

(No Model.)

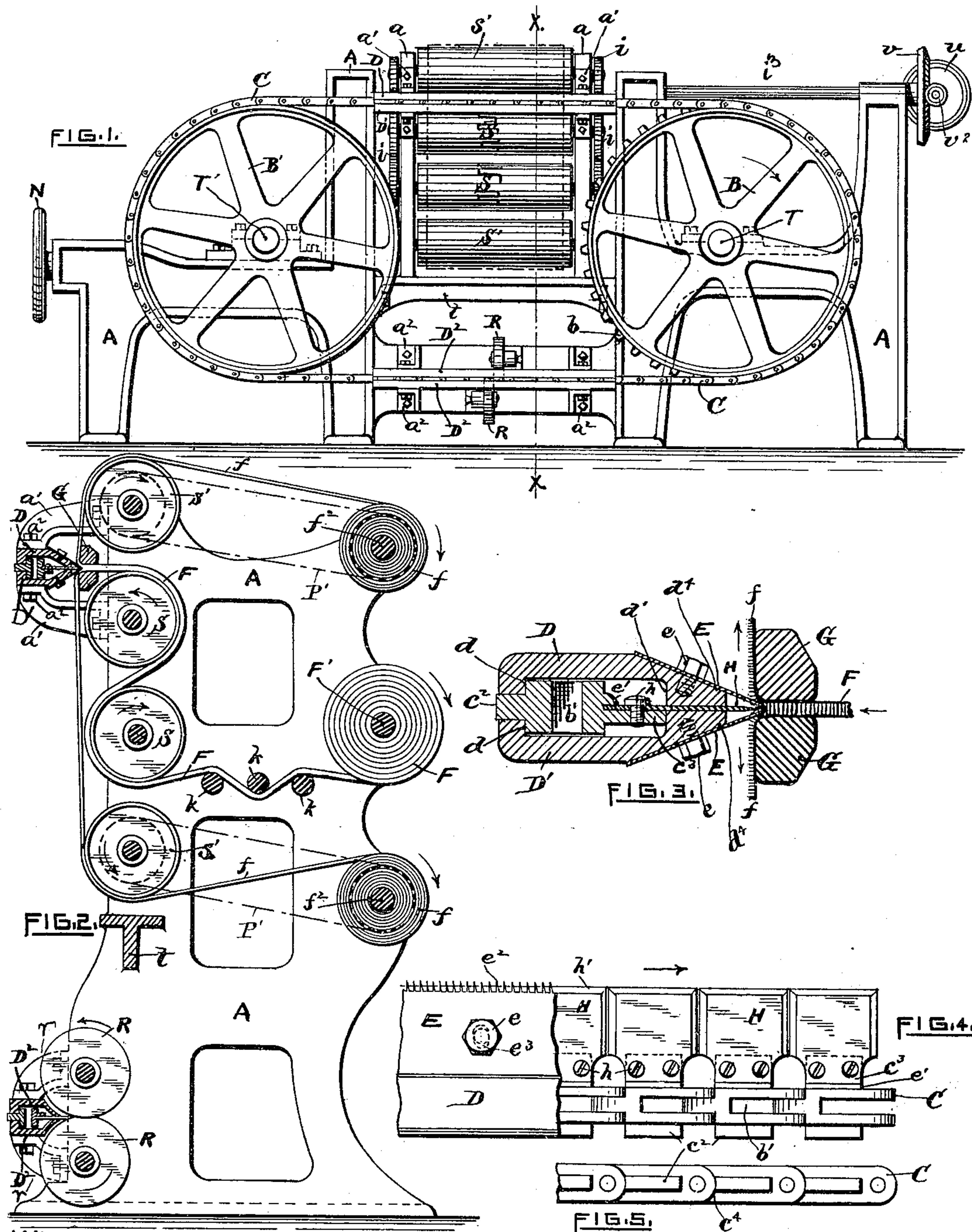
3 Sheets—Sheet 1.

O. E. DROWN.

MACHINE FOR CUTTING DOUBLE PILE FABRICS.

No. 350,726.

Patented Oct. 12, 1886.



WITNESSES.

Charles Harrigan.
Frederic A. Gay.

INVENTOR.

Otis E. Drown.
by *Geo. H. Remington*
Att'y.

(No Model.)

