

(No Model.)

3 Sheets—Sheet 1.

H. J. HOPE.

LOOM FOR WEAVING DOUBLE FABRIC FOR PLUSH.

No. 539,179.

Patented May 14, 1895.

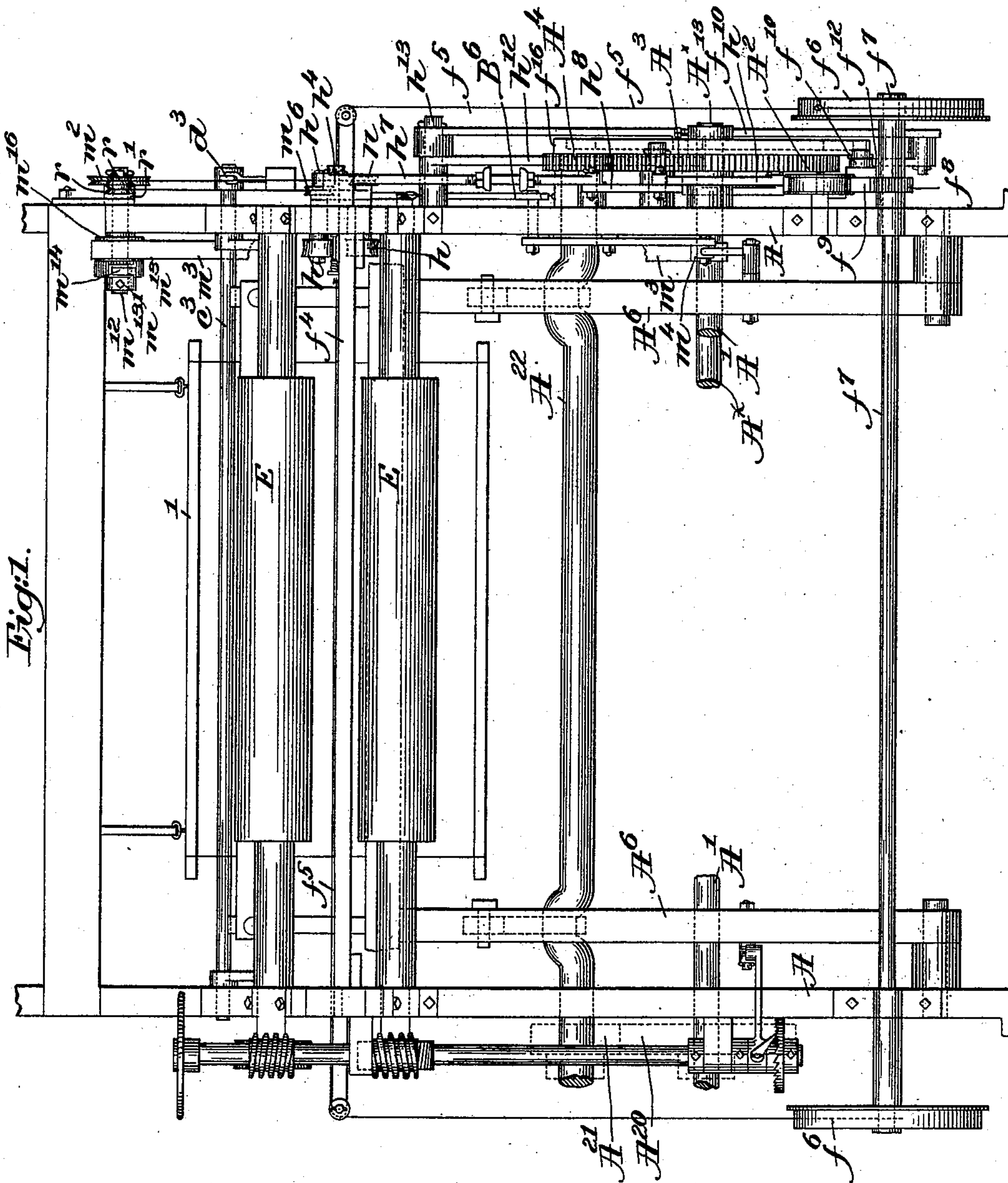


Fig. 1.

Witnesses.

Edward F. Allen.

Thomas J. Drummond

Inventor.

Herbert J. Hope.

By Crosby & Gregory
Attys.

(No Model.)

