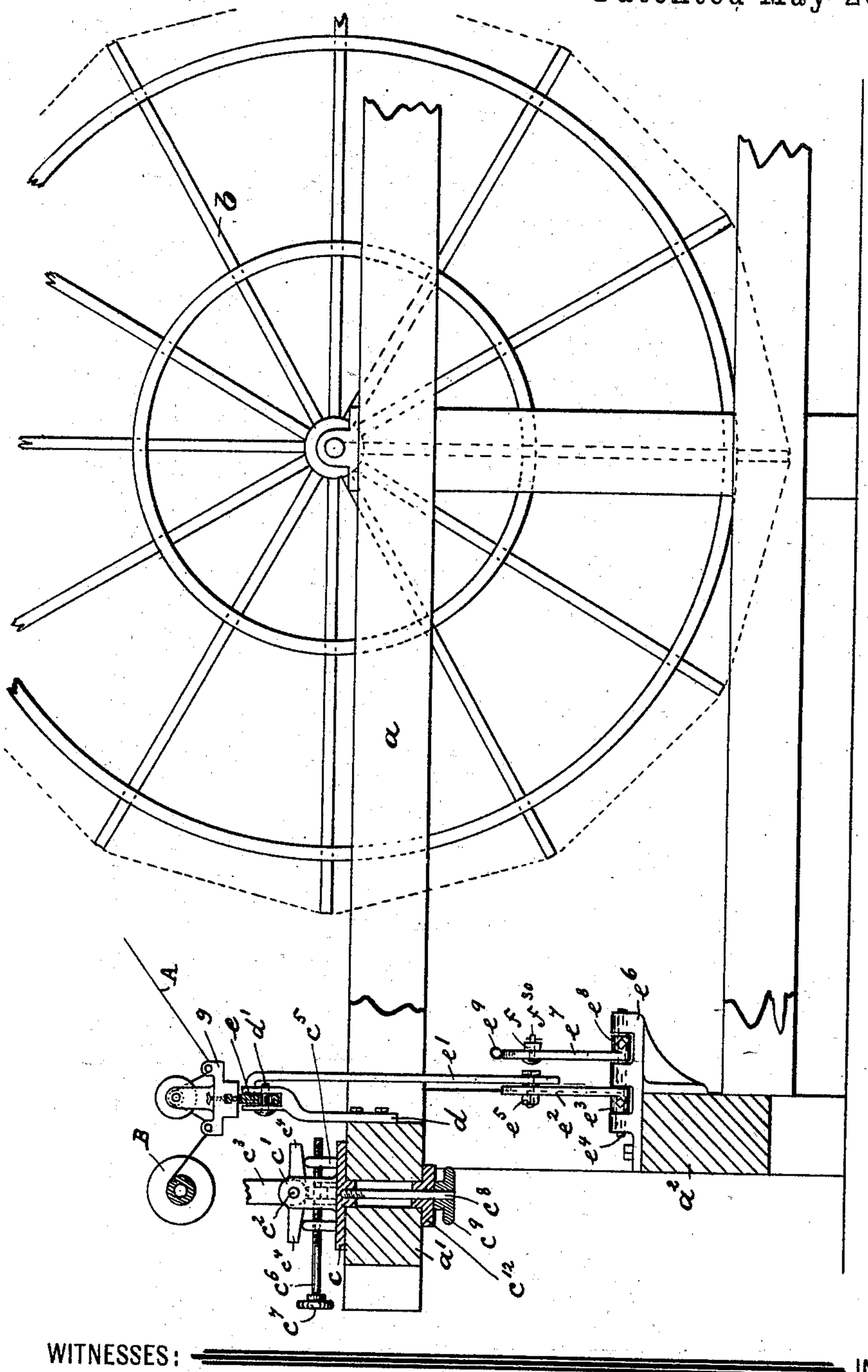
(No Model.)

3 Sheets—Sheet 1.

# R. ATHERTON.

## WARP BEAMING MACHINE.

No. 560,769. Patented May 26, 1896.