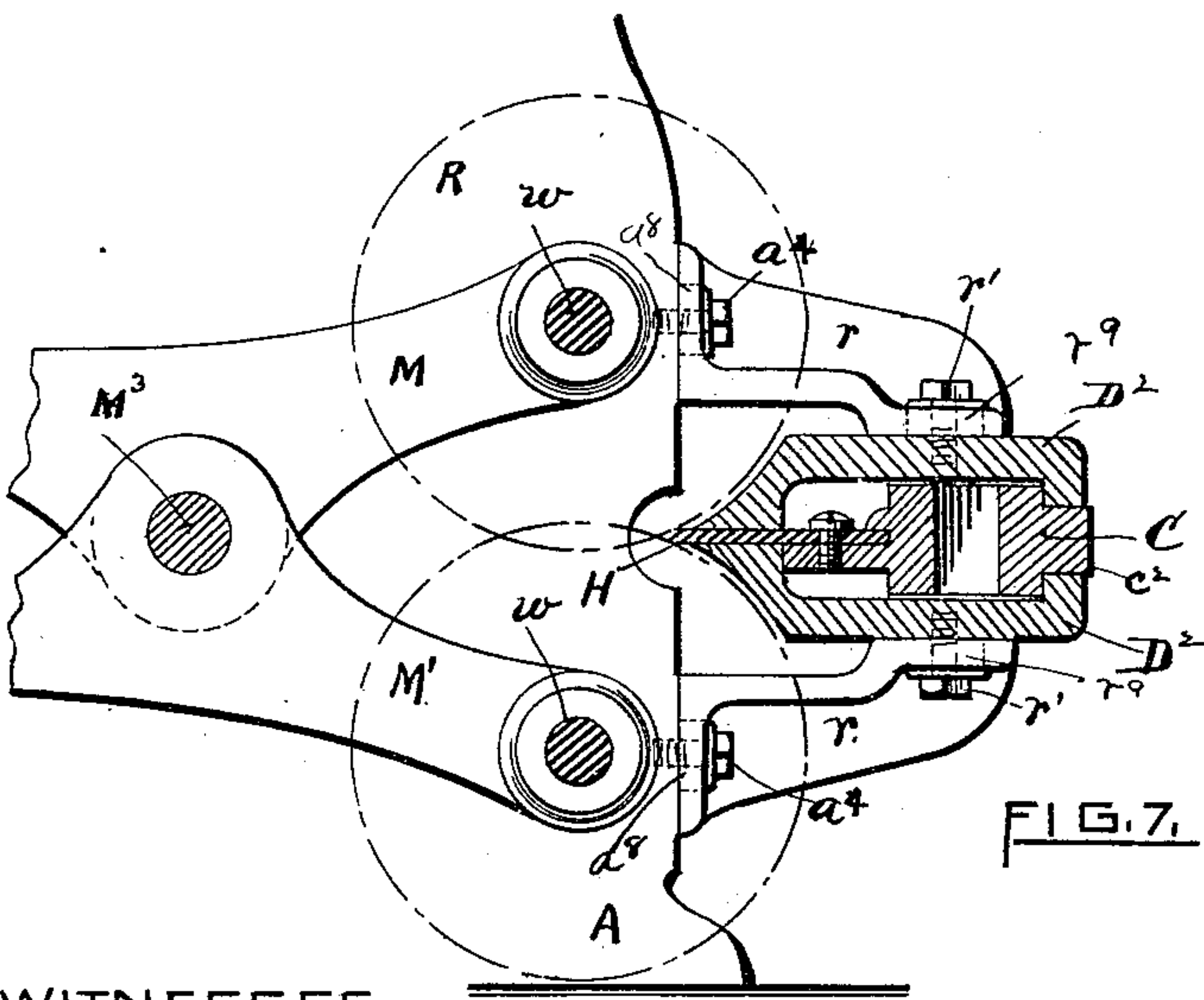
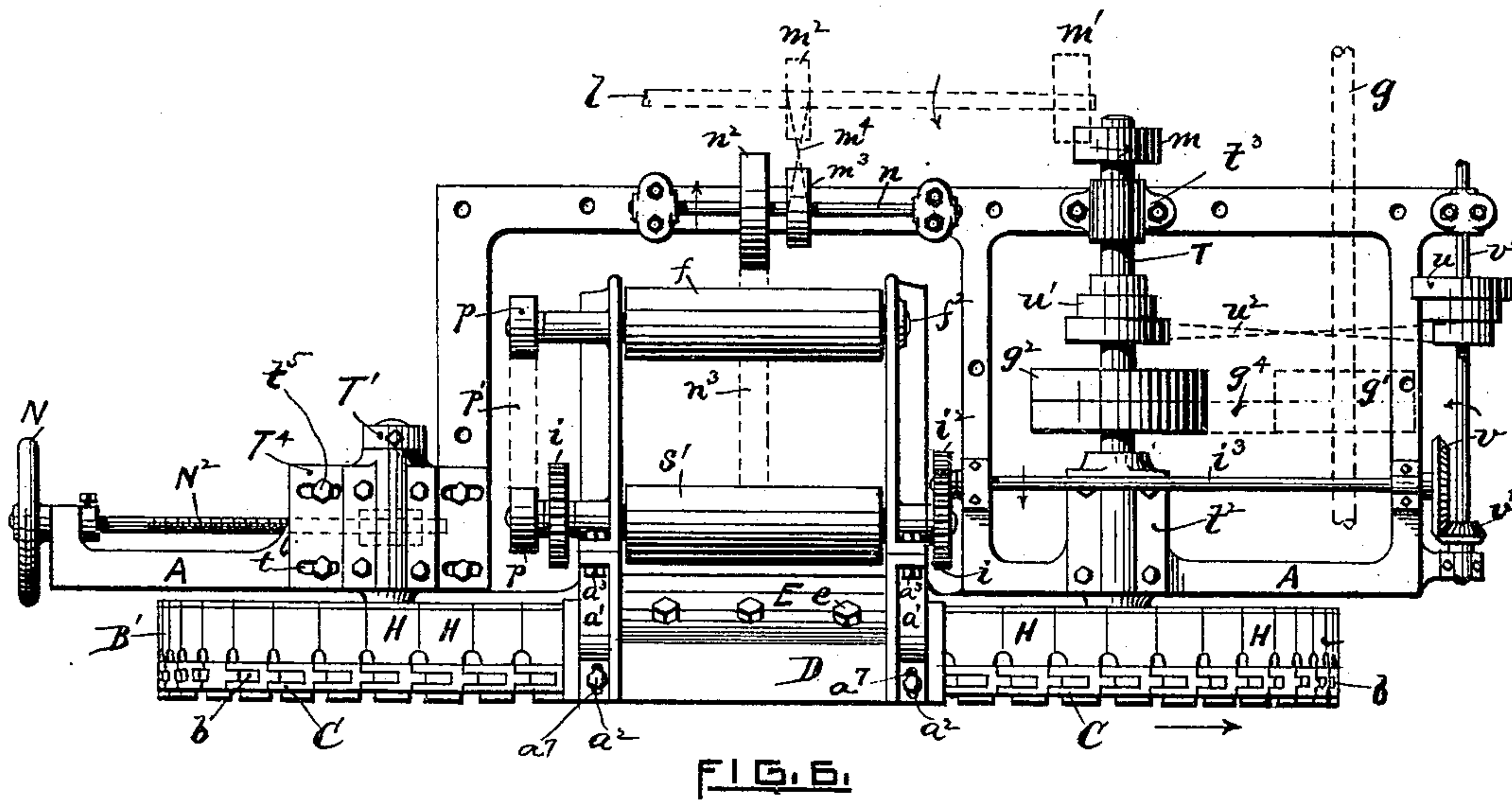
3 Sheets—Sheet 2.

