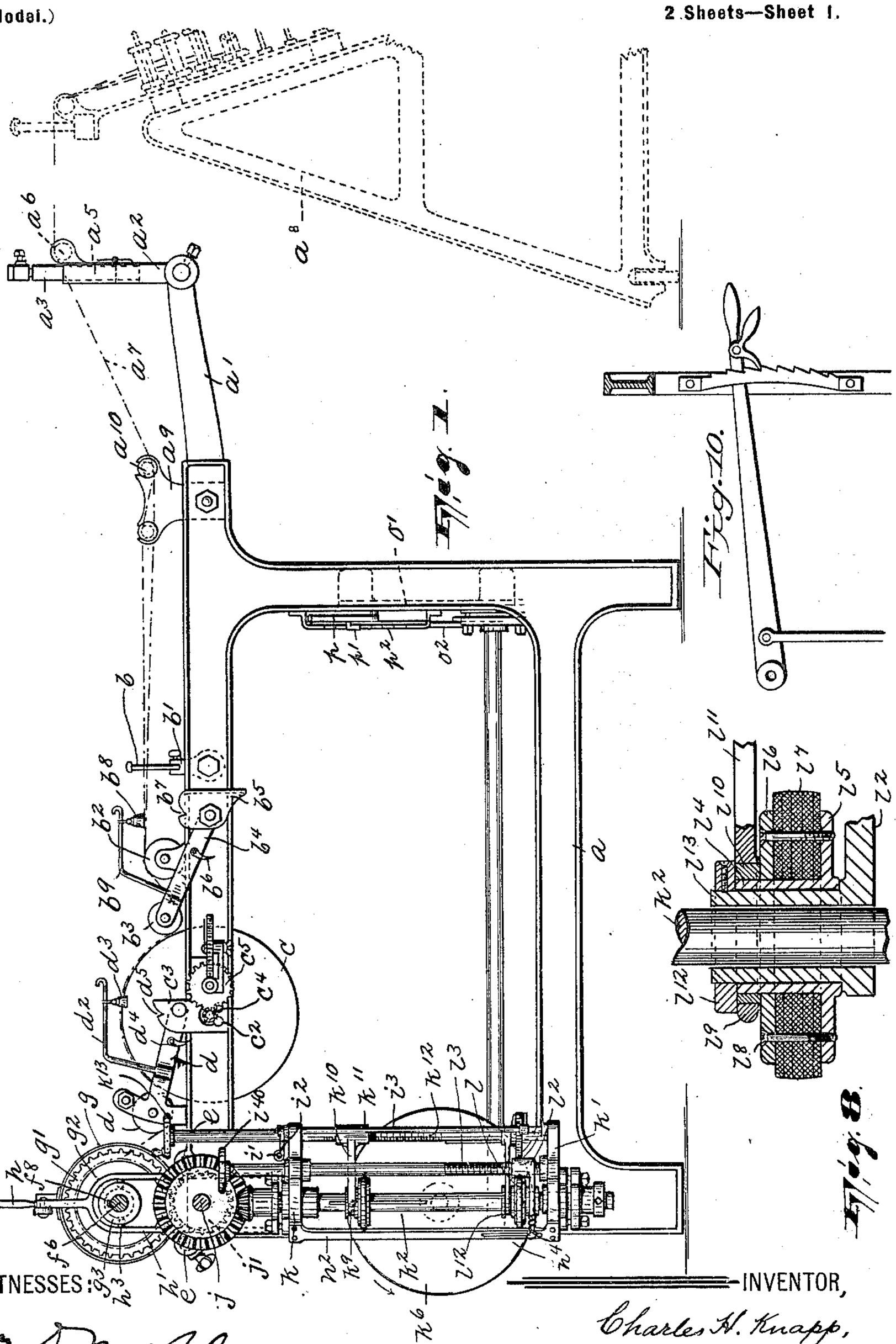
No. 661,268. Patented Nov. 6, 1900.

C. H. KNAPP.

WARPING MACHINE.

(Application filed Mar. 6, 1900.)

(No Model.) 2 Sheets—Sheet 1.



