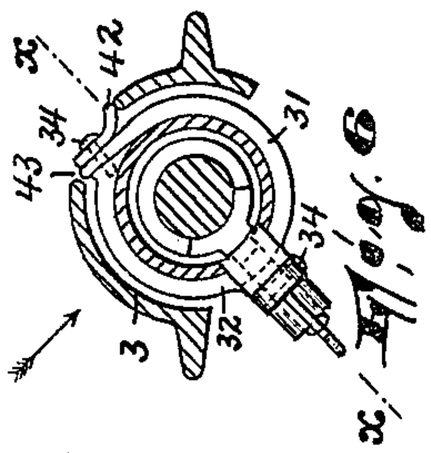

Fig. 6.

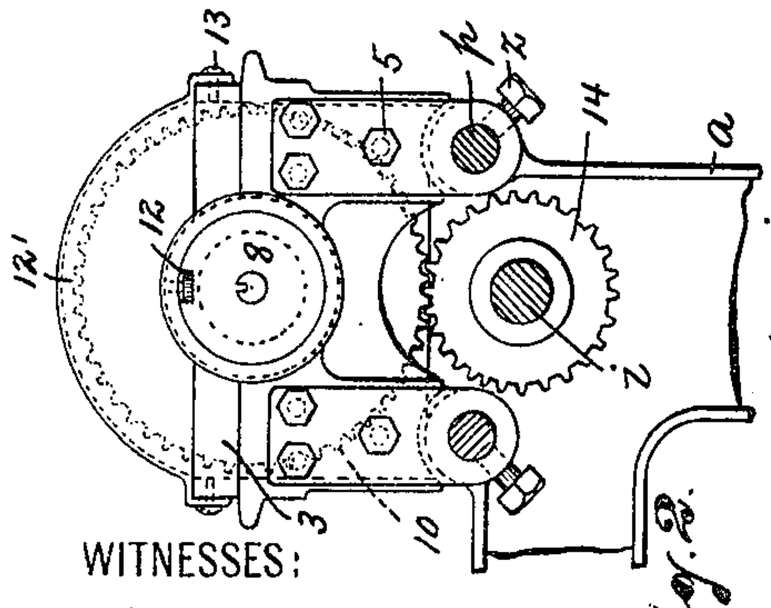

Fig. 3.

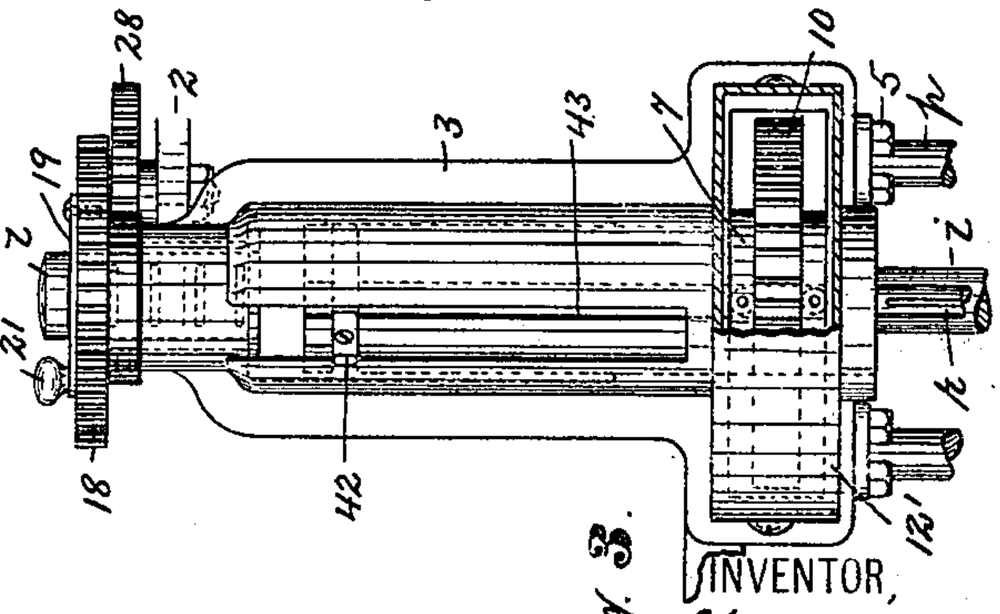

Fig. 2.

WITNESSES:

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No. 670,135. Patented Mar. 19, 1901.

C. H. KNAPP.

WARPING MACHINE.

(Application filed May 26, 1900.)

(No Model.) 3 Sheets—Sheet 3.