O. E. DROWN.

MACHINE FOR CUTTING DOUBLE PILE FABRICS.

No. 350,726.

Patented Oct. 12, 1886.



WITNESSES.

Charles Hannigan.
Frederic A. Grey,

INVENTOR.

Otis E. Drown.
by Geo. H. Remington
Atty.

(No Model.)

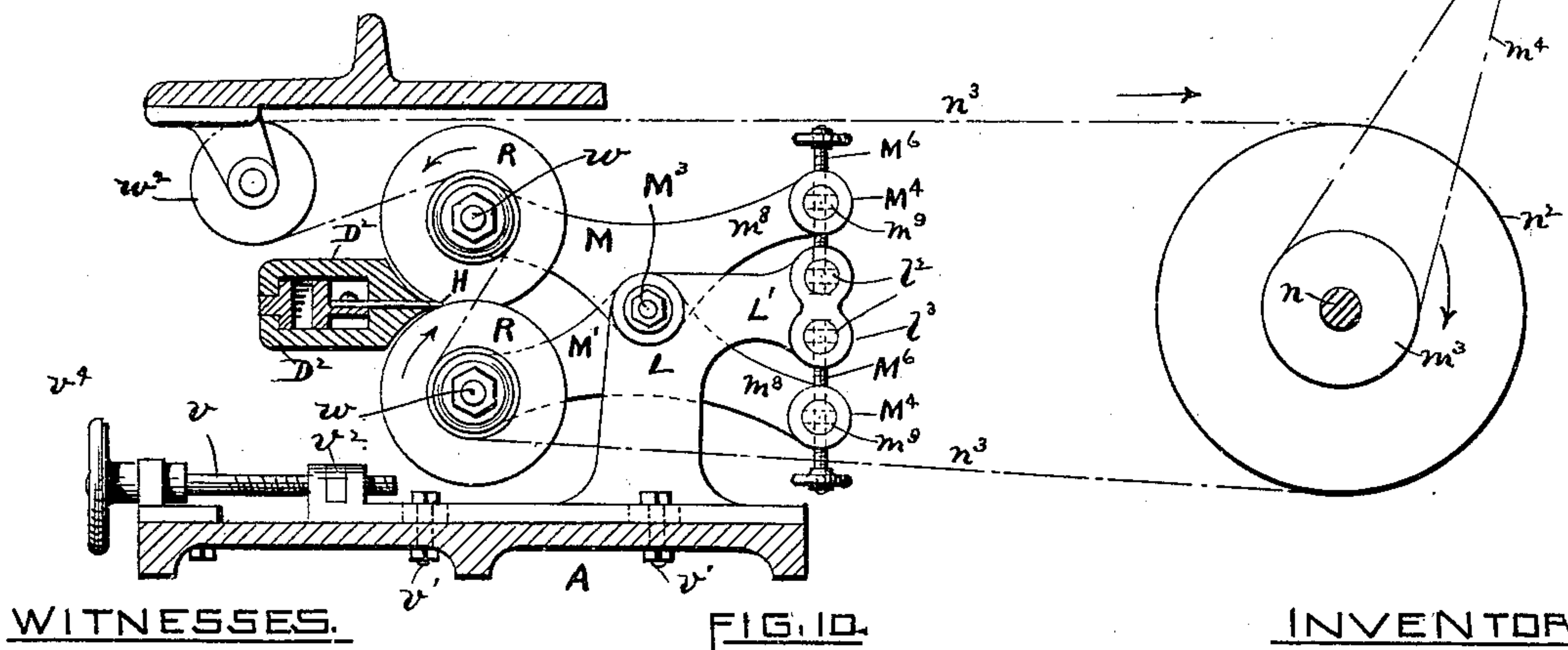
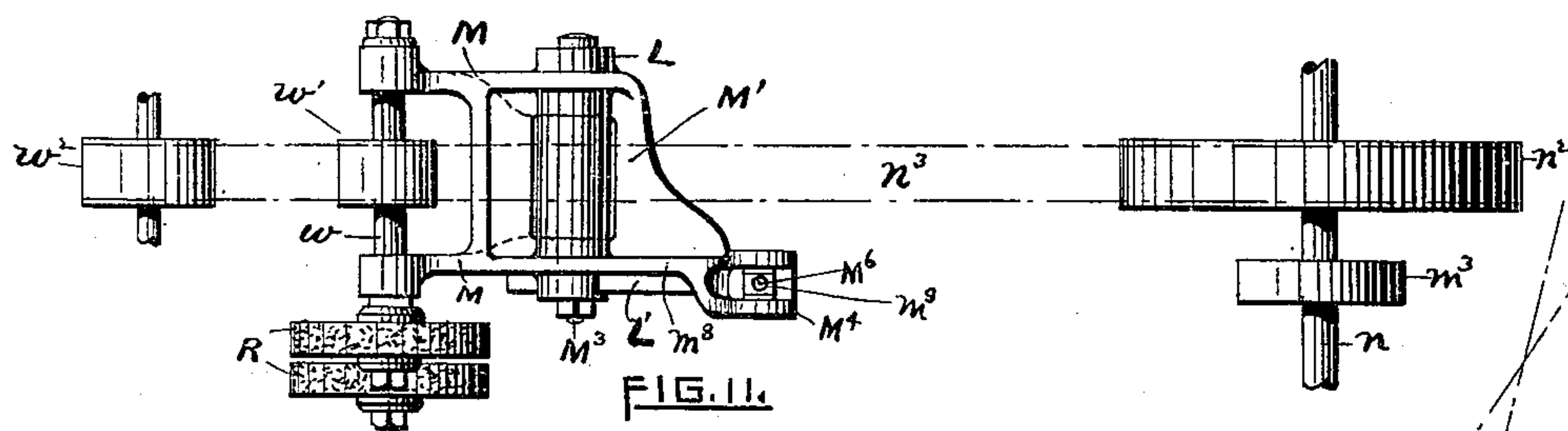
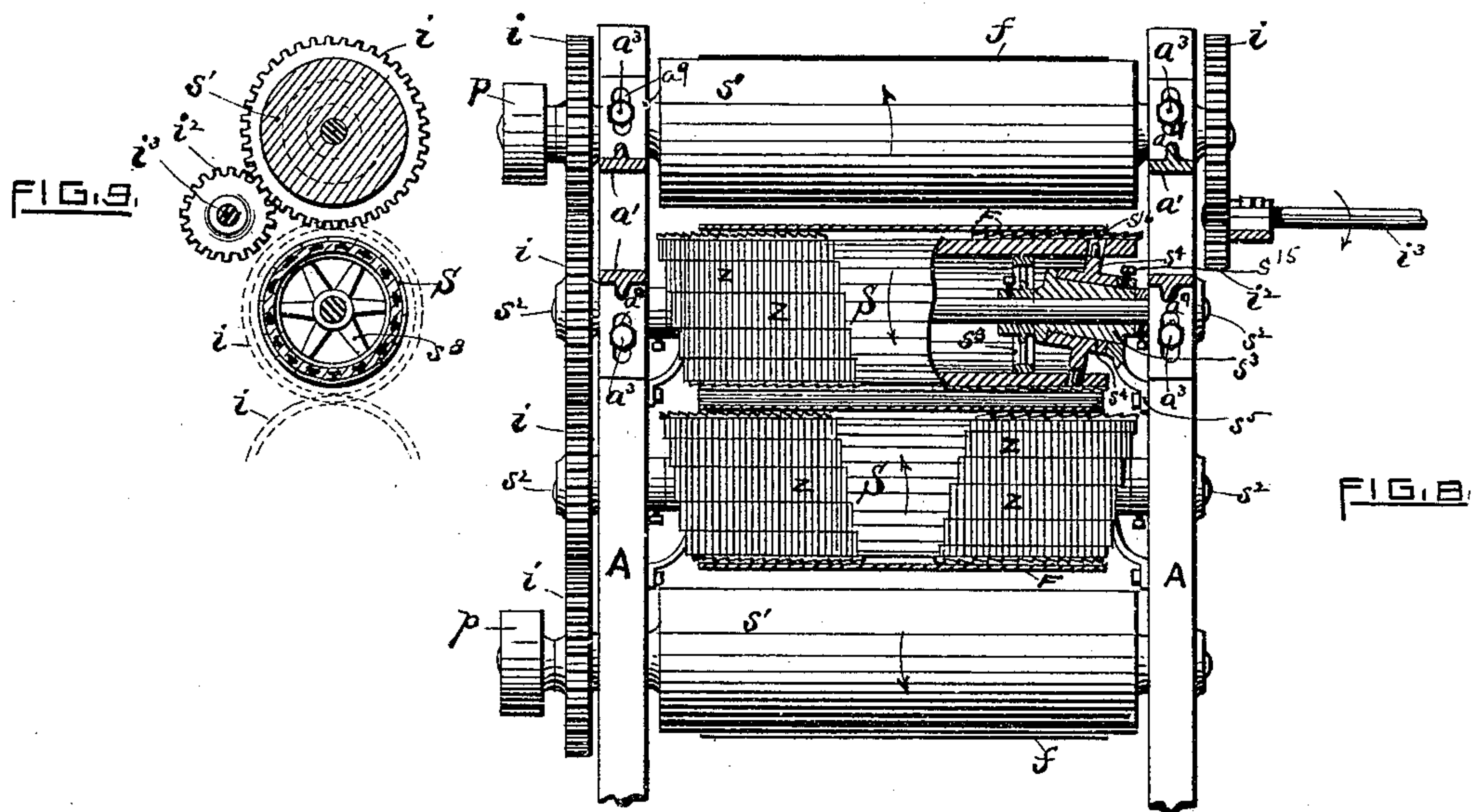
3 Sheets—Sheet 3.