WITNESSES:

Duncan Dn. Robertson.

Alz. Risner,

INVENTOR:

Robert Atherton

BY Gartner & Co

ATTORNEYS.

(No Model.) 3 Sheets—Sheet 2.

# R. ATHERTON.

## WARP BEAMING MACHINE.

No. 560,769 Patented May 26, 1896.

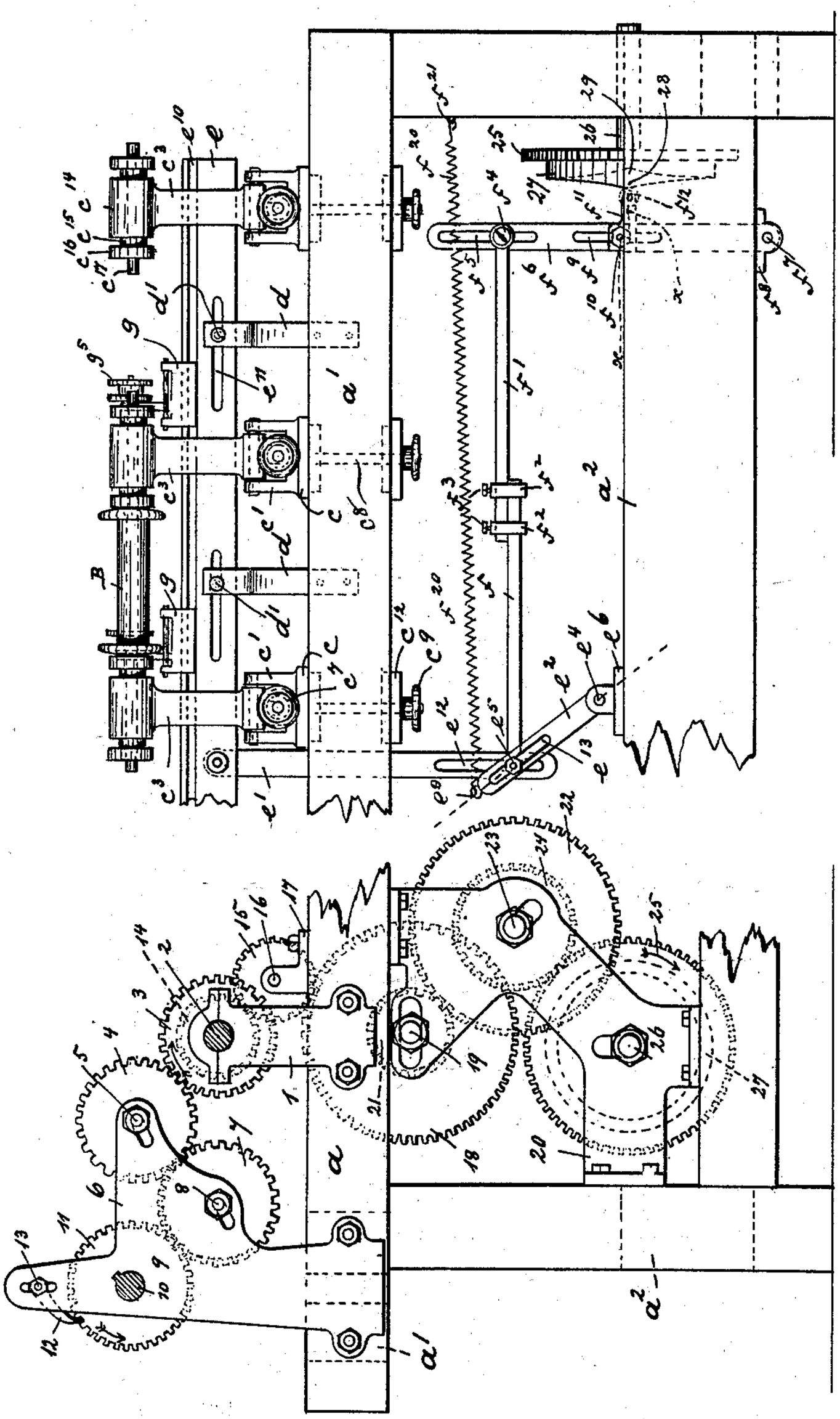


Fig. 3.