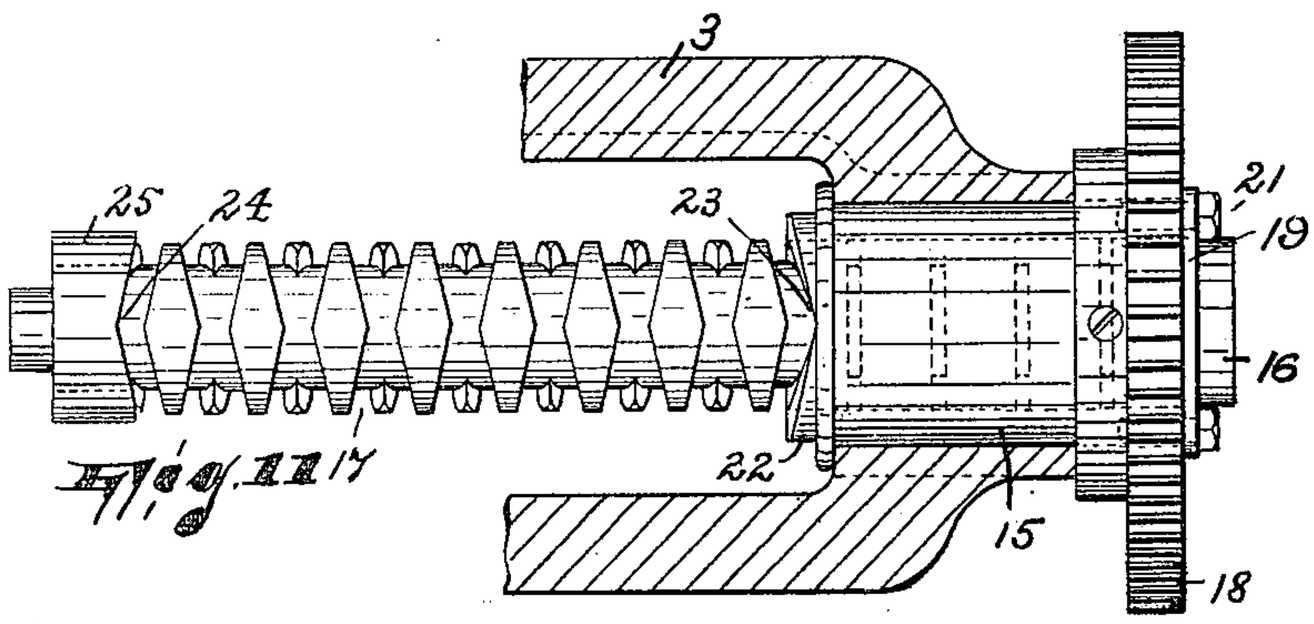

Fig. 11.

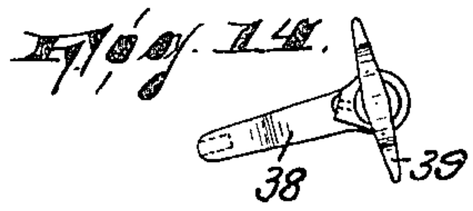

Fig. 14.

