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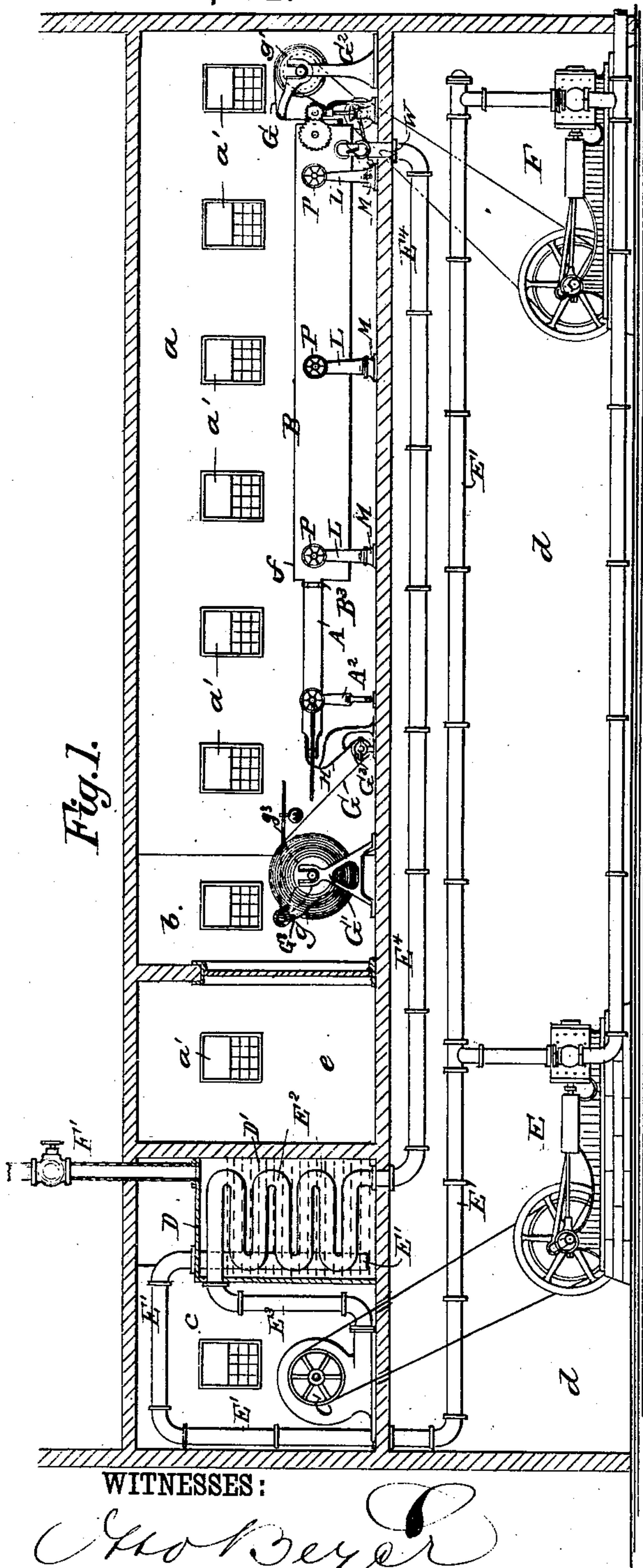
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J. H. VARNEY.

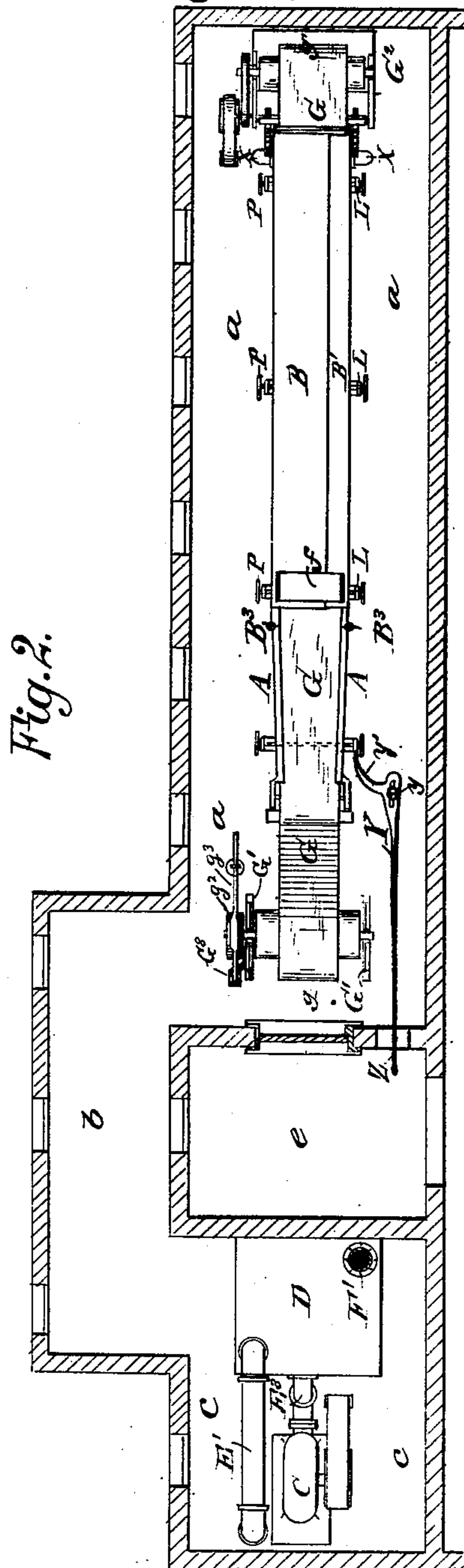
APPARATUS FOR STRETCHING AND DRYING CLOTH.

No. 347,212.

Patented Aug. 10, 1886.



Wm Beyer
C. Sedgwick



J. H. Varney
BY *Munn & Co*
ATTORNEYS.

(No Model.)

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Fig. 2.

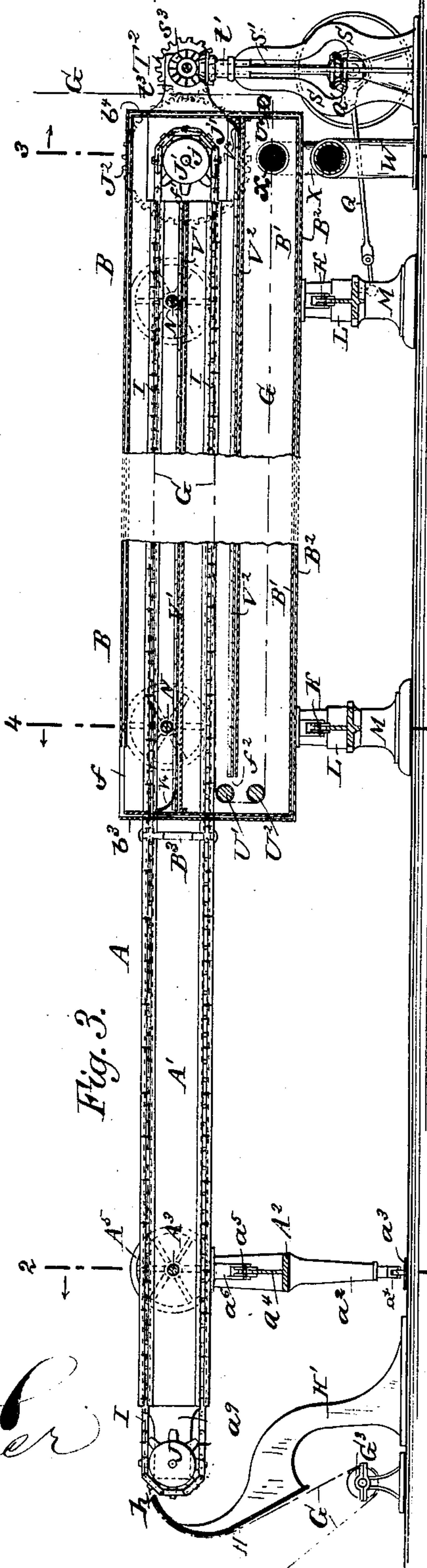
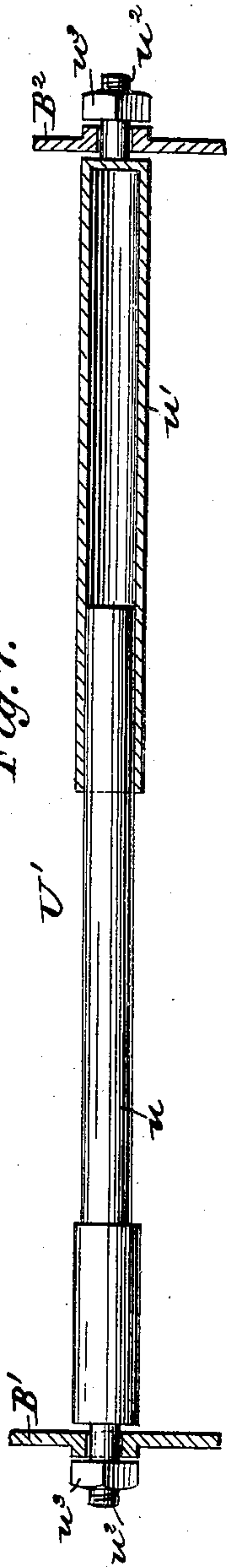


Fig. 6.