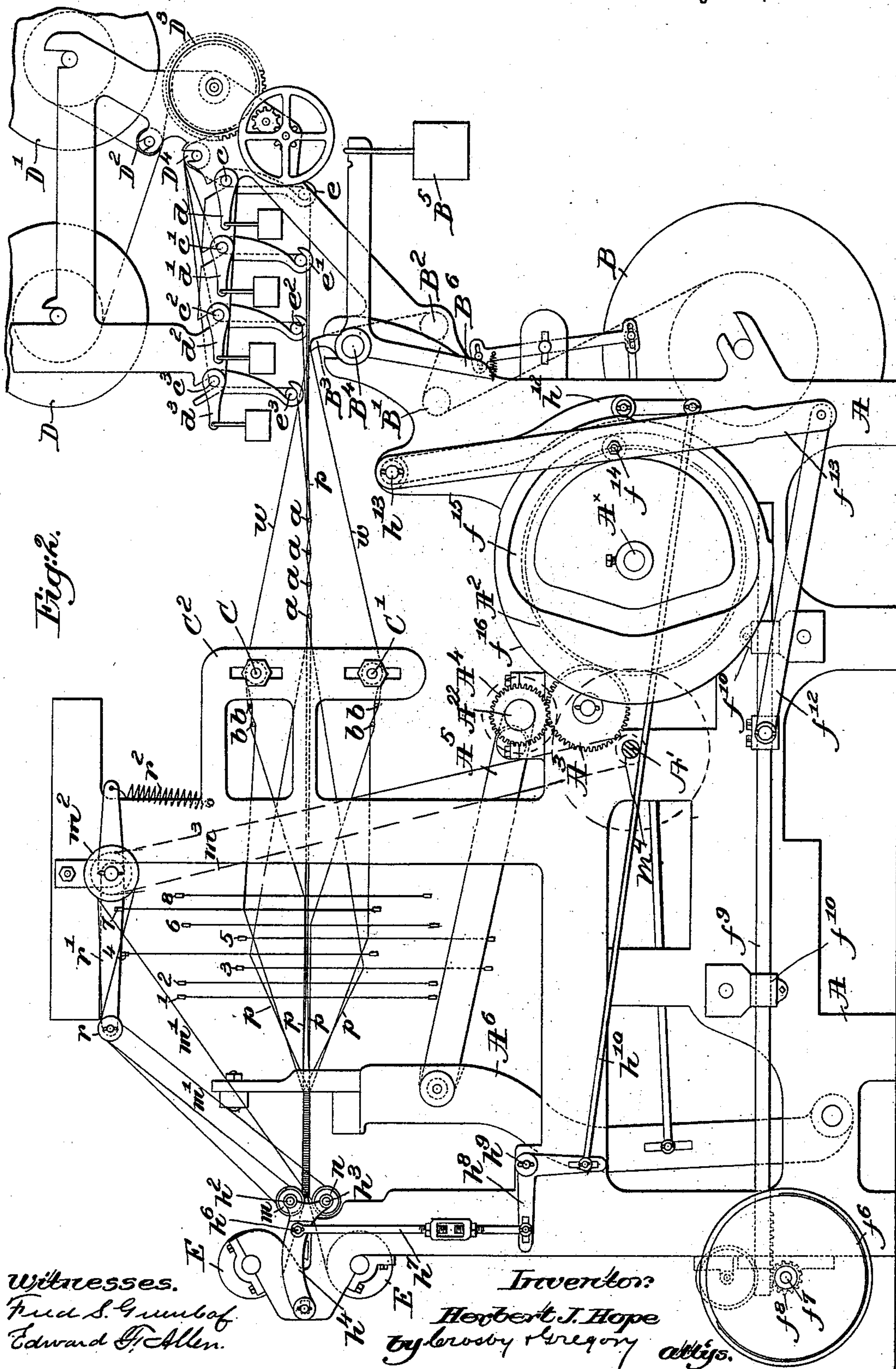
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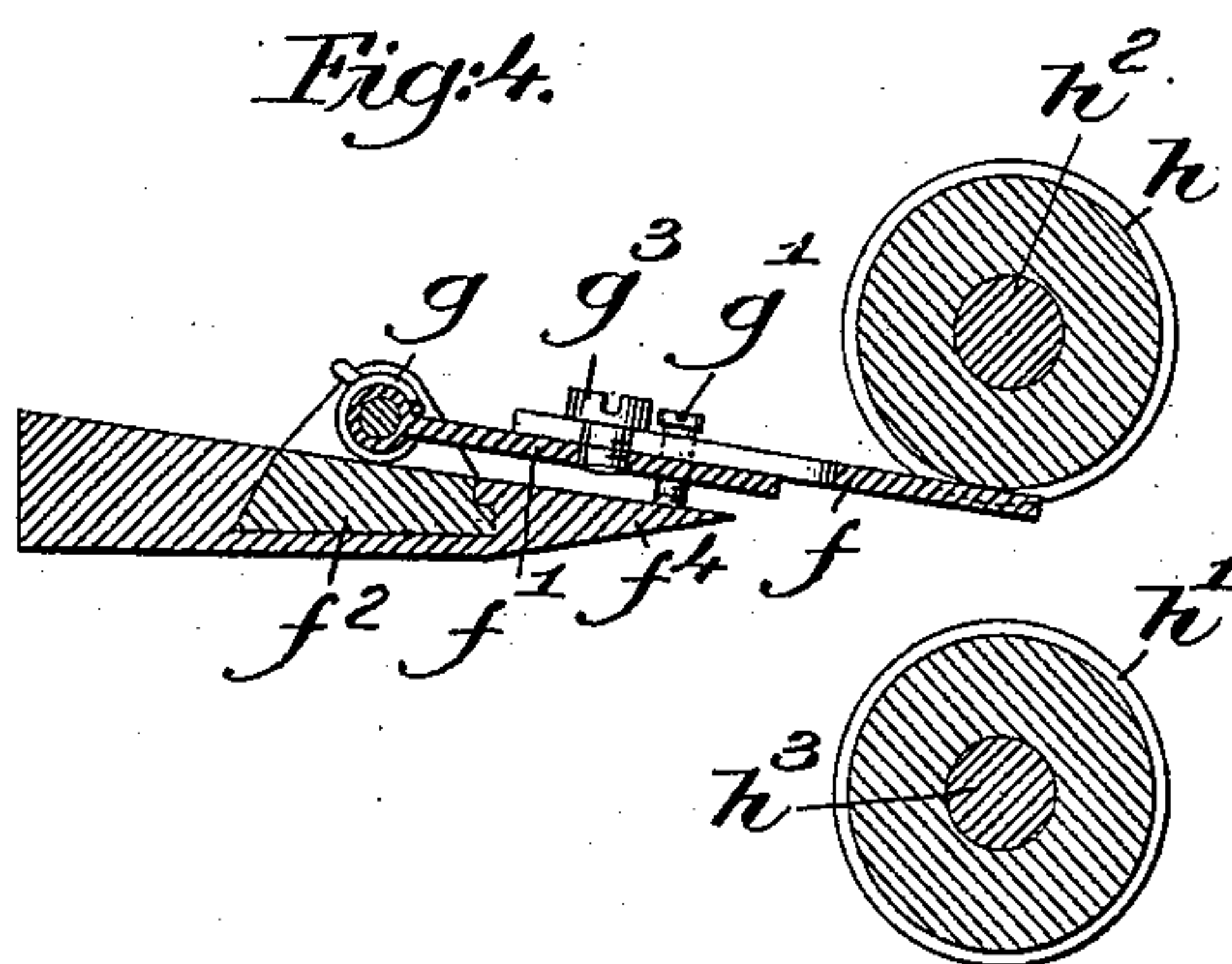