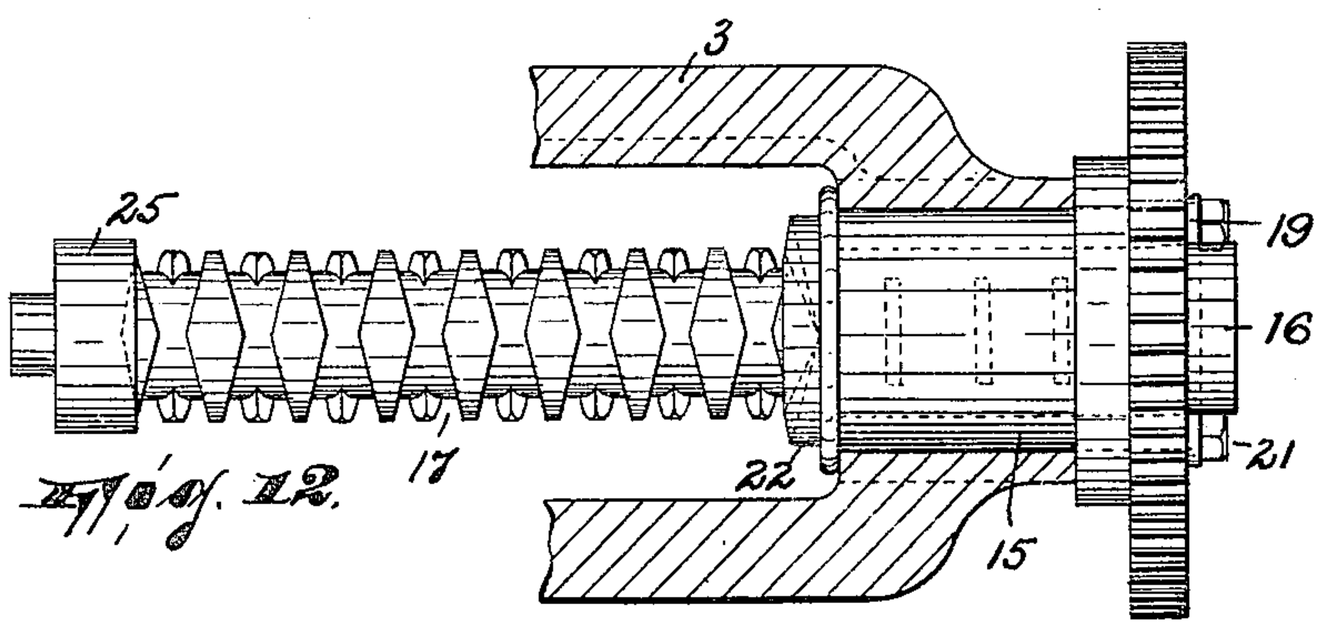

Fig. 12.

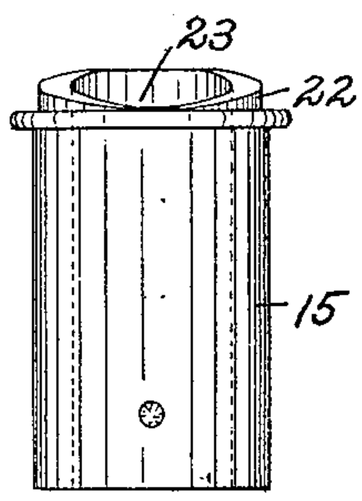

Fig. 13.

WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES H. KNAPP, OF PATERSON, NEW JERSEY.

WARPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 670,135, dated March 19, 1901.

Application filed May 26, 1900. Serial No. 18,083. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. KNAPP, a citizen of the United States, residing in Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Warping-Machines; and I do hereby declare the following to be 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, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

This invention relates to warping or beaming machines; and it has reference particularly to the mechanism employed in certain machines of this nature whereby a traverse motion is effected, so as to produce a continuous back-and-forth spiral winding of the warp on the beam or spools or bobbins.

The object of the invention is to provide a simple and durable traverse-motion mechanism, especially for warping-machines, whereby the winding of the material onto the beam or bobbins may be accomplished with the highest degree of celerity, the cops produced being at the same time uniformly and compactly built up.

Referring to the accompanying drawings, wherein corresponding characters of reference indicate like parts, Figure 1 is a view in front elevation of the upper portion of a warping-machine provided with my traverse-motion mechanism. Fig. 2 is an inner end view of said traverse-motion mechanism. Fig. 3 is a top plan view, a portion thereof being broken away to show the internal construction. Fig. 4 is a longitudinal vertical sectional view of said mechanism. Fig. 5 is a sectional view of said mechanism on the line $x\,x$ in Fig. 6. Fig. 6 is a transverse sectional view on the line $y\,y$ in Fig. 4. Fig. 7 illustrates a certain detail of the invention. Fig. 8 is an outer end view of the mechanism, certain parts being removed. Fig. 9 is an outer end view similar to Fig. 8, the parts removed in said figure being in this figure shown. Fig. 10 shows one of the cops which may be produced by a machine having my improved traverse-motion mechanism. Figs. 11 and 12 are views, slightly enlarged, of a portion of the traverse-motion mechanism, showing opposite sides of a certain double screw constituting a part thereof Fig. 13 is a plan view of a certain bushing also constituting a portion of said traverse-motion mechanism, and Fig. 14 is an enlarged view of some of the parts illustrated in Fig. 7.

I have illustrated my invention in the accompanying drawings as applied to a warping-machine like that set forth in my copending application for United States Letters Patent, filed March 6, 1900, Serial No. 7,483; but it is to be understood that the invention may also be used in connection with other warping-machines.