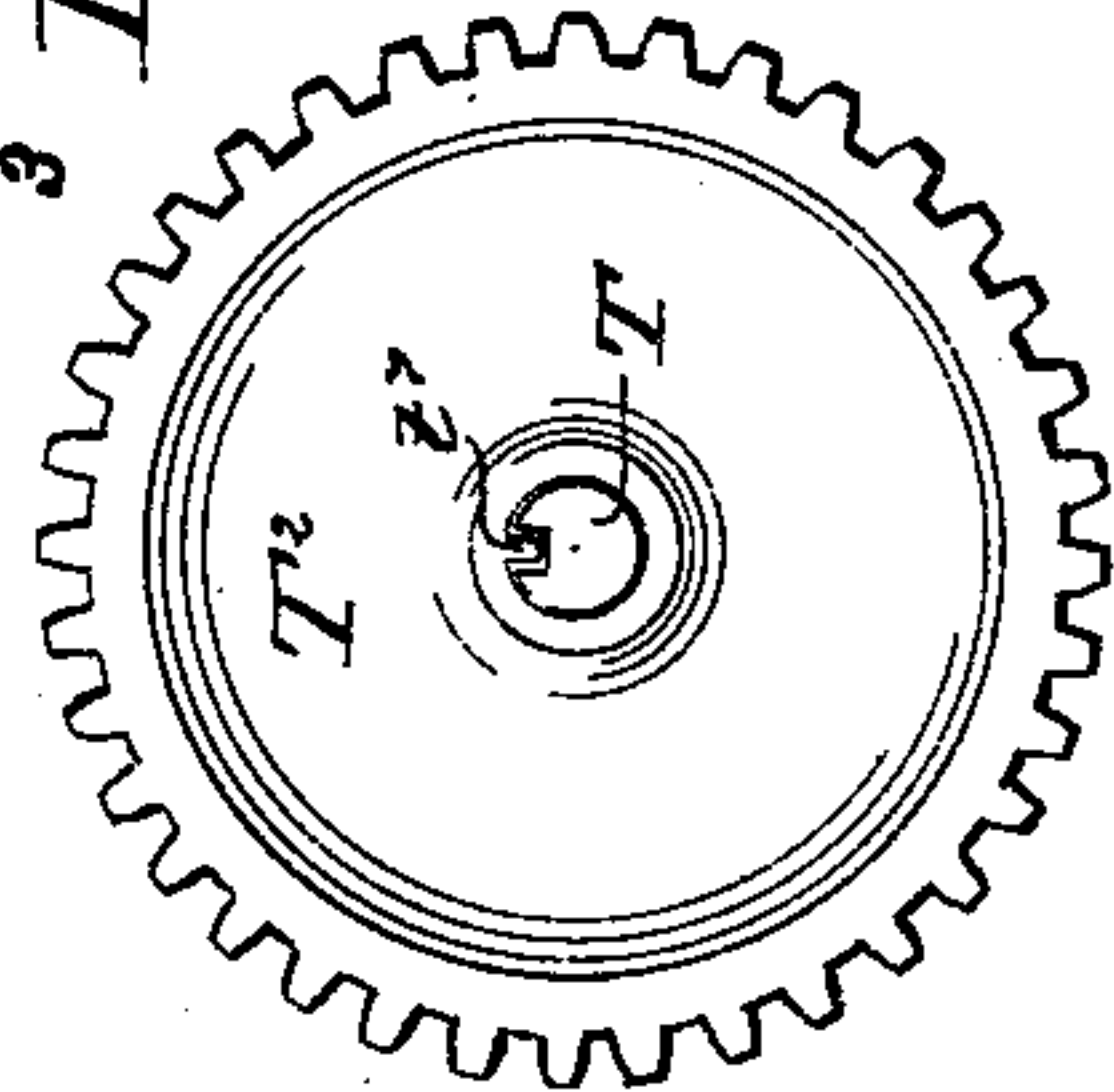


Fig. 5.

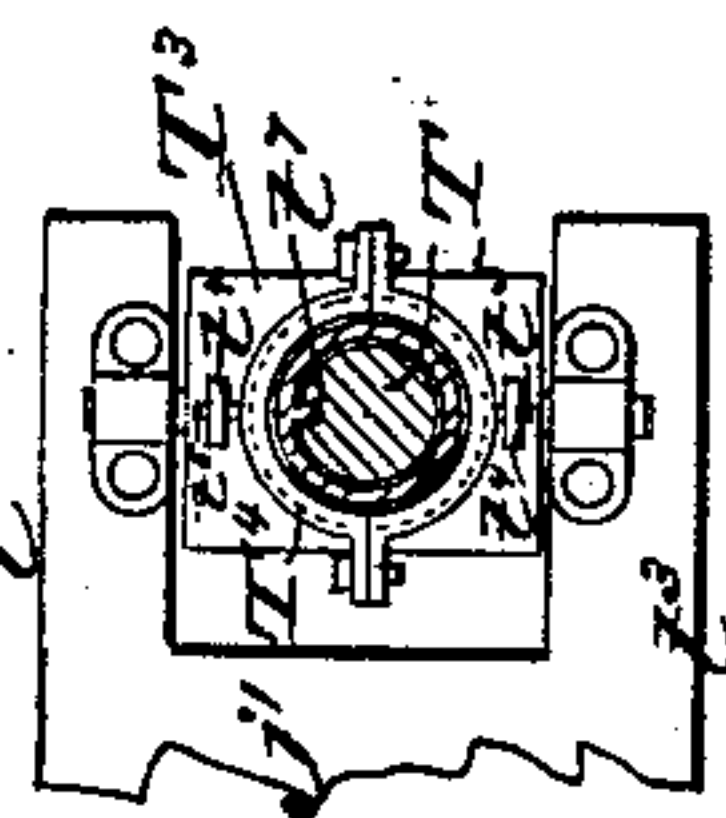
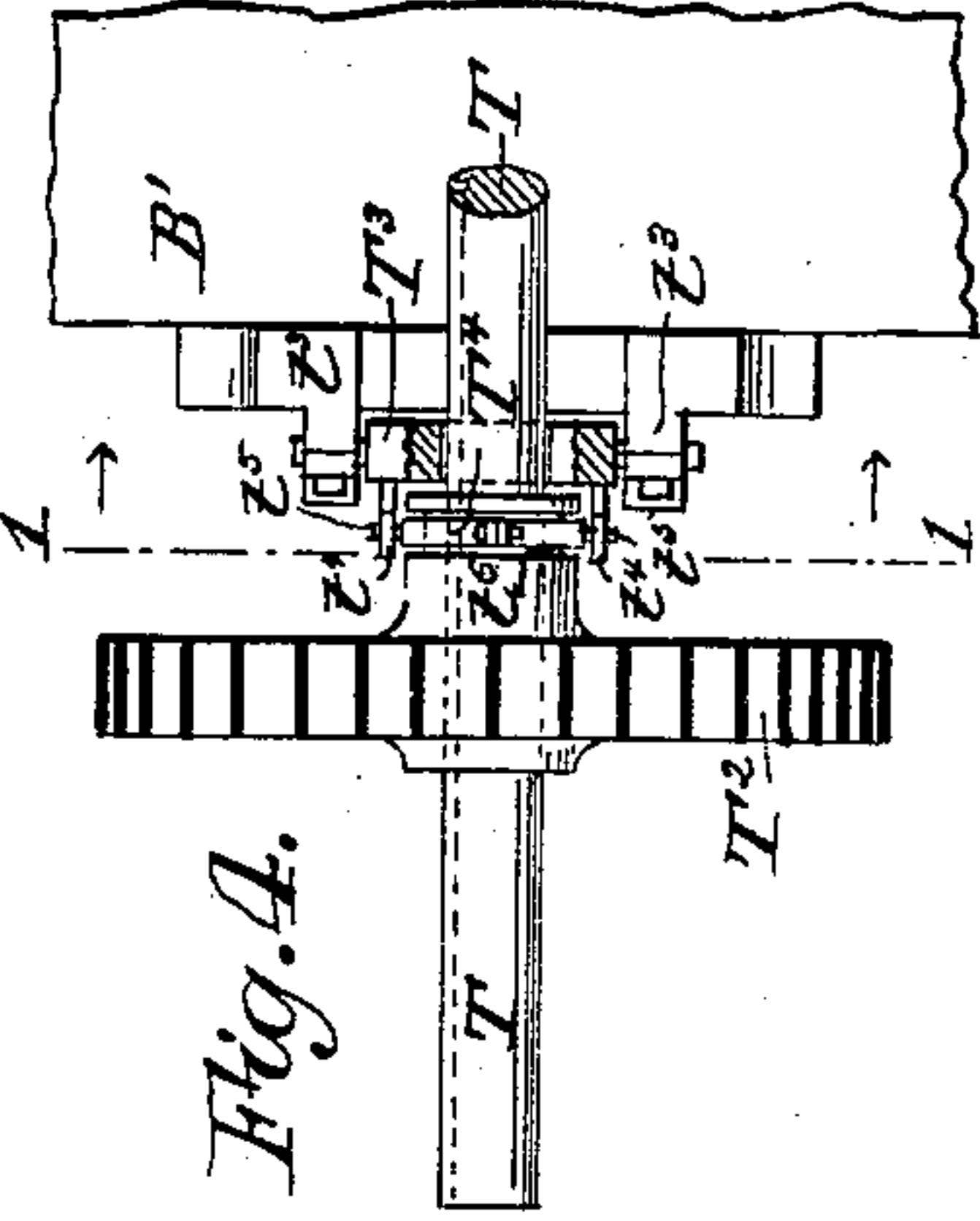