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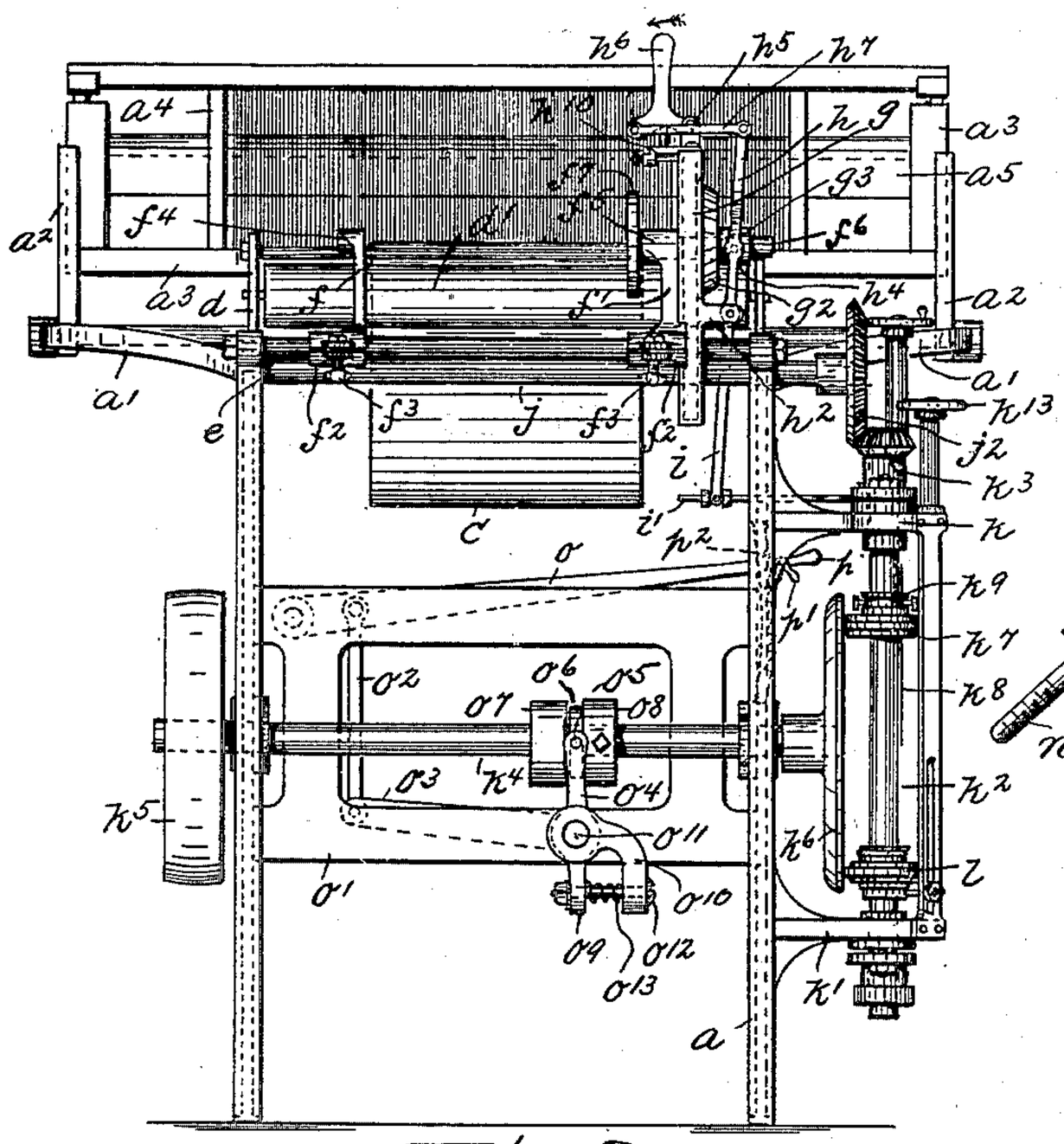

Fig. 2.

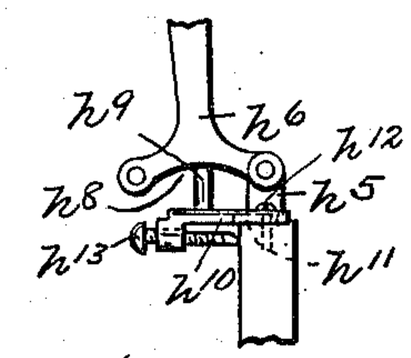

Fig. 3.

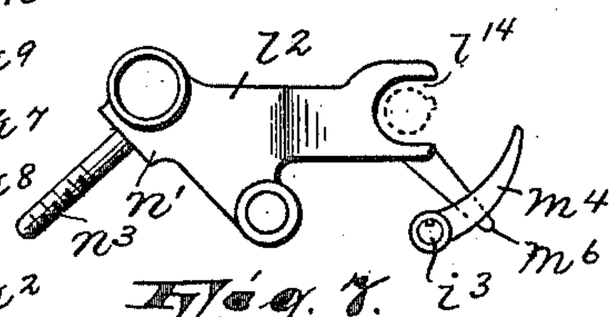

Fig. 4.

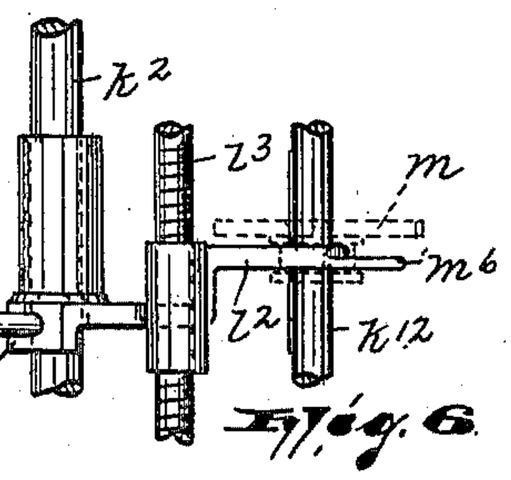

Fig. 6.