In said drawings, *a* designates the frame of the machine, in which is journaled the main drive-shaft *b*, carrying at one end a driving-pulley *c* and at the other end a friction-disk *d*. Through the medium of the friction-disk and a friction-wheel *e* a vertical shaft *f*, on which said friction-wheel is keyed and which is journaled in a bracket *g*, is adapted to be rotated. *h* is another friction-wheel whose purpose is simply to control the position of the friction-wheel *e* relatively to the disk through the medium of suitable mechanism, as duly set forth in my copending application above mentioned. Above the shaft *b* a shaft *i* is also journaled in the frame, the same protruding beyond one of the end uprights of said frame extending over the shaft *f*, to which it is operatively connected through the medium of intermeshing bevel-gears *j* and *k*, carried by said shafts. Back of the shaft *i* is disposed another shaft *l*, upon which is journaled a series of beams *m*, each side of and close to which are disposed gravity-actuated rollers *n*, which are supported in levers *o*, that are suitably fulcrumed upon the frame, as also set forth in my said application. Only one of the rollers *n* is illustrated in the drawings. Both sides of the shaft *i* are disposed stationary shafts *p*, which connect the side standards of the frame. On these shafts is supported a bracket *q*, in which is journaled one end of a shaft *r*, having a keyway *s*. On the shaft *r* is secured a series of collars *t*, carrying securing-screws *u*, which engage the keyway in the shaft and prevent the collars from turning. The shaft *r* also carries bobbins *v*, which alternate with the collars and which

are adapted to be driven thereby in the usual manner by means of face-plates *w*, which said collars carry and which are preferably provided with pins engaging orifices in the heads of the bobbins.

It should be remarked that the beams *m* correspond in number to the bobbins *v*. In other words, what is usually a single beam is divided up into a number of smaller beams, one for each bobbin, and thus any variations existing in the several warps because the threads thereof are of varying qualities are accommodated. As hereinafter explained, the bobbins have a traverse or longitudinally-reciprocating motion imparted to them as they rotate, and so the width of each beam *m* should be at least equal to the distance between the extreme points to which the corresponding bobbin moves.

Upon each of the shafts *p* is adjustably secured, by means of a set-screw *z*, a bracket 1, and upon the protruding end of the shaft *i* is supported another bracket 2. These brackets sustain a casting 3, whose downwardly-extending projections 4 are secured to the several brackets, preferably by bolts 5. Said casting is in the form of a cylindrical casing, which is open at the bottom for a portion of the distance between the projections 4 and which at its rear end has other openings 6, disposed the one above the other. In this casing is disposed a longitudinally-movable and revoluble sleeve 7, having one end closed by an integral head 8, into which projects the squared end 9 of the shaft *r*, said shaft being thereby supported at this end. The shaft is movable longitudinally with the sleeve in its bearing in the bracket 2. The openings 6 are provided for the accommodation of a gear 10, which the sleeve 7 carries, said sleeve having a keyway 11, in which an antifriction-key consisting of one or more rollers 12, disposed in the bore of the gear, works. The gear 10 is inclosed by a gear-casing 12, which is secured upon the casing 3, over the upper opening 6 therein, preferably by means of screws 13. On the shaft *i* is arranged a pinion 14, which meshes with the gear 10, so as to rotate the same.

In a revoluble bushing 15, arranged in the outer end of the casing 3, is mounted a shaft 16, which is provided with reverse screw-threads or spiral grooves 17 for a portion of its length. Upon the outer end of this bushing is fixed a pinion 18, upon which is pivoted a latch 19, adapted to lock said pinion and shaft together and consisting of a short bar, which is adapted to engage notches 20, alternately disposed on opposite sides of the shaft, as seen in Fig. 4, said bar being adapted to be held in operative position in any one of the notches by a thumb-screw 21 on the pinion. By manipulating the latch and moving the shaft lengthwise the latter can be so adjusted as to expose more or less of its threaded portion. It should be remarked that the bushing is provided with a head 22 at its inner end, which not only prevents the outward movement of said bushing, but whose end (said inner one) instead of being plain has a shallow recess 23 formed therein. (See Figs. 11 and 13.) The function of this recess is the same as that of a recess 24, provided in the adjacent face of an integral head 25 at the other end of the screw, and will be again referred to.

The bracket 2 is provided with a curved slot 26, in which is adjustably arranged a stud 27, which carries a pair of pinions 28 29, the latter being the smaller. The pinion 29 meshes with the pinion 18, whereas the pinion 28 meshes with a smaller pinion 30 on the end of the shaft *i*.

Upon the outer end of the sleeve 7 is carried a bracket, which is best shown in Fig. 6. This bracket consists of two members in the form of substantially semicircular straps 31 32, which together surround the sleeve, being disposed in an annular groove 33 therein. They are held together at their ends by screws 34, said straps, respectively, having projections 35 36, affording a bearing between them, in which is loosely arranged a short spindle 37, carrying a lever 38 at one end and a pawl 39 at the other end, said pawl being tapered at both its ends and being adapted to engage the grooves 17 of the shaft 16. The lever 38 is normally pulled in one direction by a spring 40, which connects said lever with a pin 41, mounted in the projection 35 of the strap 31. In order to prevent the bracket just described from revolving with the sleeve 7, I provide a detent 42, which is secured in place by the screw 34 and works in a longitudinal slot 43 in the upper portion of the casing 3.