Fig. 4.



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(No Model.)

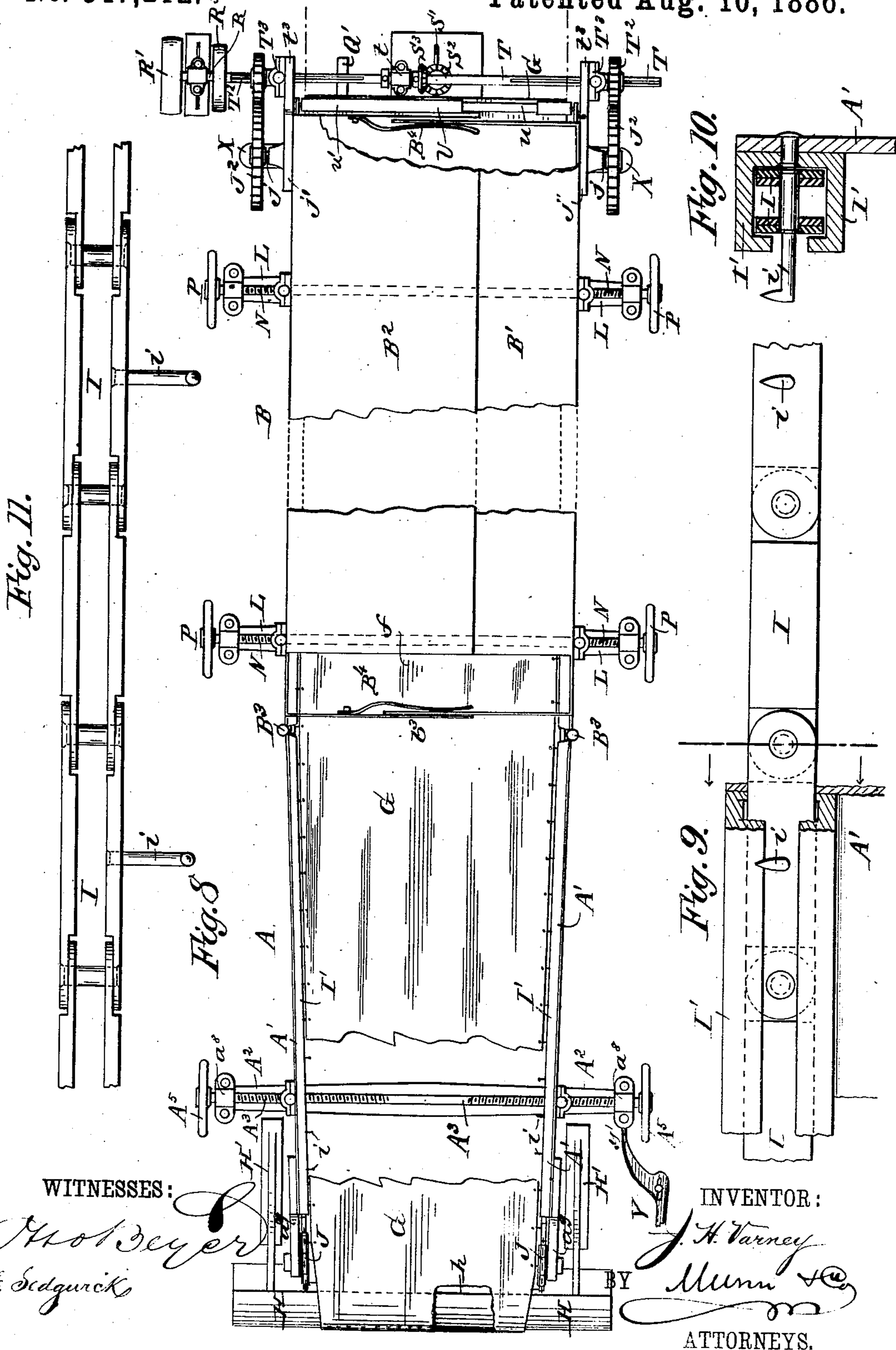
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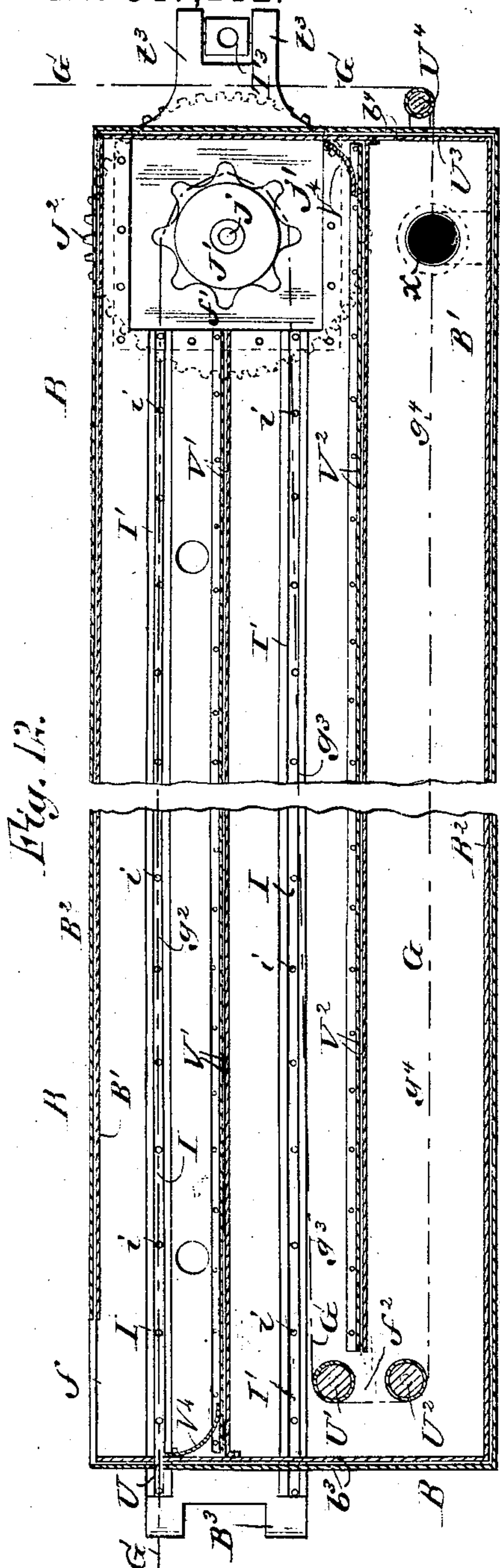


Fig. 12.