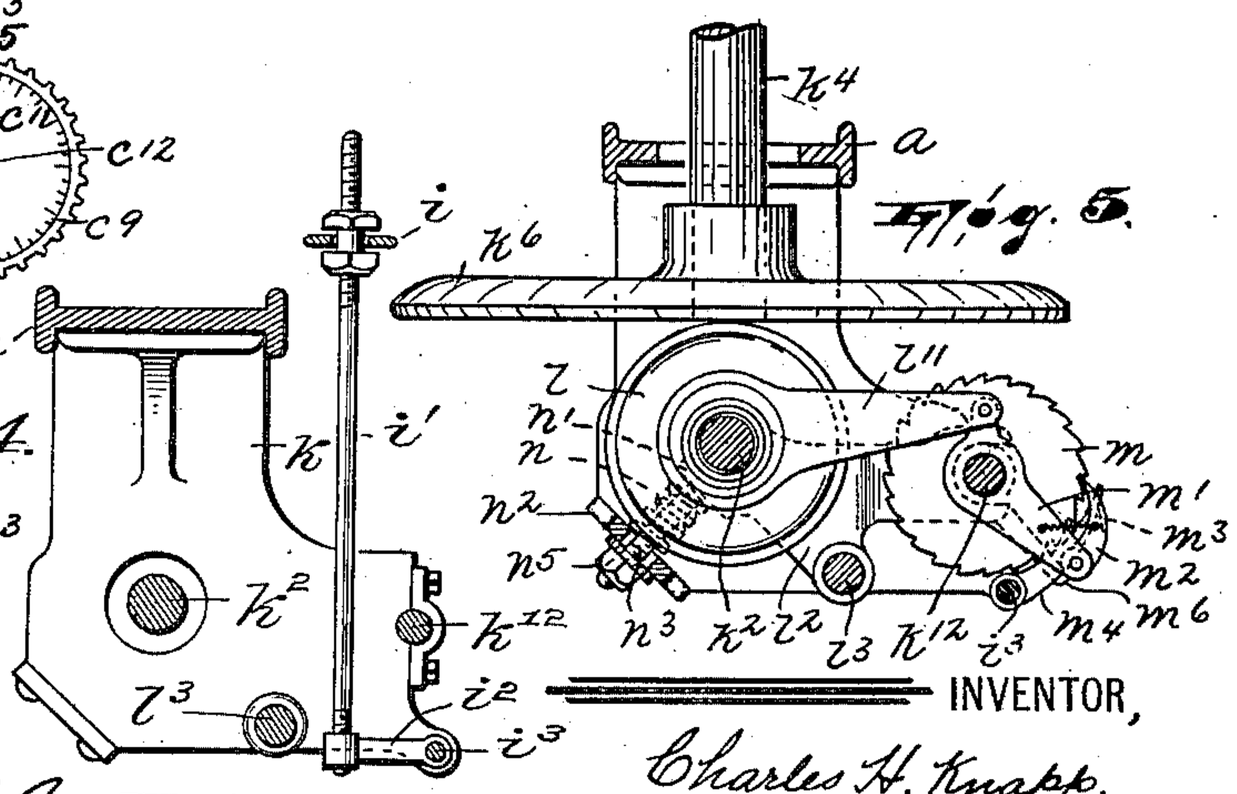

Fig. 5.

Fig. 5a.

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CHARLES H. KNAPP, OF PATERSON, NEW JERSEY.

WARPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 661,268, dated November 6, 1900.

Application filed March 6, 1900. Serial No. 7,483. (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 the letters of reference marked thereon, which form a part of this specification.

This invention relates to warping-machines, and it has reference particularly to that class of warping-machines wherein provision is made for compensating for the tendency of the beam to draw the threads onto itself with gradually-increasing speed as the operation proceeds owing to the constant increase in the diameter of the combined beam and goods wound thereon.

One of the objects of my invention is to provide a warping-machine of the nature above indicated with an improved form of the mechanism whereby power is communicated to the beam for receiving the warp from the drive-shaft of the machine in such manner that the tendency of said beam to draw the threads onto itself with constantly-increasing speed as the operation proceeds is compensated for and the pull upon the warp maintained constantly uniform.

It is a further object of my invention to so construct the above-mentioned mechanism for transmitting power from the drive-shaft of the machine to the beam that the same may be manually adjusted and also effectively and quickly disconnected when for any reason occasion requires.

The invention consists in the improved warping-machine, and also in the several combinations of the parts thereof, constructed substantially as hereinafter described and finally embodied in the clauses of the claim.

My invention is fully illustrated in the accompanying drawings, wherein—

Figure 1 is a side view of my improved warping-machine and also of a creel from bobbins on which the threads are delivered to the machine, said creel and its accessory parts being shown in dotted lines. Fig. 2 is a front view of my improved warping-machine. Fig. 3 is a top plan view of a certain mechanism for indicating or measuring the amount of threads placed on the beam. Fig. 4 shows a certain bracket used in connection with the mechanism illustrated in Fig. 3. Figs. 5, 5^a, 6, 7, and 8 show in detail the mechanism whereby the tendency of the beam to exert a gradually-increasing pull upon the thread is automatically compensated for. Fig. 9 is a detail view of a portion of the starting mechanism of my machine, and Fig. 10 is a detail view showing a portion of a certain shaft-shifting mechanism.