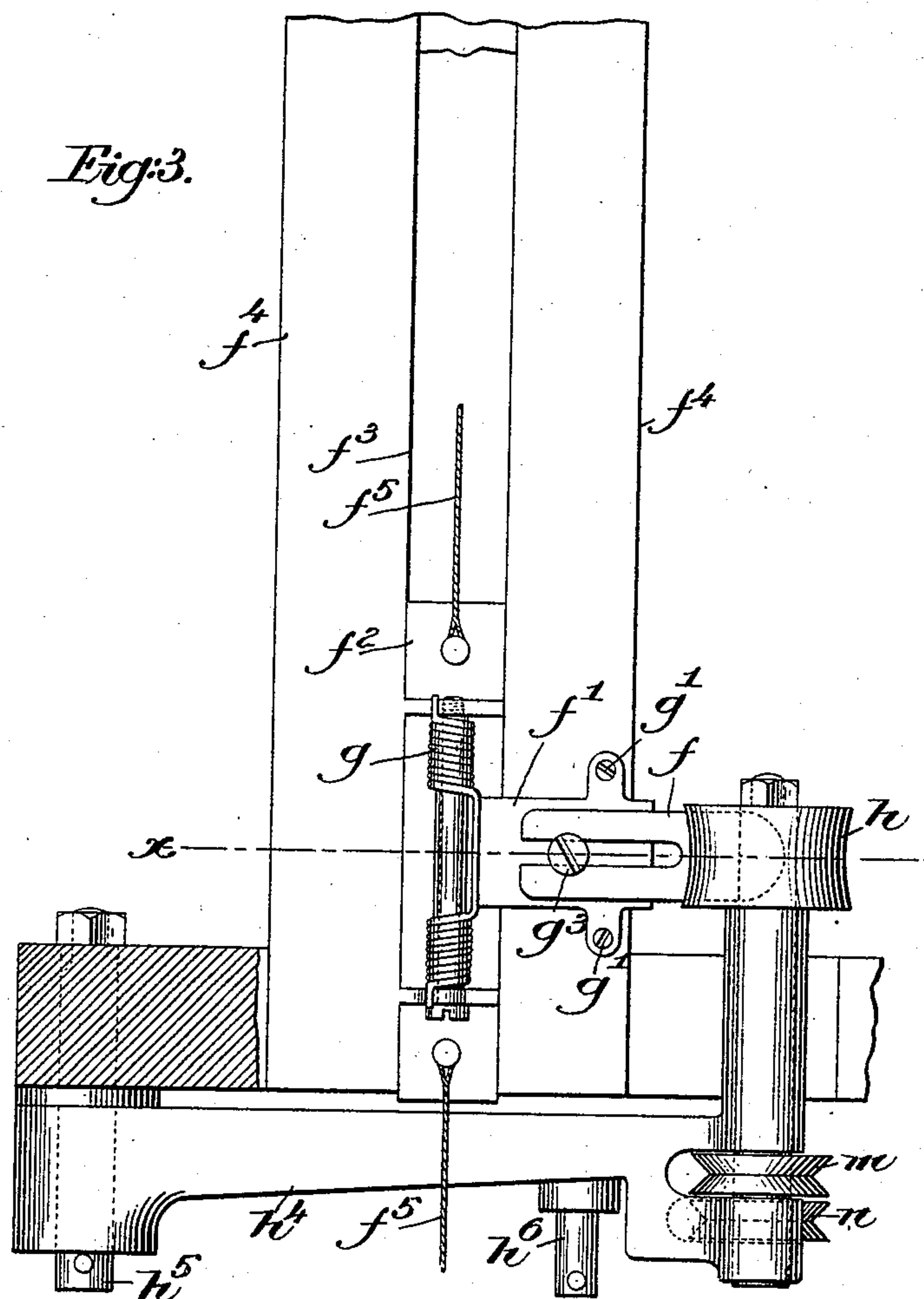
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Thomas Drummond.