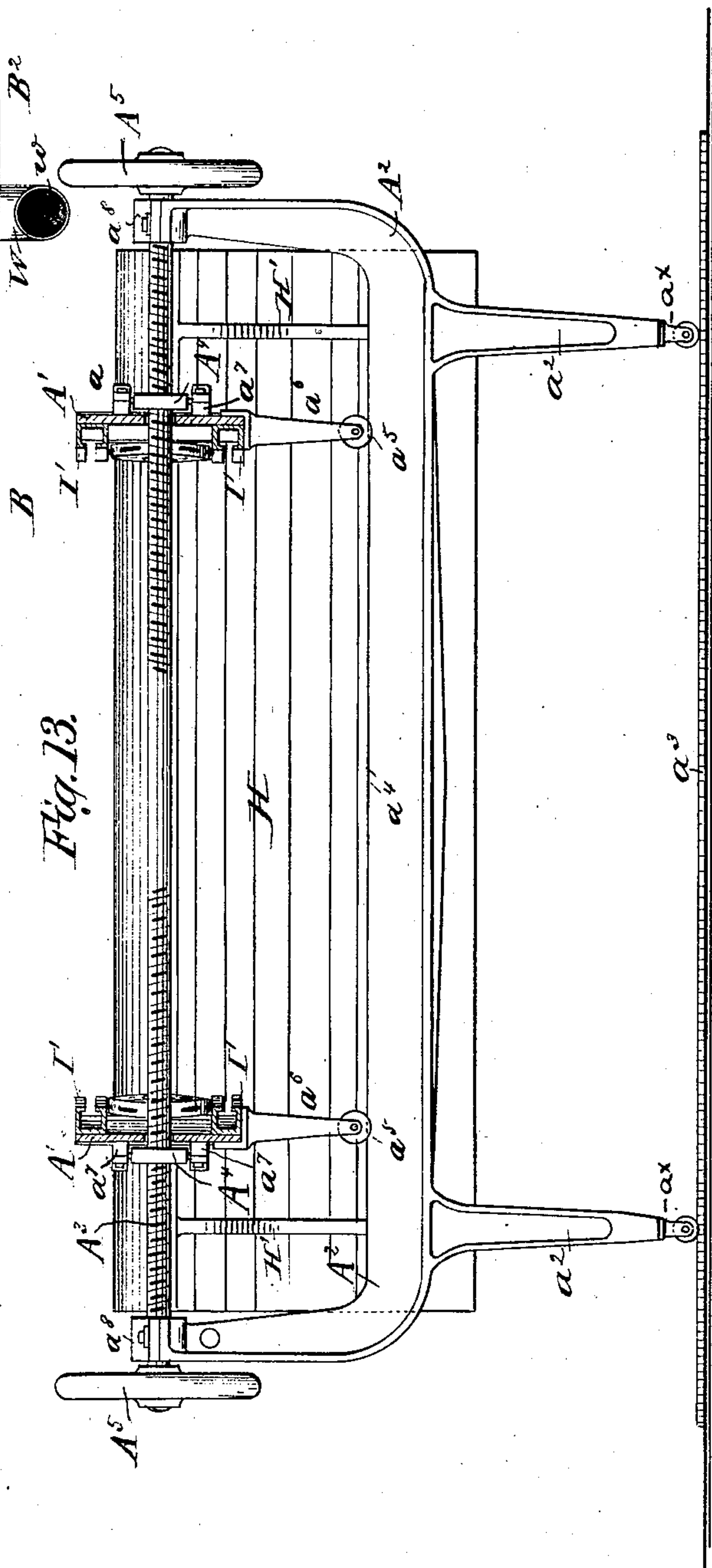


Fig. 13.

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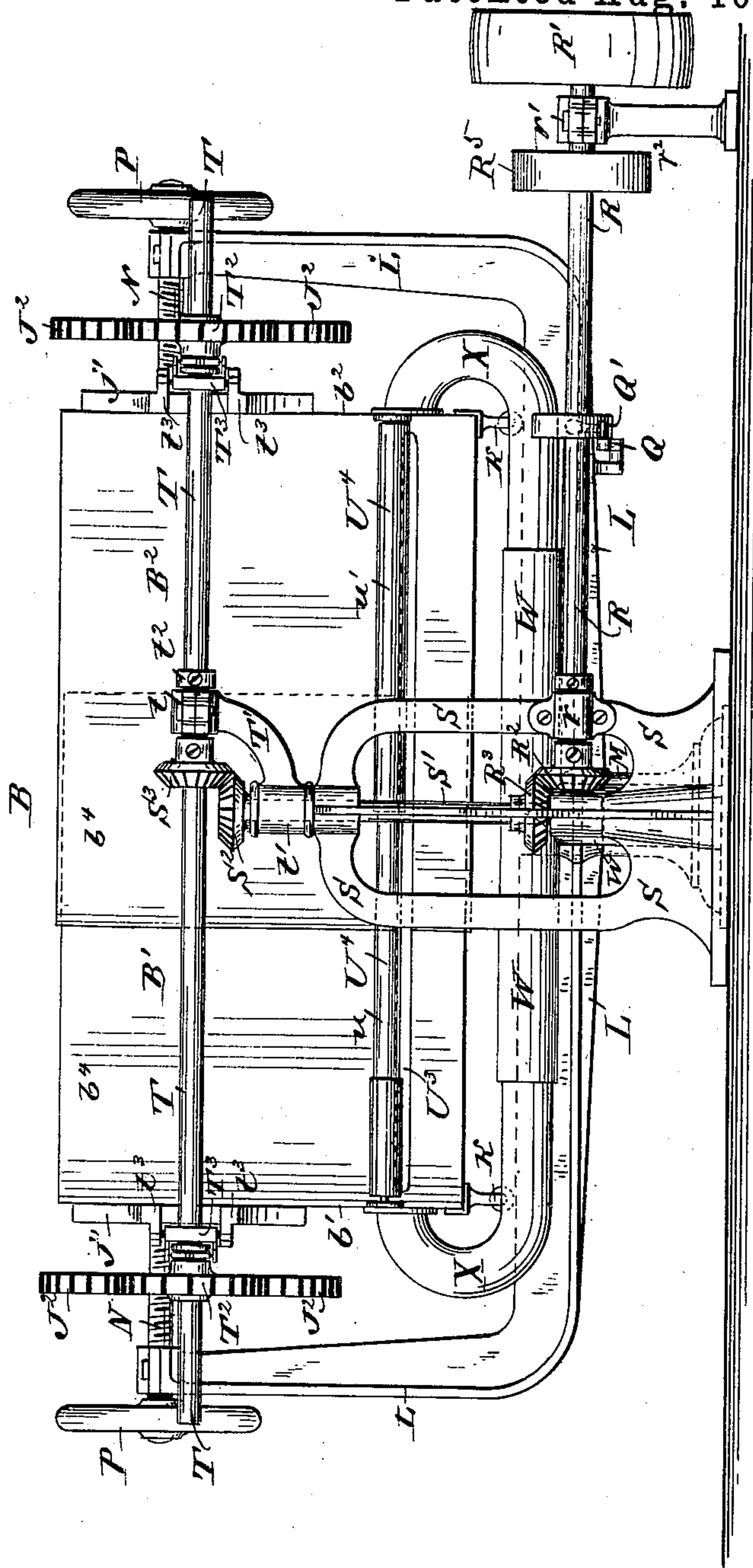


Fig. 47

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6 Sheets—Sheet 6.