O. E. DROWN.

MACHINE FOR CUTTING DOUBLE PILE FABRICS.

No. 350,726.

Patented Oct. 12, 1886.



WITNESSES.

INVENTOR

Charles H. Remington.
Frederic A. Guy.

Otis E. Drown.
by Geo. H. Remington
Atty.

UNITED STATES PATENT OFFICE.

OTIS E. DROWN, OF SAYLESVILLE, RHODE ISLAND.

MACHINE FOR CUTTING DOUBLE PILED FABRICS.

SPECIFICATION forming part of Letters Patent No. 350,726, dated October 12, 1886.

Application filed August 13, 1884. Serial No. 140,395. (No model.)

To all whom it may concern:

Be it known that I, OTIS E. DROWN, a citizen of the United States, residing at Saylesville, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Machines for Cutting Double Pile Fabrics; 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 or figures of reference marked thereon, which form a part of this specification.

My present invention relates to machines for cutting apart the intermediate pile of double woven pile fabrics; and it consists of an endless chain whose links are provided with lateral wings or lugs having cutters on one side of the chain secured to said lugs.

It also consists in the combination, with stationary guides adjustably secured to the frame of the machine, of upper and lower comb-plates and means for adjustably securing the comb plates to the guides.

It also consists of the chain, the wheels, their shafts, guides for the chain comb-plates, means whereby the latter are adjustably secured to the guides, upper and lower brackets, and means for adjustably securing said brackets to the frame, in combination with stretchers, friction-rolls, means for driving said stretchers and rolls, and guides adjustably secured to the frame.

It also consists of two geared stretchers mounted one over the other in the frame, each having cams, guide-wheels, bars, &c., and means for operating the same, in combination with the stationary guides, geared friction-rolls, cutter-chain, wheels carrying said chain, adjustably secured upper and lower guides for said chain, brackets adapted to hold said guides, comb-plates, and means whereby they are adjustably secured to said upper and lower guides.

It also consists in the combination, with the cutter-chain, wheels carrying said chain, and means for adjusting the tension of the chain, of two cutter grinding or sharpening rolls, means for supporting the rolls and driving the

same in opposite directions, and upper and lower guides adjustably secured to the frame adjacent to the grinding-rolls.

It also consists in the general construction and arrangement of the several parts to form the complete machine, as hereinafter set forth.

The object of this invention is to provide a machine for cutting double woven pile fabrics with a series of removable metallic cutters mounted upon an endless chain, said cutters being adapted to receive a more uniform cutting temper than can be obtained in an endless band or saw. Such cutters also possess an obvious advantage over the endless band in case of breakage, as a duplicate cutter can be readily substituted for the broken one, thereby saving much time and annoyance.