In the accompanying drawings the frame of the machine is designated by the reference-letter a. Projecting rearwardly from the upper end of this frame is a pair of arms a', from which project upwardly vertical guides a^2, in which is arranged the frame a^3 for the reception of the main reed a^4 of the machine. To the back of the frame a^3 is hinged a bar a^5, carrying a glass rod a^6, over which the threads a^7 to be wound upon the beam are extended before passing through the dents of the reed and after leaving the bobbins on the creel a^8.

a^9 is a pair of standards which support a pair of glass bars a^{10}, the threads being adapted to pass under the one of and parted by the other, as clearly shown in Fig. 1. From the glass bars a^{10} the threads extend through another reed b, disposed in suitable brackets b', and they then extend over a roller b^2, having stationary bearings on the frame a, and thence under another roller b^3, that is journaled in a pair of levers b^4, which are fulcrumed in brackets b^5, secured to the sides of the frame a. The levers b^4 are adapted to be thrown back into substantially vertical position, so as to remove the roller b^3 from contact with the warp and to be maintained in this position by pawls b^6, that are adapted to engage notches b^7 in the brackets b^5. The action of the roller b^3 against the warp may be adjusted by means of one or more weights b^8, carried upon upwardly-extending bent arms b^9, having their free ends hooked so as to prevent the disengagement of the weights therefrom when the levers are swung back. After passing under the roller b^3 the threads extend

over a beam *c*, which I term the "measuring-beam." The trunnions *c'* of this measuring-beam extend through the sides of the frame *a* and bear upon rollers c^2, journaled in one of a pair of brackets c^3, secured to said frame. One of the trunnions *c'* carries a pinion c^4, which meshes with another pinion c^5, that is secured upon a sleeve c^6, said sleeve being itself journaled upon a shaft c^7, projecting from the bracket c^3. The end of the shaft c^7 is squared, the squared portion receiving one end of an arm c^8, that projects laterally from the shaft and provides a support for a worm-wheel c^9, whose teeth engage a worm c^{10} on the sleeve c^6. The upper face of the worm-wheel may be graduated, so that by means of a pointer c^{11}, which is secured above the worm-wheel by a screw c^{12}, acting as a bearing for the latter, the amount of material that has passed over the measuring-beam *c* may be measured. In the brackets c^3 is fulcrumed a pair of levers *d*, which carry a roller *d'* and which are also provided with bent arms d^2 for the reception of weights d^3 and pawls d^4, adapted to engage notches d^5 in the brackets c^3, the same as the levers b^4.

At the front end of the frame is mounted a pair of parallel horizontal rods *e*, which connect the sides of said frame. Said rods are adapted to sustain brackets *f f'*, each having split tubular portions f^2, controlled by thumb-screws f^3 for securing it in various positions upon said rods. These brackets project upwardly from the rods, and the one of them *f* is provided with a bearing f^4 for one trunnion of the beam onto which the threads are to be wound, while the other of them *f'* is provided with a corresponding bearing f^5, in which is journaled a shaft f^6, the end of which adjacent the bearing f^4 carries a face-plate f^7, adapted to bear against the end of the beam in an obvious manner.

To the bracket *f'* is secured a gear-casing *g*, wherein is freely journaled upon the shaft f^6 a gear-wheel *g'*. The shaft f^6 is provided with a key f^8, which engages a feather in a friction-disk g^2 and in a collar g^3, rigidly secured to said friction-disk. When the gear is rotated and the friction-disk is forced against its outer face, the rotary motion of said gear will be imparted, as will be obvious, to the shaft f^6.

h is a lever which has a loop *h'* formed therein and which is fulcrumed in ears h^2, projecting from the gear-casing *g* below the shaft f^6. Its loop portion is provided with two inwardly-projecting pins h^3, which engage a circumferential groove h^4 in the collar g^3, so that by vibrating the lever the collar can be moved longitudinally upon the shaft f^6, carrying the friction-disk with it, of course. Projecting upwardly from the gear-casing is a lug h^5, in which is fulcrumed an inverted-T-shaped hand-lever h^6, said lever being connected to the upper end of the lever *h* by means of a link h^7. Relatively to the fulcruming-point of the hand-lever h^6 its pivotal point of connection with the link h^7 is remote from the point of connection of said link with the lever *h*. The hand-lever is adapted to be thrown in the direction of the arrow in Fig. 1 slightly past the dead-center, so as to maintain the friction-disk g^2 effectively against the gear-wheel *g'*, and for this reason its under side is provided with a concavity h^8 (see Fig. 9) of graduated depth and adapted to receive a pin h^9, that is carried by an adjustable angular arm h^{10}, secured upon the top of the gear-casing and having a slot h^{11}, which receives the screw h^{12} for securing it in place. The arm is rendered adjustable by means of a set-screw h^{13}, set into it and bearing against the side of the gear-casing. It will be seen that by adjusting the arm to and from the gear-casing the point of the pin h^9 will be brought to where it can project to a greater or less distance, as required, into the concavity in the lever h^6, so as to insure the securing of the lever in the desired position without materially releasing the friction-disk from contact with the gear after the line of dead-center has been passed. The lever *h* is provided with a downwardly-projecting leg *i*, which is jointed to a horizontal pitman *i'*, said pitman being connected to an arm i^2, projecting from a vertical rod i^3, hereinafter more particularly referred to.