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APPARATUS FOR STRETCHING AND DRYING CLOTH.

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Fig. 15.

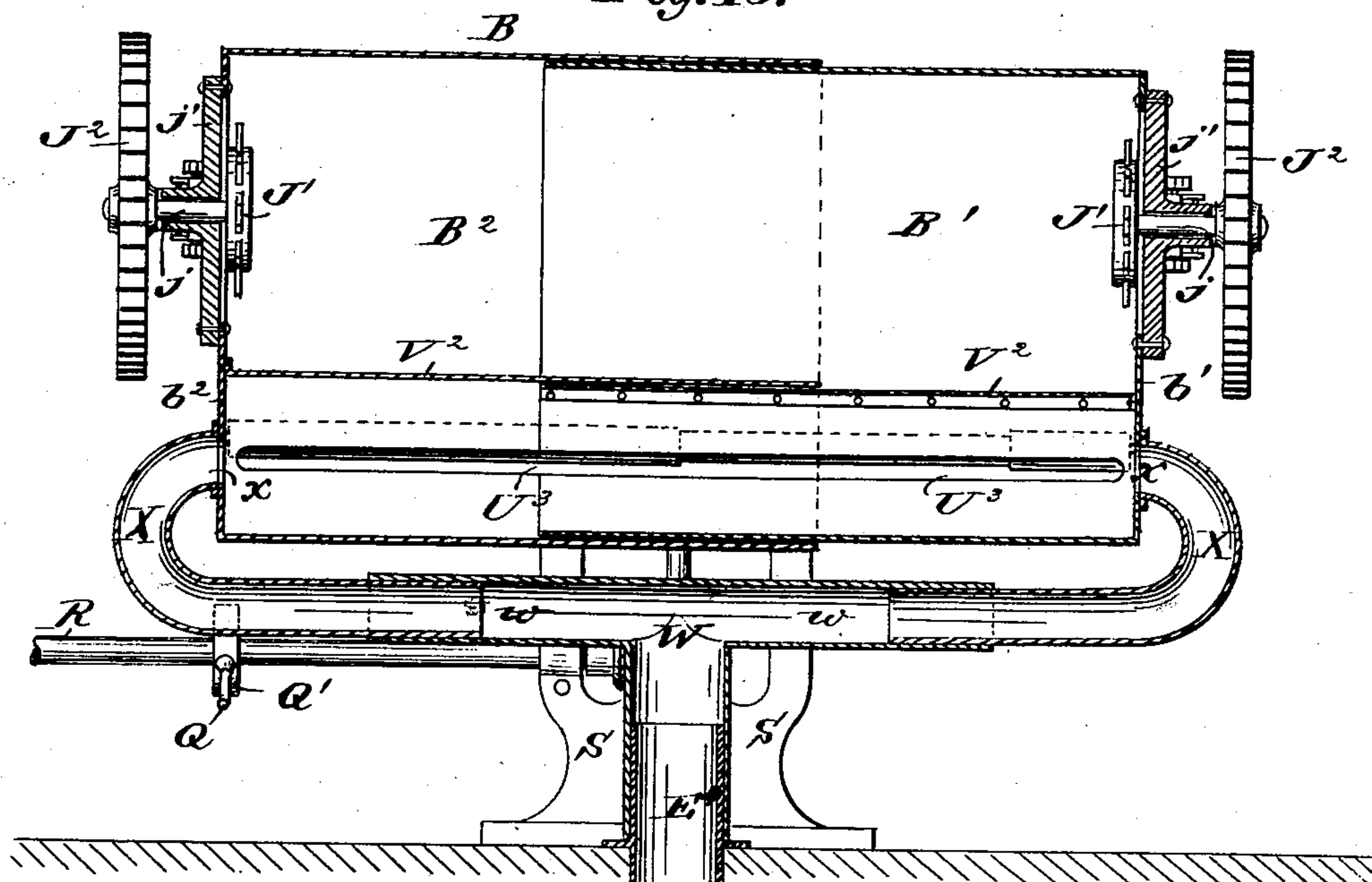
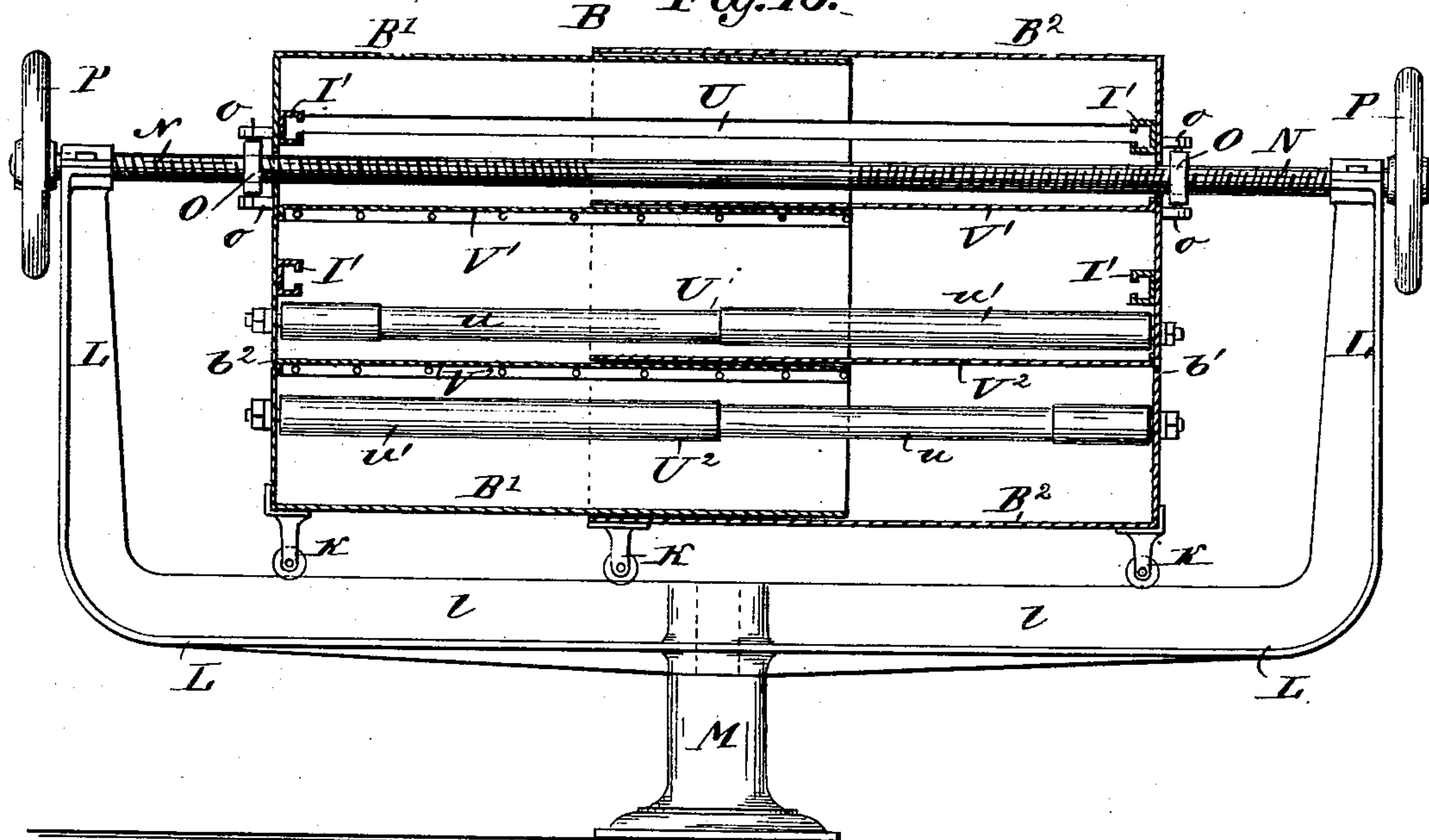


Fig. 16.



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UNITED STATES PATENT OFFICE.

JOHN HENRY VARNEY, OF HALLOWELL, MAINE.

APPARATUS FOR STRETCHING AND DRYING CLOTH.