In the accompanying three sheets of drawings, Figure 1 represents in reduced scale a front view of a machine for cutting double woven pile fabrics embodying my invention, some of the minor details, however, which are shown in other figures, being omitted. Fig. 2 is a cross sectional view of the same through line *xx* of Fig. 1, enlarged, the means for supporting and driving the grinding-rolls not being shown in said figure. Fig. 3 is an enlarged cross-sectional view of the chain and the guide-bars, between which the fabric passes prior to its being cut or separated by means of the traveling cutters secured to the endless chain, and also showing the stationary guides for the chain, as well as the upper and lower steel combs, the points of which enter the pile forward of the cutters, a portion of fabric being represented as partially severed. Fig. 4 is a top view of a portion of the chain, each link having a cutter secured thereto, and also showing a part of the upper comb and guide. Fig. 5 is a front side view of the chain. Fig. 6, Sheet 2, is a plan view of the machine, showing, in addition to the parts shown in Fig. 1, the main driving mechanism and mechanism for adjusting one of the driving-wheels which carries the chain of cutters. Fig. 7 is an enlarged cross-sectional view of the cutters and guides, showing the adjustable brackets therefor, and also showing a portion of the supporting-frames for the grinding-rolls, the latter being indicated in dotted lines, said sec-

tion being taken adjacent to the rotary grinding-wheels. Fig. 8, Sheet 3, is a front view of the stretchers and feeding-rolls, together with the driving mechanism therefor, one of the stretchers, however, being represented in partial section. Fig. 9 is a detached view of the upper or main driving-gear, showing a cross-section of the top feed-roll and the upper stretcher. Fig. 10 is a view in partial section of the grinding-wheels, together with mechanism for adjusting and operating the same; and Fig. 11 is a plan view of the grinding devices and the driving means therefor.

The following is a more detailed description of my invention, including the manner of its operation.

A, again referring to the drawings, designates the frame of the machine, provided with standards, &c., to which the working parts are attached.

The main driving mechanism consists, essentially, of an overhead shaft, g , and pulley g' , (shown in dotted lines, Fig. 6,) which, by means of a belt, g^1 , and pulleys g^2 , communicate rotary motion to the driving-shaft T of the machine, the latter shaft being supported in bearings $t^2 t^3$, and also having the chain-wheel B secured to its front overhanging end.

u' indicates a cone-pulley secured to the shaft T, which, by means of the belt u^2 (shown dotted) and pulley u causes the shaft v' to revolve, the latter in turn, through the agency of the bevel-gears $v^2 v$, slowly revolving the shaft i^3 , which, by means of the driving-pinion i^2 , connects with the rolls, stretchers, and feeding mechanism hereinafter described.

m designates a pulley secured to the rear end of the shaft T, from which a belt leads upward and connects with the pulley m' , secured to the shaft l , (shown dotted,) thereby revolving the shaft in the arrow direction. To the shaft l is also secured the pulley m^2 , which, by means of the belt m^1 and pulley m^3 , drives the shaft n , for the purpose of operating the grinding mechanism, which also is more fully hereinafter set forth.

To the left of the machine, as shown in plan in Fig. 6, and to which figure the foregoing description is particularly referable, is mounted upon the short shaft T' a chain-wheel, B', (see also Fig. 1,) said shaft being journaled in the bearing T'. This bearing is adapted to be laterally adjusted by means of the screw N², which engages a nut secured to the under side of the bearing, a hand-wheel, N, serving to effect the adjustment, while the bolts t^5 , passing through slots t^6 in the bearing, serve to retain the bearing in position.

One of the chain-carrying wheels, as B, is provided with a series of spurs or lugs, b , which are equally spaced around the periphery thereof for the purpose of engaging the links of the cutting device. Said wheels are located, respectively, at the right and left of the center of the machine and in front of the frame A.

C designates an endless chain, each link thereof having front and rear or the outer and

inner guide-lugs, $c^2 c^3$, the lug c^3 being adapted to carry a thin sheet-steel cutter or knife, H, which is secured thereto by means of the screws h and overhanging lip or flange e' , (see Figs. 3 and 4,) said knives each having their cutting-edges h' beveled upon both the top and bottom sides, thus making them substantially \triangleright -shaped in cross-section. It is apparent that cutters thus constructed are adapted to be readily removed and replaced, as desired. A space, b' , is formed in each link between the joints, for the purpose of engaging the lugs b before described, by means of which the horizontally-moving cutters H are given a positive and uniform rate of motion, the chain meanwhile being kept "taut" by the screw N², &c., as before stated.

D and D' indicate, respectively, upper and lower bars or guides, between which the said chain is embraced, the guides being adjustably secured at each end to the front upper portion of the frame A about midway of the wheels B B' and adjacent to the point where the fabric F is cut or severed. $a' a'$ are upper and lower brackets, which serve to retain said guides in position, the vertical faces of the brackets being slotted at a^9 to receive the bolts a^3 , Fig. 8, which connect the brackets to the frame, and the front horizontal faces being slotted at a^7 to receive the bolts a^2 , Fig. 6, which are tapped into the guides D D'. By means of these latter bolts a^2 the cutters and chain are adapted to be laterally adjusted, the bolts a^2 being used to effect the vertical adjustment of the guide-bars, chain, &c., when desired.