Fig. 2.

WITNESSES:

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(No Model.) 3 Sheets—Sheet 3.

# R. ATHERTON.

## WARP BEAMING MACHINE.

No. 560,769. Patented May 26, 1896.

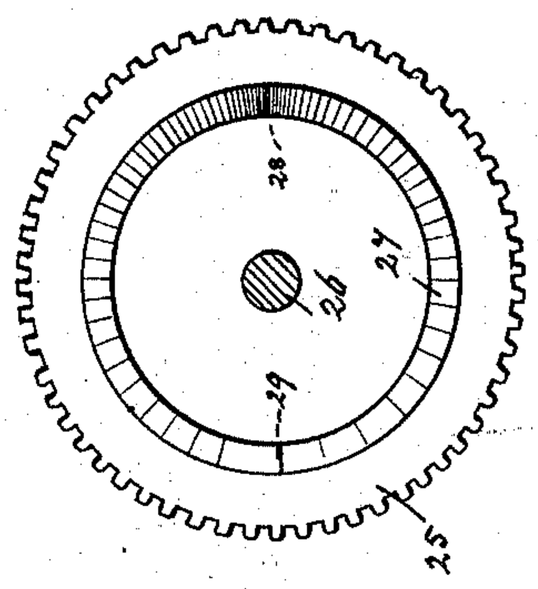

Fig. 7.

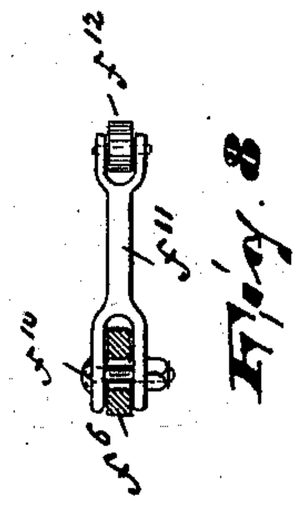

Fig. 8.

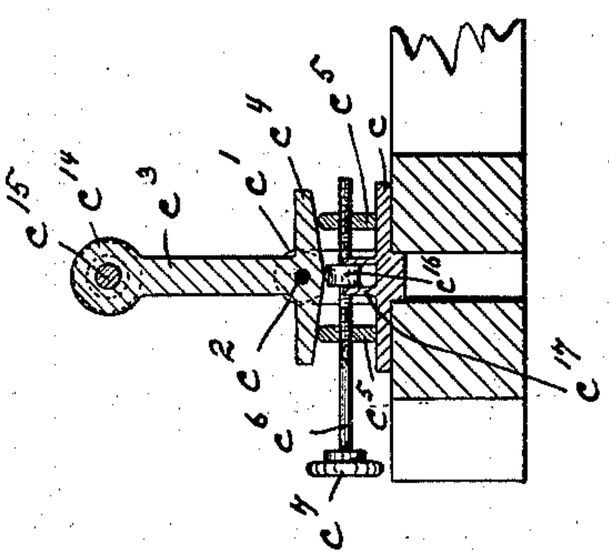

Fig. 4.

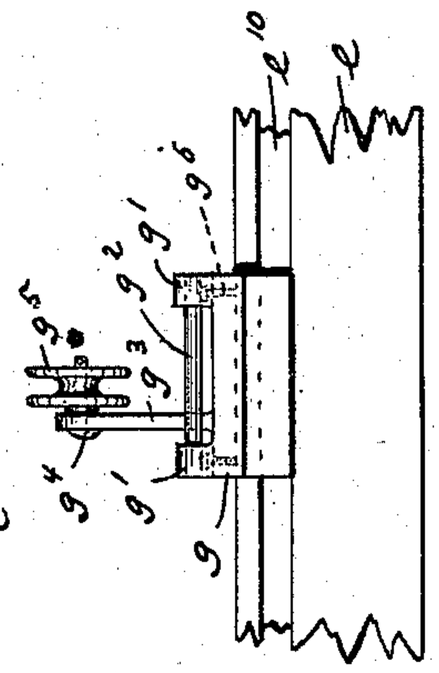

Fig. 5.