SPECIFICATION forming part of Letters Patent No. 347,212, dated August 10, 1836.

Application filed July 16, 1884. Serial No. 137,847. (No model.)

To all whom it may concern:

Be it known that I, JOHN HENRY VARNEY, of Hallowell, in the county of Kennebec and State of Maine, have invented a new and Improved Apparatus for Stretching and Drying Cloth, of which the following is a full, clear, and exact description.

My invention relates to machines for stretching and drying cloth; and the object of the invention is to promote economy in the stretching and drying processes and to give a better stretch and finish to the fabrics.

The invention consists in constructions and combinations of parts of the apparatus, all as hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 represents my improved apparatus for stretching and drying cloth, and shows in vertical section the building in which such apparatus is placed. Fig. 2 is a plan view of the apparatus with the building in horizontal section. Fig. 3 is a longitudinal sectional elevation of the stretching and drying machine, partly broken away. Fig. 4 is a sectional elevation of one end of the outside shaft and one of the gear-wheels by which the hook-chain wheels are driven at the back end of the machine. Fig. 5 is a sectional elevation on the line 1 1, Fig. 4. Fig. 6 is a side view of the drive gear-wheel and end view of the outside shaft. Fig. 7 is a sectional elevation of one of the telescoping cloth-guide rollers. Fig. 8 is a plan view of the stretching and drying machine, parts being broken away. Figs. 9, 10, and 11 are enlarged detail views of one of the cloth-carrying hooked chains and guides therefor. Fig. 12 is an enlarged longitudinal section of the cloth-drying chamber, and shows also in side elevation the hooked-chain guides and chain-wheel. Fig. 13 is a transverse section of the stretcher A, taken on the line 2 2 of Fig. 3, and shows also in rear elevation the front bearer of the stretcher and the apron over which the cloth passes, also the screw-shaft and hand-wheels for operating the side bars. Fig. 14 is a back end view of the drier. Fig. 15 is a transverse sectional elevation on line 3 3 of Fig. 3, the wheels J' and J² and

shaft j being also shown in elevation. Fig. 16 is a transverse sectional elevation on the line 4 4 of Fig. 3, bearer L, shaft N, and wheels P and rollers U' U² being in elevation.

The general arrangement of the cloth stretching and drying apparatus which I employ for economically heating the air and conducting it to the cloth-drying chamber of the machine is illustrated in Figs. 1 and 2 of the drawings, in which the letters A B indicate the stretching and drying machine, which is placed in a close room, a, which connects by a passage, b, with the close room c, in which the air-forcing apparatus or blower C and the air-heater D are placed. I show the engine E, for driving the blower C, and the engine F, for driving the machine A B, located in a room, d, below the rooms and passage a b c; but the engines may be arranged on the same level, if desired. The exhaust-steam from the engines E F is conducted through a pipe, E', to the air-heater D, said pipe E' preferably extending nearly to the bottom of the heater, which contains the coils E² of pipe, through which the air is forced by the blower C on its way to the drier. A pipe, E³, connects the outlet of the blower with the coils E², which in turn connect by a pipe, E⁴, with the back end of the drier in a manner hereinafter more fully explained.

F' is the outlet-pipe for the exhaust-steam from the heater D, which pipe may be valved to control the escape of the steam after it has risen through the water D' in the heater, and so as to control the temperature of the pipes and the air passing through them to the drier to any desired degree for the best drying effect on the fabric.

Between the rooms a c, and next the passage b, I arrange a room, e, for the workmen to enter for protection from the high temperature prevailing in the machine and heater rooms. The heated air, after passing through the drier B of the machine, escapes at f to the room a with the steam or vapor which has passed from the fabric, and I provide along the close rooms and passage a b c a series of windows, a', or other ventilators, which may be opened to discharge the vapor and control the temperature and humidity of the air. It will of course be understood that the windows are not, during the operation of the machine,

to be opened sufficiently to interfere materially with the passage of the heated air from the drier back to the blower. It will be seen that the air discharged from the drying-chamber B at a temperature considerably higher than the outside atmospheric air is drawn along the rooms and passage $a b c$ by and into the blower C, which passes the air through the heater and back again to and through the drying-chamber, the heated air being used over and over again in a continuous circuit, whereby much greater economy in heating the air is attained than would be possible by leading the cool outside air to the blower and heater, and by using the exhaust-steam from the engines E F to reheat the air in circuit a greater economy of fuel is secured than would be attained by passing live steam direct from a boiler to the heater. The reuse of the same heated air to a very large extent enables the exhaust-steam to keep the air in circuit at a sufficiently high temperature for effective drying action on the cloth.

I particularly describe the cloth stretching and drying machine as follows: The cloth or fabric, G, to be stretched and dried is supported in a bolt, as at g , upon standard G, at the front end of the machine, and after passing through the machine it is wound in a bolt or roll, g' , held on standards G^2 at the back end of the machine. The roll is wound by a belt passing from a pulley on the shaft of the bolt g' to a pulley, R^3 , on the shaft R. The cloth passes from the bolt g down to and beneath a guide-roller, G^3 , held to revolve in standards fixed to the floor, and thence the cloth passes up to and over a convex apron or plate, H, which is supported rigidly at the front end of the machine, and in its passage to and over the apron the cloth is stretched lengthwise slightly by the pull on it in unwinding before reaching the endless chains I I, which are arranged along each side of the machine, and have tenter-hooks i , on which the cloth G is caught by its selvages for being carried through the machine as the chain-wheels are revolved by gearing hereinafter described. The shaft of the bolt g has a friction-wheel, g^2 , secured to it, and a weighted brake-lever, g^3 , pivoted to an arm, G^8 , projecting from one of the standards G' , bears on this friction-wheel to form a tension device and allow of the fabric being properly stretched.

The side bars, $A' A'$, of the front section, A, of the machine are hinged to the rear section or drier, B, on strong pins, as at B^3 , allowing the opposite side bars, $A' A'$, of section A to be swung bodily in horizontal plane on their support, which consists of a suitable frame or bearer, A^2 , having legs $a^2 a^2$, which rest on the floor or on a metal wear-plate, a^3 , held thereon, and having also a suitable track or way, a^4 , along its upper edge, on which rollers a^5 , journaled to feet a^6 , fixed to each side bar, A' , may move transversely of the machine for bringing the front or free ends of the bars $A' A'$ nearer to or farther from each other, according to the desired sidewise stretch the cloth is to receive.

These feet a^2 are provided with casters a^x , that run on the track a^3 , the track being of sufficient width to allow of the necessary longitudinal movement of the bearer as well as its transverse movement.

To gather or spread the bars $A' A'$, I employ a screw-shaft, A^3 , having right and left threads fitted, respectively, into boxes $A^4 A^4$, which are swiveled on vertically-ranging pins or journals fitted loosely to boxes $a^7 a^7$, held to each of the side bars, A' , through which bars the screw-shaft passes. The shaft is journaled in boxes $a^8 a^8$ on the tops of the end standards of the bearer A^2 , and has hand-wheels A^5 at the ends, which serve to prevent end motion of the shaft, and to turn the shaft by for positioning the side bars, $A' A'$, relatively to each other as desired. The swiveled boxes A^4 allow the side bars, $A' A'$, of the section A to have an independent or reverse end motion, as the entire machine is oscillated endwise on pivots of bearers which support the cloth-drying chamber B, as hereinafter described. The cloth-guide apron H is held rigidly by standards H' , fixed to the floor, and so that the chain-wheels J J, journaled to the free ends of the side bars, $A' A'$, will move as closely as may be to the edge h of the plate as the section A is shifted transversely for catching the cloth on the tenter-hooks i of the chains I I, and as the bars $A' A'$ are moved backward and forward as the drier is oscillated, as hereinafter described. The front chain-wheels, J J, (see Fig. 3,) are journaled on studs of arms $a^9 a^9$, fixed to the ends of the bars $A' A'$ and the back chain-wheels, $J' J'$, (see Figs. 15 and 12,) are fixed to shafts $j j$, which are journaled in the opposite sides of the case of the drying-chamber, or to plates $j' j'$, fixed to the case. (See Fig. 15.) Guideways $I' I'$ are provided along the inside faces of the bars $A' A'$ of the section A, and continue backward along the inner faces of the sides of the drying-chamber B, so as to support the upper and lower sides of the endless chains, the tenter-hooks i of the chains running along through face-slots of the guides, and projecting therefrom to hold the cloth.