Beneath the pair of rods *e* is journaled a shaft *j*, the same having bearings in and connecting the two side portions of the frame *a*. This shaft carries a gear *j'*, which meshes with the gear *g'*, and at one end it carries a bevel-gear j^2.

From the side of the frame *a* to which the bevel-gear j^2 is journaled project two brackets *k k'*, the one being disposed above the other. These brackets provide bearings for a vertical revoluble shaft k^2, upon the upper end of which is mounted a bevel-gear k^3, that engages the bevel-gear j^2. Near this shaft is journaled in the frame *a* a horizontal shaft k^4, which shaft is provided with a pulley k^5 and is the main drive-shaft of the machine. This shaft k^4 is provided at the end thereof adjacent the shaft k^2 with a friction-disk k^6, against which friction-disk bears the periphery of a friction-wheel k^7, said friction-wheel being adapted to rotate with the shaft k^2 by virtue of a key k^8, which engages a feather in the bore of said friction-wheel k^7. The friction-wheel k^7 carries an integral circumferentially-grooved collar k^9, with which engages the forked end of an arm k^{10}, that projects from an internally-threaded sleeve k^{11}, which is penetrated by and engages a threaded revoluble shaft k^{12}, also journaled in the brackets *k k'*. The upper end of the threaded shaft k^{12} is provided with a hand-wheel k^{13}, whereby it may be manually rotated. Near the lower end of the shaft k^2 is disposed another friction-wheel *l*, that is supported on a bracket l^2, which is penetrated by and engages the threading of another threaded shaft l^3, that is journaled in the brackets *k k'* to one side

of the other two shafts k^2 and k^{12}. The friction-wheel l is loosely mounted on the shaft k^2, and it may be adjusted longitudinally upon the same by manipulating a hand-wheel l^{10}, that the upper end of the threaded shaft l^3 carries. As shown in Fig. 8, the friction-wheel l consists of a sleeve l^4, having a surrounding flange l^5 near one of its ends and penetrating a disk l^6, between which and the flange are secured disks l^7, of paper, leather, or other suitable material, the flange and the disk l^6 being clamped together by screws l^8, penetrating them and the disks l^7. If desired, the construction of the other friction-wheel k^7 may be similar to that just described. Upon the upper end of the sleeve l^4 of the friction-wheel l is secured an eccentric l^9, which receives an eccentric-strap l^{10}, from which projects an arm l^{11}. The friction-wheel is kept down against the bracket l^2 by means of a collar l^{12}, which is secured upon an integral sleeve l^{13}, projecting upwardly from said bracket l^2.

The bracket l^2 has a recess l^{14} in its end, which receives the shaft k^{12}, and it carries a ratchet-wheel m, which is journaled on said shaft and above which is fulcrumed, also on said shaft, a lever m', that is pivotally connected at one of its ends to the lever l^{11} and at the other of its ends carries a spring-actuated pawl m^2, which engages the teeth of the ratchet-wheel. The pawl m^2 is provided with a downwardly-extending lug m^3, against which bears a finger m^4, that projects from the shaft i^3, hereinbefore referred to, said shaft having bearings in the two brackets $k\,k'$. The finger is keyed upon the shaft so as to be movable vertically thereon when lifted by a projection m^5 on the bracket l^2.

In order to maintain the friction-wheel l in proper contact with the friction-disk k^6, the bracket which carries it is pressed toward said disk, having a tendency to move about the shaft l^3 by a spiral spring n, that is disposed between a projection n' on the bracket and a bar n^2, that connects the brackets k and k'. From the projection n' extends a threaded pin n^3, which protrudes through a slot n^4 in the bar n^2 and is provided with an adjusting-nut n^5. The shaft k^4 has a slight longitudinal movement in its bearings in the frame a, so that the friction-disk which it carries may be thrown into and out of contact with the two friction-wheels k^7 and l. In order to move the shaft longitudinally in its bearings, I have provided a lever o, which is fulcrumed in a brace o', connecting the side portions of the frame, and which is connected by a pitman o^2 with a bell-crank lever o^3, said bell-crank lever being also fulcrumed in the brace and having its upper end forked and provided with opposing pins o^5, which work in a slot o^6, that is formed between two collars o^7 o^8, suitably secured upon the shaft. From the bell-crank lever projects a lug o^9, which is disposed in opposition to a bent arm o^{10}, that projects downwardly from the stub-shaft o^{11}, upon which the lever o^3 is fulcrumed, said arm and the lug being connected by a bolt o^{12}, about which is coiled a spiral spring o^{13}, that acts to force apart the lug and arm. It will be seen that the spring therefore normally acts to maintain the friction-disk in contact with the friction-wheels. The lever o is provided with a handle p and pawl p', the latter being adapted to engage the teeth of a rack p^2, that is secured to the side frame and is shown in Fig. 1, but is best shown in dotted lines in Fig. 2.