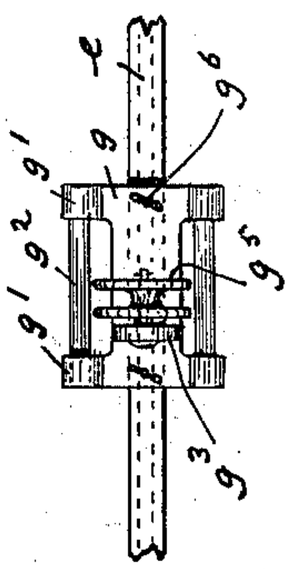

Fig. 6.

WITNESSES:

Duncan Or Robertson.
Abs Rosser,

INVENTOR:

Robert Atherton

BY Gartner & Co

ATTORNEYS.

# UNITED STATES PATENT OFFICE.

ROBERT ATHERTON, OF PATERSON, NEW JERSEY.

## WARP-BEAMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 560,769, dated May 26, 1896.

Application filed December 24, 1895. Serial No. 573,204. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT ATHERTON, a citizen of the United States, residing in Paterson, Passaic county, and State of New Jersey, have invented certain new and useful Improvements in Warp-Beaming 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 letters and figures of reference marked thereon, which form a part of this specification.

The object of my invention is to provide a beaming attachment for warping-mills of simple, strong, and durable construction, reliable in operation, and easily handled and controllable.

The invention consists in the improved beaming attachment, in the adjustable beam-supporting standards, the sliding warp-guiding carriage, the means for operating said carriage, and in the combination and arrangement of the various parts, substantially as will be hereinafter more fully described, and finally embodied in the clauses of the claim.

In the accompanying drawings, Figure 1 is a side elevation of a warping-mill provided with my improvements, the driving mechanism being removed and other parts being broken away or illustrated in section; Fig. 2, a side elevation of the driving mechanism, only a portion of the frame being shown; Fig. 3, a front elevation of Fig. 1, only the right-hand portion being shown, the driving mechanism and certain other portions being removed to better illustrate the nature of my said invention; Fig. 4, a central sectional view through one of the beam-supporting standards; Figs. 5 and 6, a front elevation and top plan view, respectively, of the warp-guiding carriage; Fig. 7, a face view of a certain operating cam-wheel, and Fig. 8 an enlarged detail sectional view on the line $x\,x$ of Fig. 3.

In said drawings, $a\,a'\,a^2$ represent the frame, on which the reel $b$ is mounted in the usual manner. The main driving-shaft 2, to which power is applied, has its bearing in the bracket 1 and carries the gear-wheel 3 and pinion 14, meshing with gear-wheel 4 and pinion 15, respectively. The gear-wheel 4 operates, through intermediate gear 7 on shaft 8, the gear 11, which is loosely mounted on the shaft 10 and is controlled by pawl 12, pivoted, as at 13, to the bracket-frame 6, which frame also serves as a bearing for the said shafts 5 and 8.

The pinion 14 meshes with pinion 15 on shaft 16, supported in bracket 17, which latter pinion 15 engages the teeth of gear 18 on shaft 19. The pinion 21 on shaft 19 operates, through intermediate gear 22 and pinion 24 on shaft 23, the gear 25, which latter is supported on shaft 26, having its bearing in the bracket-frame 20, which frame also serves as bearings for the shafts 19 and 23. Each of said shafts 26, 23, 19, 8, and 5 is a stub-shaft and is adjustably arranged in a slot of its respective bracket, as clearly illustrated in Fig. 2 of the drawings.