$d d'$ indicate, respectively, front and rear inner edges or surfaces formed in said guide-bars D D', for the purpose of guiding the chain laterally during its passage therein. Said bars are beveled off adjacent to the stationary guides G, thereby forming the seats d^4 , upon which the top and bottom comb-plates, E, are adjustably secured. These plates are provided with a series of teeth, e^2 , which in use project in front of the cutters, the points of the teeth of both combs touching each other and serving as a guard or protector for the cutters, all as fully shown in Fig. 3. The teeth project into the "pile" of the fabric, and thereby the latter is held in position laterally during the cutting operation.

e designates screws or bolts, which pass through slotted holes e^3 formed in the comb-plates and into the guide-bars D D', the surfaces thereof being beveled at d^4 , as stated, the object of said bolts and slots being to effect a lateral adjustment of the comb-plates.

D² D² indicate top and bottom guides adjustably secured to the central lower portion of the main frame A by means of upper and lower brackets, r , the vertical adjustment being effected through the agency of the bolts a^4 , which pass through slotted holes a^8 formed in the vertical faces of the brackets, and are tapped into the frame. The lateral adjustment in turn is effected by means of bolts r' ,

passing through slotted holes r^9 , formed in the horizontal faces of said brackets, substantially as represented in Fig. 7. The guides D^2 are more particularly adapted to keep the cutting-edge of the traveling knives in close contact with the revolving grinding-rolls $R R$, by means of which said knives are automatically and continuously sharpened.

The grinding devices are represented in detail in Figs. 7, 10, and 11, wherein the two emery or other grinding-rolls $R R$ are mounted each upon an arbor, w , which also carries a pulley, w' .

Upon the shaft n , before described, is secured the pulley n^2 , from which leads the belt n^3 , the same passing partially around said pulleys w' and the idler-pulley w^2 , as shown, by means of which the grinding-wheels R are revolved in opposite directions. The arbors w are arranged one above the other and mounted in upper and lower frames or levers, $M M'$, which in turn are pivoted in standards forming a part of the frame L , the latter frame (see Fig. 10) being adjustably secured to the main frame or housing A by means of the adjusting-screw v and holding-down bolts v' . An arm, L' , extends rearwardly from the frame L , for the purpose of receiving the two bearings or steps, l^2 , which are adapted to vibrate slightly therein. Each of the frames or levers $M M'$ is provided with an arm, m^8 , which terminates in the eye M^4 , the latter being bored out to receive the nut m^9 , through which in turn the adjusting-screw M^6 passes and is pivoted in one of said steps l^2 . By means of this arrangement the rolls R are suitably adjusted in relation to each other.

The feeding mechanism is operated by means of the slowly-revolving shaft i^2 , Figs. 6 and 8, upon which is mounted the pinion gear-wheel i^2 , the same intergearing with the wheel i , secured to the right-hand end of the upper feed-roll s' , the opposite end of said upper feed-roll also having an overhanging gear wheel, i , the latter in turn driving the gear-train $i i i$, secured to the stretchers $S S$, and the bottom feed-roll s' , all as fully shown in Fig. 8. Said rolls, &c., are mounted in uprights forming a part of the frame A . The rolls and stretchers are practically uniform in diameter, as well as the gear-wheels i for driving them.

Upon one end of each of the shafts which carry the feed-rolls s' is secured a pulley, p , which pulleys, by means of the belts p' , revolve the upper and lower take up rolls, f^2 .

The stretchers S , which are arranged one above the other, consist each of the revolving shaft s^2 , upon which are secured wheels s^3 , adapted to receive and guide the longitudinally-moving corrugated bars or slats z . At each end of the stretcher is secured to the frame A a holder or bearing, s^5 , the same being bored out to receive the cam s^3 , so-called, said cam being adapted to be adjusted in position circumferentially and retained in place by means of the set-screw s^{15} , passing through the hub of the stationary holder s^5 , as clearly shown in Fig. 8, said cams each in turn having a wheel, s^4 , loosely

mounted thereon, said wheels being provided with a series of peripherally-arranged pins, s^{16} , which engage alternate bars z , whereby the stretcher in revolving causes said bars to move endwise or longitudinally. By means of this arrangement both sides of the double fabric F are stretched and smoothed out laterally in passing over the surface of the stretchers. As the fabric F emerges from between the stationary guides G at the front of the machine, it is under considerable tension, thereby presenting a better surface and adapting it to be cut with greater accuracy and facility.