I make the cloth-drying chamber B in rectangular box-like form and in two sections, $B' B^2$, having sides $b' b^2$, overlapping ends $b^3 b^4$, and top and bottom parts overlapping each other so as to form a closed chamber adapted to be made wider or narrower, to accommodate different widths of fabric. I support the sectional drier B, preferably by rollers K, upon the flanges l of the bearers L, which are supported on vertical pivots on the pedestals M, fixed to the floor. There may be as many of these pivoted bearers as desired, and each one has a right and left screw-shaft, N, fitted in threaded swiveled boxes O, journaled to brackets $o o$, fixed to the opposite sides, $b' b^2$, of the drier-sections, and the shafts have a hand-wheel, P, at each end, by which to turn them for contracting or expanding the case of the dryer, the arrangement of the screw-shafts N

and their swiveled boxes being substantially the same as that of the shaft A^3 , before described. It will be seen that the drier may be made wider or narrower, as required, and also is free to oscillate on the pedestals, and will carry the bearer A^2 and frame A with it, so that the sections $A B$ of the machine may receive together a limited back and forth or reverse motion of their opposite sides, for stretching the cloth G as it is carried along by the endless chains $I I$. To give this oscillating movement to the machine-sections $A B$, I connect the back bearer L , at one side of its pivot, by a rod, Q , with an eccentric, Q' , held on a shaft, R , which is journaled in bearings $r r'$ of a yoke, S , and standard r^2 , fixed to the floor, and carries a pulley, R' , to receive a belt for driving it. The shaft R carries at the other end a bevel gear-wheel, R^2 , which meshes with a bevel-gear, R^3 , of a vertical shaft, S' , journaled in line with the pivots of the bearers L in the yoke S . The shaft S' carries on its upper end a beveled gear, S^2 , meshing with a bevel-gear, S^3 , fixed upon a transverse shaft, T , which passes along the back end of the machine, through a strong bracket-arm, T' , and revolves in the upper horizontal bearing, t , of the arm. The shaft T is supported, mainly, in boxes $T^3 T^3$, which are swiveled to lugs $t^3 t^3$, fixed to the sides $b' b^2$ of the drier-case sections $B' B^2$, and said lugs $t^3 t^3$ may be extensions of the plates $j' j'$, in which the shafts or gudgeons of the chain-wheels $J' J'$ are journaled. The boxes T^3 each have fixed lugs $t^4 t^4$, which receive pins $t^5 t^5$, fixed to a strap or collar, T^4 , which is held in an annular groove, t^6 , of the hub of the adjacent driving-gear T^2 , fitted to its shaft T^3 by a feather or spline, t' , so that the gear T^2 will revolve with the shaft and will be slid along the shaft with the case-section, to which it is attached, and thus hold the gears J^2 and T^2 always in mesh for driving the cloth-carrying chains $I I$, irrespective of the width at which the drier-case may be set by the screw-shafts N . The lower vertical bearing, t' , of the arm T' is mounted loosely on the shaft S' , to swing thereon as the drier-case oscillates, and a collar, t^2 , is or may be fixed to the shaft T outside of the bearing t of the arm T' . The cloth or fabric G enters the drier B through a horizontal slot, U , at the front end, and proceeds with the endless chains $I I$ to the back end of the drier, from which it passes forward to and over a front guide-roller, U' , thence down to and beneath a roller, U^2 , directly below the roller U' , thence back again to leave the drier-case through a slot, U^3 , thence to and around a roller, U^4 , journaled in bearings to revolve outside the drier-case, and up to the winding-bolt g' in a dried and finished condition. It will be seen that the cloth travels along and through the drier in three continuous layers or webs, $g^2 g^3 g^4$. I have fixed to the side sections of the drier-case an upper partition consisting of overlapping plates $V' V'$, which come between the cloth layers $g^2 g^3$, and fit closely to the front

end of the drier-case and stop short of its back end, to form an air-passage, f' , at the back of the partition and case. I fix another partition, consisting of overlapping plates $V^2 V^2$, closely to the back end of the drier-case, and extend the partition forward between the layers $g^3 g^4$ of the cloth, but not quite to the front end of the drier, so that an air-passage, f^2 , will be formed thereat. The rollers $U' U^2$ are positioned, respectively, in the drier-case so as to carry the web or layer g^3 of cloth downward to release it from the inverted hooks i of the chains I , and to bring the lower layer, g^4 , about midway between the lower partition-plates, $V^2 V^2$, and the bottom of the drier-case. Each of the rollers $U' U^2$ consists of two telescoping sections, $u u'$, having end shoulders coming at the inner faces of the sides of the drier-sections $B' B^2$, and end spindles, u^2 , on which the nuts u^3 are screwed so as to come outside of the sections, so that as the sections are contracted or expanded, to narrow or widen the drier, the roller will likewise contract or expand. The overlapping-plate construction of the partitions $V' V^2$ allows them to be shifted on each other, so that neither the rollers nor partitions interfere with the adjustment of the drier-case by the screws. At the same time the partitions subdivide the case, so as to confine the heated air in separate narrow or shallow passages, through which the layers of cloth travel, thereby insuring the thorough and quick drying of the fabric. The pipe E^4 , leading from the heater D , connects with a T-pipe or coupling, W , in or over the opposite heads or ends w of which the pipes X pass, and the pipes X bend upward, or so as to be connected with the opposite sides $b' b^2$ of the drier-case at its back end, and to allow them to move in and out of the T-coupling W as the cross sections are adjusted. I prefer to arrange the discharge ends $x x$ of the opposite pipes $X X$, so that the air will be discharged against the side edges of the cloth, and so as to pass the both sides of the lower web or layer of cloth, as indicated in Figs. 3 and 12.

It will be noticed that the dry hot air first enters the drier B next to where the cloth leaves the drier, and thereby the air has the best effect in giving the final dry-finish to the cloth, and that the air passes forward along and through the lower cloth layer, g^4 , thence up through the front lower opening, f^2 , and along and through the second cloth layer, g^3 , and up through the opening f' , thence forward again along and through the opening f at the front of the drier into the room a , whence the air is drawn by the blower C into the heater D , to again be passed to the drier, as above described.

In practice I propose to cut away the ends of the partitions $V' V^2$ a little at the points when they would be liable to strike the case, and also provide room at the ends of the case itself to allow oscillation. If it should be found that the heated air escaped from between the

two sections of the drying-section in a sufficient quantity to interfere with its serpentine course, a flexible flap could be used to close the spaces between said sections and at the cut-away portions of the partitions, and yet allow of adjustment and oscillation.

V' V' represent transverse flexible strips of metal, rubber, or other suitable material, which are fastened at one edge to the ends of the drier-section and rest at their free edges on the partitions at their cut-away ends. (See Figs. 3 and 12.)

In Fig. 8, B' B' represent flexible strips of sheet metal, which are secured at one edge to one section, and rest at the free edge on the other section, and thus close the joint between the two sections of the drier. The rollers U' U' will have sufficient looseness in their bearings, so that they may move relatively with the drier-case. The supply-pipes X X oscillate at their points of connection with the ends u u of pipe W.

As usually arranged, the guide apron or plate over which the cloth passes to be hooked onto the traveling chains is held at some distance from the chains, so as to allow an attendant at each side of the cloth to hook its opposite selvages onto the opposite chains as the cloth is drawn into the machine, and the front section of the machine is supported on pivoted bearers, the same as the drier; hence I make special mention of my arrangement of the plate or apron H as extending quite closely to the hook-chains I, and of the arrangement of the section A to be moved transversely at the forward end independently of the endwise oscillation of the machine in stretching the cloth, as these features of construction allow the cloth to automatically be caught by the tenter-hooks i of the chains by shifting the forward end of the section A from side to side, which may be done by an attendant at one side of the machine, thus saving the labor of one man, and hooking the cloth to the opposite chains as evenly as with a man at each side. As the cloth G passes up over the apron H and the bearer A' is moved to the right hand of the longitudinal center of the machine, the left-hand hooks i will catch in the selvage of the cloth at that side, and as the bearer is moved to the left the right-hand hooks will engage the right-hand selvage of the cloth, and as the opposite hooks, which first catch the opposite selvages of the cloth, are farther apart than the width of the cloth, as it passes from the bolt g the cloth will be stretched considerably in width as it enters the machine, after first having been stretched lengthwise in its passage from the bolt g and around the roller g' and over the apron H, as hereinbefore described. As the cloth moves along the section A toward the drier, B it is stretched still more in width by the divergence of the tenter-hook chains carried by the side bars, A' A'. The section A may be moved transversely by direct hold of the hands on the bearer A' or one of its hand-wheels; but

I prefer to use a slotted lever, Y, which is fulcrumed through its slot to a post at y, to act by its end y', connecting with the bearer A', for the purpose, and as shown in Fig. 2 the lever Y may extend to the cool-room e, to be worked by an attendant therein.