On the longitudinally-slotted cross-beam $a'$ are adjustably secured a series of bed-plates $c$, by means of the screw $c^8$, and hand-wheels $c^9$ penetrating the slot of said beam and the bearing-plate or washer $c^{12}$, on the under side of the beam, as clearly shown in Fig. 1. On each side of the bed-plate $c$ is arranged an upwardly-extending flange or lug $c'$, forming the bearing for the pin $c^2$, on which is pivotally secured the standard $c^3$, provided at its top with the bearing $c^{14}$ for the shafts $c^{15}$, having at each end a flange or collar $c^{16}$ and a trunnion $c^{17}$, adapted to respectively bear against the flange of and to engage the hole in the beam B, as will be manifest. Projecting from the lower portion of the standard $c^3$ are the arms $c^4$, having their under sides outwardly tapering and in permanent engagement with the sliding blocks $c^5$, operated through screw $c^6$ and hand-wheel $c^7$, for a purpose hereinafter described.

On the screw $c^6$ and in the center line of the standards $c^3$ is secured a flange or collar $c^{16}$, bearing against the lugs $c^{17}$, projecting from the bed-plate $c$, as shown in Fig. 4. By this arrangement the screw is adapted to be operated or rotated without traversing motion and is bound to move the sliding blocks $c^5$ simultaneously in one or other direction. On the cross-beam $a'$ are also secured a series of upwardly-extending forked arms or brackets $d$, adapted to guide the traveling frame $e$, which latter for that purpose is provided with a series of elongated slots $e^{11}$, engaging the pins $d'$, secured to and penetrating the forked portions of the arms $d$, as

clearly shown in Figs. 1 and 3. The upper portion of said traveling frame *e* is provided at each side with an elongated groove $e^{10}$, and is adapted to support the warp-guiding carriages *g*, which are adjustably secured on said traveling frame by means of the thumb-screws $g^6$. (See Figs. 5 and 6.) Each of said carriages is provided at each corner with an upwardly-projecting lug $g'$, forming the bearings for the parallel cross-rods $g^2$, which are preferably made out of glass, porcelain, or any other suitable material having a slippery surface. Between the cross-rods $g^2$ and supported by the flange $g^3$, projecting upwardly from the carriage *g*, is arranged a shaft or pin $g^4$, on which is mounted the grooved guide-wheel $g^5$, made of material similar to that of the cross-rods $g^2$.

To about the center of the traveling frame *e* is rigidly secured the downwardly-projecting arm $e'$, provided at its lower end with a slot $e^{12}$, adapted to engage the pin $e^5$, adjustably secured in the slot $e^{13}$ of lever $e^2$, which latter is provided at its lower end with a sleeve $e^3$, by means of which latter it is secured on the shaft $e^4$. Said shaft has its bearing in the bracket $e^6$ arranged on the cross-beam $a^2$, as shown in Figs. 1 and 3. On the shaft $e^4$ is also secured the sleeve $e^8$ of the lever $e^7$, of a construction similar to that of lever $e^2$—that is to say, it is provided with an elongated slot in which is adjustably secured a pin $f^{30}$, projecting horizontally from and loosely arranged in the inner end of rod $f f'$, which is made in two sections, adjustably secured together by the clamping-sleeves $f^2$ and the set-screws $f^3$.

In the outer end of the sectional rod $f f'$ is loosely arranged a horizontally-projecting pin $f^4$, adapted to be adjustably secured in the slot $f^5$ of lever $f^6$, which at its lower end is fulcrumed, as at $f^7$, to the bracket $f^8$, arranged on cross-beam $a^2$. In about the middle of said lever $f^6$ is arranged an elongated slot $f^9$, in which is adjustably secured by means of the bolt and nut $f^{10}$ the arm $f^{11}$, supporting at its free end the roller $f^{12}$, adapted to travel on the annular cam 27, which latter projects from the inner face of gear-wheel 25.

The cam 27 consists of two tapering surfaces connecting at the highest and lowest culminating points 28 and 29, respectively, as clearly shown in Figs. 3 and 7.