In operation, the shaft *i* being rotated from the shaft *b* through the intermediate connecting mechanism described, the pinion 14 will drive the pinion 10, which in turn will rotate the sleeve 7, and consequently the shaft *r* and the several spools or bobbins carried thereby. At the same time said shaft *i* will rotate the shaft 16 through the medium of the pinions 30, 28, 29, and 18. Since the sleeve 7 is connected with the shaft 16 by the pivoted double pawl 39, which the bracket described as loosely surrounding said sleeve carries, a rapid reciprocating motion will be imparted in an obvious and well-known manner to the sleeve 7, and consequently to the shaft *r* and the bobbins simultaneously with the rotation thereof, this being permitted by virtue of the key connection afforded between the gear-wheel 10 and the sleeve. It is to be observed that the reciprocation of the sleeve 7 is the direct result of the rotation of the threaded shaft 16, connected with said sleeve, as it is, through the medium of pawl 39 and the non-revoluble bracket which, carrying said pawl, loosely embraces the sleeve and is guided for reciprocation in the slot 43 of the

casing. The pawl is reversed, of course, at each of its limits of motion in the threads of the screw by the recesses 23 and 24.

By virtue of the fact that the traverse motion is imparted to the bobbins and not to the warps, as in the usual manner, I find that I can not only wind cops on the bobbins more compactly and more uniformly than is possible in existing machines, but that the compactness and uniformity of the winding is so perfect that bobbins without heads—*i. e.*, bobbins in the shape of plain cylinders (see Fig. 10)—may be used, and thus all the objections attendant upon the use of headed bobbins are obviated.

It will be observed that it is only necessary to shift the shaft 16, adjusting it by means of the latch 19, in order to produce a traverse motion of more or less length, according to the size of the bobbins on the shaft *r*.

I claim—

1. The combination, in a warping or other similar machine, with a frame, of a revoluble bobbin or beam carrying shaft, said shaft being longitudinally reciprocatory, a reciprocatory and revoluble sleeve operatively connected to said shaft at one end thereof, another revoluble shaft, and a non-revoluble band-shaped bracket surrounding said sleeve and engaging and adapted to reciprocate with the same, said last-named shaft and said bracket having a pawl and reverse screw-thread connection between them, substantially as described.

2. The combination, in a warping or other similar machine, with a frame, of a revoluble bobbin or beam carrying shaft, said shaft being longitudinally reciprocatory, a reciprocatory and revoluble member operatively connected to said shaft at one end thereof, a gear surrounding and keyed to said member, another shaft having reverse screw-threads, supporting means for said last-named shaft, a bracket engaging said member and adapted to reciprocate therewith, and a pawl carried by said bracket and engaging the threading of said shaft, substantially as described.

3. The combination, in a warping or other similar machine, with a frame, of a revoluble bobbin or beam carrying shaft, said shaft being longitudinally reciprocatory, a reciprocatory and revoluble sleeve operatively connected to said shaft at one end thereof, a gear surrounding and keyed to said sleeve, another revoluble shaft projecting into said sleeve and having reverse screw-threads, supporting means for said last-named shaft, a non-rotary bracket engaging said sleeve and adapted to reciprocate therewith, a pawl carried by said bracket and engaging the threading of said shaft, and means for rotating said last-named shaft, substantially as described.

4. The combination, in a warping or other similar machine, with a frame, of a revoluble cop-receiving or other device or devices to be operated, a reciprocatory and revoluble member operatively connected to said device or devices, a suitably-supported and reversely-threaded shaft, a pawl carried by said member, said pawl and the threaded shaft engaging each other and the one of them being revoluble relatively to the other, and a stop adapted to be engaged by said pawl, said shaft being adjustable longitudinally with reference to said stop, substantially as described.

5. In a warping or beaming machine, the combination, with the frame, of a shaft journaled in said frame, a bobbin or beam carrying shaft also journaled in said frame, a suitably-journaled member, said member and the bobbin or beam carrying shaft being longitudinally reciprocatory and operatively connected, gearing connecting said member and said first-named shaft, one of the members of said gearing being keyed on said member, another shaft having reverse screw-threading, supporting means sustained by said first-named shaft for the threaded shaft, gearing connecting said threaded shaft and said first-named shaft, and a pawl carried by said member and engaging the threading of said threaded shaft, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 22d day of May, 1900.

CHAS. H. KNAPP.

Witnesses:
JOHN W. STEWARD,
ALFRED GARTNER.