It is obvious that by inclosing the traveling web of cloth in the drier B at the top and bottom as well as at the sides far less heat or air escapes without effective or continuous drying action on the cloth than in the ordinary cloth stretching and drying machines, wherein one side of the web of cloth is quite uncovered and the air forced between the two layers of fabric held by the endless-chain hooks blows directly through the fabric into the machine-room; hence my improved machine may, for this reason, also, be operated more economically.

The drawings represent the end parts of the opposite sections B' B' of the drying-chamber B fitted rather closely together, so as apparently to prevent their oscillating movement; but it will be understood that these reverse endwise movements are but a few inches in extent, or comparatively slight; hence the overlapping end parts of the drier-sections B' B' may be set quite closely together, to prevent too free escape of heat from the drier, and at the same time admit of the free oscillating movement of the drier B and stretching-frame A, as hereinbefore described.

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

1. The combination, with a cloth-drying section and means for oscillating it, of a front section hinged at one end to one end of the drier-section and means for transversely oscillating the free end of said front section, substantially as set forth.

2. The combination, with a cloth-drying section and means for oscillating it, of a front section having side bars hinged to the front end of the drying-section to oscillate with it, and means, substantially as described, for oscillating said front section independent of the drier, and cloth-carrying chains within said sections, substantially as set forth.

3. The combination, with the drier B and means for oscillating it, of the front section, A, having side bars, A' A', hinged to the forward end of the drier to oscillate therewith, means, substantially as described, for oscillating said front section independent of the drier-section, and a transversely-movable bearer, A', supporting the forward end of the front section; substantially as set forth.

4. The combination, with the drier-section B and means for oscillating it, of the front section, A, having side bars, A' A', hinged to the drier at one end to move therewith, means for adjusting said side bars toward and from each other, a movable support for the free end of the front section, and cloth-carrying chains mounted on said sections, substantially as set forth.

5. The combination, with the drier B and means for oscillating said drier, of the front section, A, having side bars, A', hinged to the drier at one end, the transversely-movable bearer A², supporting the opposite ends of said side bars, the swiveled boxes A⁴, and the right-and-left screw-shaft A³, connecting the said sides through said swiveled boxes, substantially as set forth.
6. The combination, with the front section having side sections and means for adjusting said sections toward and from each other, of the endless cloth-carrying tenter-hook chains and a fixed apron or plate adjacent to the tenter-hooks at the front end of the front section, substantially as set forth.
7. The combination, with the front section, A, having hinged side bars, A' A', and means for adjusting said side bars, of the cloth-carrying chains mounted on said side bars, and fixed apron H, having its edge h adjacent to the said chains, substantially as set forth.
8. The cloth-drying section consisting of a case formed of telescopic sections and means for adjusting said sections toward and from each other, in combination with the wheels journaled in the opposite inner sides of said drier and cloth-carrying chains on said wheels, substantially as set forth.
9. The combination, with a cloth-drier consisting of a casing formed of telescopic sections and means for oscillating said sections, substantially as described, of wheels journaled at the opposite inner sides of the drier and cloth-carrying chains on said wheels, substantially as set forth.
10. The cloth-drier comprising a case to inclose the fabric and means for oscillating said casing and adjusting it in width, in combination with the cloth-carrying chains within the case, wheels supporting the same, and overlapping partitions within the case, said partitions being secured alternately to opposite ends of the drier, thereby forming separate drying-chambers and a serpentine air-passage, substantially as set forth.
11. The cloth-drier comprising a case to inclose the fabric and means for oscillating said case and adjusting it in width, chain-wheels on opposite sides of the case, and cloth-carrying chains mounted thereon, in combination with the overlapping partitions forming a serpentine air-passage and drying-chambers and the telescopic guide-rollers, whereby when the width of the case is adjusted that of the partitions and rollers will also be adjusted, substantially as set forth.
12. The drier-case B, comprising two overlapping or telescopic sections, B' B², whereby the width of the same may be varied to suit different widths of fabric, substantially as set forth.
13. The drier-case B, comprising the overlapping or telescopic sections B' B², in combination with the cloth-carrying tenter-hook chains I I' within the case, substantially as set forth.
14. The drier-case B, comprising the overlapping or telescopic sections B' B², in combination with the pedestals M, bearers L, pivoted to the pedestals and supporting the drier-sections B' B², means, substantially as described, for moving the sections in and out, and the tenter-hook chains, substantially as set forth.
15. The drier-case B, comprising the overlapping or telescopic sections B' B² and swiveled boxes O, secured to said sections, in combination with the pedestals M, bearers L, supporting said case, and the right and left screw-shafts N, working in the swiveled boxes and adapted to operate the sections B' B², substantially as set forth.
16. The drier-case B, comprising the overlapping or telescopic sections B' B², in combination with the cloth-carrying chains I I, overlapping partitions V' V' V² V², fixed to the sides and alternately to the opposite ends of the drier to form a serpentine air-passage, the pivoted bearers L, supporting said sections, and means, substantially as described, for adjusting said sections, substantially as set forth.
17. The drier-case B, comprising the overlapping or telescopic sections B' B², in combination with the cloth-carrying chains I I, overlapping partitions V' V' V² V², telescopic guide-rollers N' N², the bearers L, supporting said sections, means, substantially as described, for swinging the bearers, and means for adjusting the sections, substantially as set forth.
18. The combination, with the drier-case B, comprising overlapping or telescopic sections B' B² and means for adjusting said sections, of the cloth-carrying chains and chain-wheels, boxes T³ T³, swiveled to said sections, shaft T, journaled in said boxes, drive-wheels T² T², splined to the shaft to rotate with and slide thereon and connected with the swiveled boxes, and means for revolving said shaft, substantially as set forth.
19. The combination, with the section A, the drier-case B, to which said section is hinged and comprising the overlapping or telescopic sections B' B², and the cloth-carrying chains, of the boxes T³, swiveled to the sections B' B², means for oscillating said sections, the shaft T, journaled in said boxes, the drive-wheels splined to the shaft to slide thereon and rotate therewith, and connections between the drive-wheels and swiveled boxes, the shafts J, the drive-wheels J² thereon, drive-wheels T², the chain-wheels J', the pivoted horizontally-turning bearers L, supporting the sections B' B², the shaft R, the eccentric Q' thereon, and the rod Q, connecting one of the bearers and said eccentric, and mechanism for connecting and operating the shafts T R, substantially as set forth.
20. The combination, with the section A, of the horizontally-oscillating drier-case B, to which said section A is hinged, comprising overlapping or telescopic sections B' B², the cloth-carrying chains, the boxes T³, swiveled

to the drier-sections, the shaft T, journaled therein, the drive-wheels T², splined to the shaft and connected to said swiveled boxes to be moved therewith on the shaft, drive-
5 wheels J², their shaft j, the chain-wheels, the shaft R, eccentric Q', the bearers L, the rod Q, connecting the eccentric to a bearer, the vertical shaft S', gears R² R³ S² S³, the arm T', pivoted on shaft S', and the bearing t'
10 thereon for the shaft T, substantially as set forth.

21. The combination, with the drier-case B, comprising the telescopic or overlapping sections B' B², of the telescopic hot-air pipes connected thereto, whereby the width of the
case may be adjusted without interrupting the
15 heat-supply, substantially as set forth.

JOHN HENRY VARNEY.

Witnesses:

TREBY JOHNSON,
A. W. HEDGE.