At or near the upper end of the lever $e^7$ is arranged a pin or ring $e^9$, in which is secured one end of the spiral spring $f^{20}$, the other end of which is fixed, as at $f^{21}$, to the frame $a^2$, as shown in Fig. 3.

The shaft $c^{15}$ of the right-hand end standard $c^3$ is connected with the driving-gear 11 in any desired and well-known manner.

In operation (reference being made to Figs. 1, 2, and 3 of the drawings) a series of beams is first placed on the trunnions $c^{17}$ and between the flanges $c^{16}$ of the shaft $c^{15}$, and by adjusting the standards in the elongated slot of the cross-beam $a'$ by means of the screws $c^8$ and hand-wheels $c^9$ the said beams are held, mainly by friction, between the said flanges $c^{16}$ and are thus bound to be revolved simultaneously. To center the shafts $c^{15}$, the screws $c^6$ are operated either to the right or left, and as the sliding blocks $c^5$ are moved simultaneously in one or the other direction and in constant engagement with the inclined arms $c^4$ of the standards $c^3$ the said standards are oscillated backward or forward, and thus can easily be brought into the proper required position, as will be manifest. The carriages *g* are then adjusted on the traveling frame *e* in such a manner that the warps A, after passing under the cross-rods $g^2$ and over the grooved wheels $g^5$, will commence the layers at either one or the other end of the beam B. Power is now applied to the driving-shaft 2, which, through the hereinbefore-described gear mechanism, will operate the gear-wheel 11 and the cam-carrying gear 25 in the direction of the arrows. The cam 27, rotating from left to right, Fig. 2—that is to say, with relation to the roller $f^{12}$ from the highest culminating point 28 to the lowest one 29—allows the levers $f^6$ and $e^2$, connected by the sectional rod $f f'$ and operated by the spiral spring $f^{20}$, to swing on their respective fulcrums $f^7$ and $e^4$, whereby the traveling frame *e*, through the intermediate arm $e'$, is slowly moved from left to right, Fig. 3. The first layer of the warp A on the beam B is thus completed, and as soon as the roller $f^{12}$ has passed the lowest culminating point 29 of cam 27 it is forced outward by the said cam, and thus the levers $f^6$ and $e^2$, against the action of the spring $f^{20}$, are swung from the right to left. The traveling frame gradually returns to its original position, whereby the second layer of warp on the beam is completed. Each half-revolution of the cam-wheel corresponds with one complete travel of the frame *e*. By simply changing the connecting-points $e^5$, $f^4$, and $f^2$ between the respective levers, rods, and arms the traveling distance of the frame *e* can be increased or decreased, and thus the device be adjusted for longer or shorter beams, as will be manifest.

I do not intend to limit myself to the precise construction, as various alterations can be made without changing the scope of my invention; but

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

1. In a warp-beaming machine, the combination with the frame, of a series of standards adjustably secured on said frame, a series of beam-shafts carried by said standards, a reciprocating frame in rear of said beam-shafts and provided with a series of horizontally-arranged slots, a guide-pin in each of said slots, a bracket for each guide-pin and secured to the frame, a series of warp-guiding carriages adjustably secured on said reciprocating frame, an arm projecting from said reciprocating frame, a fulcrumed lever slidingly connected with said arm, means for

oscillating said fulcrumed lever, and means for driving the beam-shafts and cam-wheel, substantially as and for the purposes described.

2. In a warp-beaming machine, the combination with the frame, of a series of standards adjustably secured on said frame, a series of beam-shafts carried by said standards, a reciprocating frame in rear of said beam-shafts, a series of warp-guiding carriages adjustably secured on said reciprocating frame, a revolving cam-wheel supported in the frame, a roller operated by said cam-wheel, an arm carrying said roller, a fulcrumed lever supporting said arm, an arm projecting downwardly from the reciprocating frame, means for adjustably connecting said arm with the fulcrumed lever and means for driving said beam-shafts and cam-wheel, substantially as and for the purposes described.