Assuming that the drive-shaft k^4 is driven from its pulley k^5 in the direction of the arrow in Fig. 1, in the operation of the machine the attendant grasps the lever p and lifts upon the same, so as to force the friction-disk carried by said shaft toward the friction-wheels, whereupon the lever is secured in the position for maintaining the contact between the friction-disk and friction-wheels by its pawl p' and the rack p^2. With his other hand the attendant grasps the lever h^6 and pushes the same from him until the link which connects this lever with the lever h is forced past its dead-center and the pin h^9 contacts with the lever in the concavity thereof. It should be remarked that the machine is of such length that the simultaneous operation of both these levers can just be effected with convenience. In setting the lever h^6, as above described, the consequent movement of the lever h has forced the friction-disk g^2 against the face of the gear-wheel g', so that the rotary motion that is imparted through the friction-wheel k^7, the shaft k^2, the bevel-gears k^3 and j^2, the shaft j, and the gears j' and g' is finally transmitted to the shaft f^6, and consequently to the beam which is journaled between the face-plate f^7 and the bracket f^4. The setting of the lever h^6 has also effected in an obvious manner the partial turning of the shaft i^3, whereby the finger m^4 is actuated to permit the pawl m^2 to engage the ratchet-wheel. It will be seen that by working the lever h^6 in a reverse direction of course the friction-disk g^2 will be immediately disconnected from its driving means, thus stopping the rotation of the beam, and the rod i^3 will be turned, thereby throwing out the pawl m^2, and thus simultaneously stopping the automatic adjusting of the friction-wheel k^7, while the release of the lever p, which is of sufficient weight to counteract the action of the spring o^3 and draw the friction-disk k^6 out of operative contact with the friction-wheels, will disconnect the intermediate driving mechanism by which power is transmitted from the friction-disk k^6 to the friction-disk g^2. Now as the friction-disk l revolves the eccentric l^{10}, which it carries, imparts an oscillating movement to the lever l^{11}, which in turn vibrates the lever m', whereby the pawl m^2 is actuated. As the pawl turns the ratchet-wheel m a rotary motion is imparted to the shaft k^{12}, (by virtue of the fact that the ratchet-wheel is keyed upon the shaft,) which action tends to feed

the sleeve k^{11}, and consequently the friction-wheel k^7, which is carried at the end of its arm, downwardly, as will be manifest. Thus, though as the threads wind on the beam the extreme diameter of the latter practically increases and said beam therefore tends to exert a leverage on the unwound portion of the threads that is constantly increasing, the speed at which the beam is rotated is gradually being reduced and the tendency referred to is overcome. In view of the fact that the threads may be wound on different beams in different thicknesses and at various rates of speed in attaining a given diameter I have provided in the hand-wheel k^{13} for manually revolving the shaft k^{12} and in the hand-wheel l^{40} for likewise revolving the shaft l^3 means for adjusting the two friction-wheels relatively to the center of the friction-disk. The effect of the adjustment of the respective friction-wheels will be apparent.

By providing the several rollers over and under which the threads have to pass before being wound on the beam and some of which are weighted I accomplish in one machine as well, if not more perfectly, what is accomplished where a reel, as at present, is auxiliarly employed for transferring the threads from the creel onto the beam.

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

1. In a warping or beaming machine, the combination, with the frame, of a beam-rotating shaft journaled in said frame, disconnective driving means for said shaft, a suitably-journaled friction-disk, a friction-wheel engaging said friction-disk and operatively connected to said driving means, mechanism, comprising disconnective parts and controlled by said friction-disk, for adjusting said friction-wheel relatively to said friction-disk, and a lever controlling said disconnective driving means and the disconnective parts of said friction-wheel-adjusting mechanism, substantially as described.

2. In a warping or beaming machine, the combination, with the frame and with a rotary element to be driven, of a friction-disk journaled in said frame, a friction-wheel engaging said friction-disk and movable radially thereof, operative power-transmitting connection between said friction-wheel and said element, and means, connected to said friction-wheel and comprising a rotary part bearing against said friction-disk, for moving said friction-wheel radially of said friction-disk, substantially as described.

3. In a warping or beaming machine, the combination, with the frame and with a rotary element to be driven, of a friction-disk journaled in said frame, a friction-wheel engaging said friction-disk and movable radially thereof, operative power-transmitting connection between said friction-wheel and said element, and adjustable means, connected to said friction-wheel and comprising a rotary part bearing against said friction-disk, for moving said friction-wheel radially of said friction-disk, substantially as described.