The operation may be described substantially as follows: A roll of double pile fabric, F , is mounted on the beam-roll F' at the rear of the machine, (see Fig. 2,) and the fabric passes therefrom to and past the drag-rolls k , then over the lower revolving stretcher, S , which smooths out the upper surface; thence over the top stretcher, which smooths out the bottom surface of the fabric. From this point the double fabric is passed between the stationary guides G , at the mouth of which (see Fig. 3) the rapidly-traveling cutters H , secured to the endless chain C , separate it into upper and lower webs, f , which pass, respectively, over the top and bottom revolving feed-rolls, s' , and finally to the driven take-up rolls f^2 . It is obvious that the chain cannot move laterally, owing to its engagement with the inner surfaces, $d d'$, of the guide-bars $D D'$. Therefore the cutters will operate truly and smoothly to produce practically perfect work. The teeth e^2 of the stationary comb-plates E penetrate the pile in front of the cutters, thus serving the double purpose of a guard and gage for the knives as well as a guide for the fabric. The lower portion of the chain passes between the stationary guides D^2 , (see Figs. 7 and 10,) for the purpose of supporting the cutters while passing along in front of and in contact with the revolving grinding-rolls R . These rolls are arranged one above and one below the cutters, thereby grinding both sides of the knives at once.

I am aware that machines for cutting double woven pile fabrics have been patented prior to my present invention. I am also aware that linked cutters have been combined with machines for cutting double pile fabrics, therefore I do not claim such, broadly; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. The endless chain C , composed of the links provided with lugs or wings $e^2 e^3$, and the plates or cutters H , secured to the said lugs e^3 , and having the spaces b' in said links, substantially as shown, and for the purpose set forth.

2. The combination, with the supporting or main frame A , stationary guides $D D'$, and means, substantially as described, for adjustably securing said guides to the frame A , of top and bottom comb-plates, E , and means, substantially as described, whereby the comb-plates are adjustably secured to the said guides,

as and for the purpose hereinbefore set forth.

3. The frame A, the cutter carrying chain C, wheels B B', shafts T T', guides D D', upper and lower comb-plates, E, means whereby the
5 comb-plates are adjustably secured to the guides, top and bottom brackets, a' , substantially as described, and means whereby the said brackets are adjustably secured to the frame A, in combination with stretchers S S,
10 each having cams s^3 , guide-wheels s^8 , bars z , and wheels s^4 , connected with said bars, upper and lower friction-rolls, s' , means, substantially as shown and described, for driving said stretchers and rolls, consisting of the shaft i^3 ,
15 gears i^2 i , and the guides G, secured to the frame A, the whole arranged as described, whereby both surfaces of the fabric F in running over said stretchers are smoothed and expanded laterally before passing between the
20 guides G to the traveling cutters H, as hereinbefore set forth.

4. The stretchers S S, mounted one over the other in the frame A, each having cams s^3 , guide wheels s^8 , wheels s^4 , and bars z , and
25 means, substantially as described, for operating the same, in combination with the guides G, secured to said frame A, friction-rolls s' , and means, substantially as described, for operating the same, the cutter-carrying chain C,
30 wheels B B', upper and lower guides, D D', the frame A, brackets a' , means whereby said brackets are adjustably secured to the frame, comb-plates E, and means whereby the comb-plates are adjustably secured to the guides D
35 D', the whole arranged substantially as shown, and for the purpose set forth.

5. The combination, with the cutter-carrying chain C, wheels B B', and means, substantially as shown and described, for adjustably
40 securing the wheel B' in position, of two grinding or sharpening wheels, R, frames M M', standard L L', means, substantially as described and shown, for driving the wheels R in opposite directions and adjusting the frames
45 M M', the upper and lower guides, D², frame

A, brackets r , and means whereby said brackets are adjustably secured to the frame, said chain passing freely between the said guides, so that the cutting-edges of the knives H pass between the oppositely-revolving sharpening-rolls, substantially as shown, and for the purpose set forth.

6. The combination, substantially as hereinbefore set forth, of the cutter-carrying chain C, guides D D', frame A, brackets a' , means for adjustably securing said brackets to the frame, comb-plates E, means for securing the comb-plates to the guides D D', the sprocket-wheel B, shaft T, having the said wheel secured thereto, wheel B', shaft T', carrying said wheel B', bearing T⁴, means whereby said bearing is adjustably secured to the frame A, two geared stretchers, S S, substantially as described, over which the fabric F passes before being cut, guides G, secured to the frame A, between which the
6 said fabric is presented to the cutters, upper and lower driven friction-rolls, s' , over which the cut webs f are carried, mechanism, substantially as described, for driving said stretchers and rolls, upper and lower grinding-rolls, R R, frames M M', standard L L', means whereby the frames M M' are adjusted, means for
7 adjusting the standard L L' on the frame A, guides D², brackets r , means for adjustably securing the guides D² to the brackets r , means whereby said brackets are adjustably secured to the frame A, arbors w , carrying each a pulley w' , and mounted in said frames M M', an idler-pulley, w^2 , means for supporting said pulley, and means, consisting of the driven shaft
8 n , pulley n^2 , and belt n^3 , whereby the pulleys w' are acted upon to drive the grinding-rolls, the whole constructed and arranged substantially as shown and described.

In testimony whereof I have affixed my signature in presence of two witnesses.

OTIS E. DROWN.

Witnesses:

GEO. H. REMINGTON,
CHARLES HANNIGAN.