3. In a warp-beaming machine, the combination with the frame, of a series of standards adjustably secured on said frame, a series of beam-shafts carried by said standards, a reciprocating frame in rear of said beam-shafts, a series of warp-guiding carriages adjustably secured on said reciprocating frame, an arm projecting from said reciprocating frame, a fulcrumed lever slidingly connected with said arm, means for oscillating said fulcrumed lever and means for driving the beam-shafts and cam-wheel, substantially as and for the purposes described.

4. In a warp-beaming machine, the combination with the frame, of a series of standards adjustably secured on said frame, a series of beam-shafts carried by said standards, a reciprocating frame in rear of said beam-shafts, a series of warp-guiding carriages adjustably secured on said reciprocating frame, an arm projecting from said reciprocating frame, a fulcrumed lever slidingly connected with said arm, a revolving cam-wheel supported in the frame, a roller operated by said cam-wheel, an arm supporting said roller, a fulcrumed lever carrying said arm, a rod connecting said fulcrumed levers, and means for driving the beam-shafts and cam-wheel, substantially as and for the purposes described.

5. In a warp-beaming machine, the combination with the frame and the series of beam-shafts carried by said frame, of a reciprocating frame in rear of said beam-shafts and carrying the warp-guides, an arm projecting from said reciprocating frame, a fulcrumed lever slidingly connected with said arm, a revolving cam-wheel supported in the frame, a roller operated by said cam-wheel, a fulcrumed lever carrying said roller, a rod adjustably connecting said fulcrumed levers, a spiral spring adapted to control the return motion of the reciprocating frame, and means for driving the beam-shafts and cam-wheel, substantially as and for the purposes described.

6. In a warp-beaming machine, the combination with the frame of a series of standards adjustably secured on said frame, a series of beam-shafts supported by said standards, a reciprocating frame in rear of said beam-shafts and carrying the warp-guides, an arm projecting from said reciprocating frame, a fulcrumed lever slidingly connected with said arm, a revolving cam-wheel supported in the frame, a roller operated by said cam-wheel, a fulcrumed lever carrying said roller, a rod adjustably connecting said fulcrumed levers, a spring adapted to control the return motion of the reciprocating frame, and means for driving the beam-shafts and cam-wheel, substantially as and for the purposes described.

7. In a warp-beaming machine, the combination with the reciprocating frame, of a series of carriages adjustably secured on said frame, a series of parallel rods on each carriage, a standard between said parallel rods and a grooved guide-wheel supported by said standard and arranged above the plane of said rods, substantially as and for the purposes described.

8. The combination with the reciprocating frame, of a carriage adjustably secured on said frame, a lug projecting upwardly at or near each end of said carriage, two parallel rods secured in said lugs, an upright standard projecting from said carriage and between the rods, and a grooved wheel supported by said standard, substantially as and for the purposes described.

9. In a warp-beaming machine, the combination with the frame, and the beam-shafts, of a series of fulcrumed standards carrying said beam-shafts, each of said standards being provided at or near its lower end with two oppositely-arranged arms having their under sides outwardly tapering, a bed-plate laterally adjustable on the frame, and supporting the fulcrum of the standard, a sliding block on said bed-plate and under each projecting arm, and a screw operating said sliding blocks, substantially as and for the purposes described.

10. In a warp-beaming machine, the combination with the frame, and the beam-shafts, of a series of fulcrumed standards carrying said beam-shafts, each of said standards being provided at or near its lower end with two oppositely-arranged arms having their under sides tapering outwardly, a bed-plate adjustably secured on the frame and supporting the fulcrum of the standard, a block under each arm and adapted to slide on the bed-plate, a screw traversing said bed-plate and operating said sliding blocks, a collar secured on said screw, and a lug on each side of the collar and projecting from the bed-plate, substantially as and for the purposes described.

In testimony that I claim the foregoing I have hereunto set my hand this 16th day of December, 1895.

ROBERT ATHERTON.

Witnesses:
ALFRED GARTNER,
EDW. B. HINDLEY.