4. In a warping or beaming machine, the combination, with the frame and with a rotary element to be driven, of a shaft journaled in said frame, a friction-disk carried by said shaft, a friction-wheel engaging said friction-disk, operative power-transmitting connection between said friction-wheel and said element, a revoluble threaded shaft, operative connecting means between said friction-wheel and said threaded shaft, and means, operatively connected to said threaded shaft and comprising a rotary part bearing against said friction-disk, for rotating said threaded shaft, substantially as described.

5. In a warping or beaming machine, the combination, with the frame and with the main drive-shaft journaled therein, of a friction-disk carried by said drive-shaft, a revoluble beam-rotating shaft, a revoluble intermediate shaft disposed substantially parallel to said friction-disk, operative connecting means between said beam-rotating shaft and the intermediate shaft, a friction-wheel keyed on said intermediate shaft and adapted to engage said friction-disk, and means, connected to said friction-wheel and comprising a rotary part bearing against said friction-disk, for moving said friction-wheel longitudinally of the intermediate shaft, substantially as described.

6. In a warping or beaming machine, the combination, with the frame and with the main drive-shaft journaled therein, of a friction-disk carried by said drive-shaft, a revoluble beam-rotating shaft, a revoluble intermediate shaft disposed substantially parallel to said friction-disk and operatively connected to said beam-rotating shaft, a friction-wheel keyed on said intermediate shaft and adapted to engage said friction-disk, a revoluble threaded shaft disposed parallel to said intermediate shaft, operative supporting means for said friction-wheel mounted on said threaded shaft, and means, operatively connected to said threaded shaft and controlled by said friction-disk, for rotating said threaded shaft, substantially as described.

7. In a warping or beaming machine, the combination, with the frame and with the main drive-shaft, of a beam-rotating shaft, a friction-disk carried by said drive-shaft, an intermediate suitably-journaled shaft disposed parallel to said friction-disk, operative connecting means between said beam-rotating shaft and the intermediate shaft, friction-wheels disposed on said intermediate shaft, the one being keyed and the other being freely movable thereon, a threaded shaft suitably journaled parallel to said intermediate shaft, operative supporting means mounted on said threaded shaft and sustaining the keyed friction-wheel, and operative connecting means between said freely-movable friction-wheel

and said threaded shaft adapted to transmit intermittent rotary movements from the one to the other thereof, substantially as described.

8. In a warping or beaming machine, the combination, with the frame and with the main drive-shaft, of a beam-rotating shaft, a friction-disk carried by said drive-shaft, an intermediate suitably-journaled shaft disposed parallel to said friction-disk, operative connecting means between said beam-rotating shaft and the intermediate shaft, friction-wheels disposed on said intermediate shaft, the one being keyed and the other being freely movable thereon, a threaded shaft suitably journaled parallel to said intermediate shaft, operative supporting means mounted on said threaded shaft and sustaining the keyed friction-wheel, a ratchet-wheel mounted on the threaded shaft and adapted to rotate the same, an eccentric carried by the freely-movable friction-wheel, a suitably-pivoted pawl engaging said ratchet-wheel, and levers connecting said eccentric and the pawl, substantially as described.

9. In a warping or beaming machine, the combination, with the frame and with the main drive-shaft, of a beam-rotating shaft, a friction-disk carried by said drive-shaft, an intermediate suitably-journaled shaft disposed parallel to said friction-disk, operative connecting means between said beam-rotating shaft and the intermediate shaft, friction-wheels disposed on said intermediate shaft, the one being keyed and the other being freely movable thereon, a threaded shaft suitably journaled parallel to said intermediate shaft, operative supporting means mounted on said threaded shaft and sustaining the keyed friction-wheel, a ratchet-wheel mounted on the threaded shaft and adapted to rotate the same, an eccentric carried by the freely-movable friction-wheel, a suitably-pivoted pawl engaging said ratchet-wheel, levers connecting said eccentric and the pawl, a movable bracket sustaining said freely-movable friction-wheel, and means for adjusting said bracket, substantially as described.

10. In a warping or beaming machine, the combination, with the frame and with stationary brackets projecting therefrom, of the main drive-shaft, a beam-rotating shaft, a friction-disk carried by said drive-shaft, an intermediate shaft disposed parallel to said friction-disk and journaled in said brackets, operative connecting means between said beam-rotating shaft and the intermediate shaft, friction-wheels disposed on said intermediate shaft, the one being keyed and the other being freely movable thereon, a threaded shaft journaled in said brackets parallel to said intermediate shaft, operative supporting means mounted on said threaded shaft and sustaining the keyed friction-wheel, a ratchet-wheel mounted on the threaded shaft and adapted to rotate the same, an eccentric carried by the freely-movable friction-wheel, a suitably-pivoted pawl engaging said ratchet-wheel, levers connecting said eccentric and the pawl, a movable bracket sustaining said freely-movable friction-wheel, and another threaded shaft journaled in said stationary bracket and penetrating and engaging said movable bracket, substantially as described.

11. In a warping or beaming machine, the combination, with the frame and with stationary brackets projecting therefrom, of the main drive-shaft, a beam-rotating shaft, a friction-disk carried by said drive-shaft, an intermediate shaft disposed parallel to said friction-disk and journaled in said brackets, operative connecting means between said beam-rotating shaft and the intermediate shaft, friction-wheels disposed on said intermediate shaft, the one being keyed and the other being freely movable thereon, a threaded shaft journaled in said brackets parallel to said intermediate shaft, operative supporting means mounted on said threaded shaft and sustaining the keyed friction-wheel, a ratchet-wheel mounted on the threaded shaft and adapted to rotate the same, an eccentric carried by the freely-movable friction-wheel, a suitably-pivoted pawl engaging said ratchet-wheel, levers connecting said eccentric and the pawl, a movable bracket sustaining said freely-movable friction-wheel, another threaded shaft journaled in said stationary brackets and penetrating and engaging said movable bracket, a rod connecting said stationary brackets, and a spring disposed between said movable bracket and the rod and acting toward the friction-disk, substantially as described.

12. In a warping or beaming machine, the combination, with the frame, of a pair of beam-carrying brackets suitably supported in said frame, a gear-casing formed with one of said brackets, a beam-rotating shaft journaled in said bracket, a gear inclosed in said casing and journaled on said shaft, a combined friction-disk and circumferentially-grooved collar keyed onto said shaft, the friction-disk being adjacent the gear, a lever fulcrumed in said gear-casing and operatively engaging said grooved collar, a hand-lever fulcrumed in said gear-casing, a link connecting said hand-lever and the other lever, the fulcruming-point for said hand-lever being normally substantially between the points of connection of said link, and the two levers and said hand-lever being movable so as to bring said points into and past alinement with each other, a stop for said hand-lever disposed at the limit of motion thereof, and means for rotating said gear, substantially as described.

13. In a warping or beaming machine, the combination, with the frame, of a pair of beam-carrying brackets suitably supported in said frame, a gear-casing formed with one of said brackets, a beam-rotating shaft journaled in said bracket, a gear inclosed in said casing and journaled on said shaft, a com-

bined friction-disk and circumferentially-grooved collar keyed onto said shaft, the friction-disk being adjacent the gear, a lever fulcrumed in said gear-casing and operatively engaging said grooved collar, a hand-lever fulcrumed in said gear-casing, a link connecting said hand-lever and the other lever, the fulcruming-point for said hand-lever being normally substantially between the points of connection of said link and the two levers, and said hand-lever being movable so as to bring said points into and past alinement with each other, an adjustable stop for said hand-lever disposed at the limit of motion thereof, and means for rotating said gear, substantially as described.

14. In a warping or beaming machine, the combination, with the frame, of a beam-rotating shaft journaled in said frame, disconnective driving means for said shaft, a lever controlling said disconnective driving means, a suitably-journaled friction-disk, a suitably-supported friction-wheel engaging said friction-disk, operative connection between said friction-wheel and said driving means, and means, comprising a rotary part bearing against said friction-disk, for adjusting said friction-wheel relatively to said friction-disk, substantially as described.

15. In a warping or beaming machine, the combination, with the frame and with a beam-rotating shaft journaled in said frame, of disconnective driving means for said shaft, another shaft, a friction-disk carried by said last-named shaft, a friction-wheel engaging said friction-disk, power-transmitting mechanism between said friction-wheel and said driving means, a revoluble threaded shaft, operative supporting means for said friction-wheel mounted on said threaded shaft, and means, operatively connected to said threaded shaft and comprising a rotary part bearing against said friction-disk, for rotating said threaded shaft, substantially as described.

16. In a warping or beaming machine, the combination, with the frame, of a beam-rotating shaft journaled in said frame, disconnective driving means for said shaft, a lever controlling said disconnective driving means, a suitably-journaled friction-disk, suitably-supported friction-wheels engaging said friction-disk, operative connection between one of said friction-wheels and said disconnective driving means, operative adjusting means connecting said friction-wheels and including a ratchet and pawl, and a finger-carrying shaft operatively connected to said lever, the finger on said shaft being adapted to engage said pawl, substantially as described.

17. In a warping or beaming machine, the combination, with the frame, of a beam-rotating shaft suitably journaled in said frame, a suitably-supported revoluble friction-disk, a suitably-journaled shaft disposed parallel to said friction-disk, a gear journaled on said beam-rotating shaft, a friction-disk keyed onto said beam-rotating shaft and adapted to bear against the gear, operative connecting means between said gear and the other shaft, a suitably-fulcrumed lever operatively connected to said last-named friction-disk, friction-wheels carried on the shaft adjacent the first-named friction-disk and bearing against said friction-disk, one of said friction-wheels being adapted to drive said shaft and the other being loosely journaled thereon, operative adjusting means connecting said friction-wheels and including a ratchet and pawl, and a finger-carrying shaft operatively connected to said lever, the finger on said shaft being adapted to engage said pawl, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 1st day of August, 1899.

CHAS. H. KNAPP.

Witnesses:
WM. D. BELL,
JOHN W. STEWARD.