Inventor:

Herbert J. Hope.

by Crosby & Gregory Attys

UNITED STATES PATENT OFFICE.

HERBERT JAMES HOPE, OF SANFORD, MAINE.

LOOM FOR WEAVING DOUBLE FABRIC FOR PLUSH.

SPECIFICATION forming part of Letters Patent No. 539,179, dated May 14, 1895.

Application filed July 10, 1894. Serial No. 517,102. (No model.)

To all whom it may concern:

Be it known that I, HERBERT JAMES HOPE, a subject of the Queen of Great Britain, and a resident of Sanford, county of York, State of Maine, have invented an Improvement in Looms for Weaving Double Fabric for Plush, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to improve and simplify looms for weaving double fabric for the production of plush.

In accordance with my invention I have aimed to get the pile warp threads into the space between the upper and lower sets of backing warps in the most direct manner possible, and to do this I have arranged the pile warp threads on two beams located above the whip roll sustaining the body warp threads on their way to the harness frame, and I have located the beam containing the body warp threads in the lower part of the loom, the several whip rolls, one for each set of pile warp threads, being arranged one behind the other in a plane substantially central with relation to the thickness of the double cloth at the weaving point, and I have provided dividing rods located between the whip roll for the body threads and the harness frames to support independently the body warps for each back. I have also improved the mechanism for grinding the knife or cutter employed to separate the pile of the double fabric centrally to form two pieces of plush.

Figure 1, in front elevation, represents part of a loom containing my invention. Fig. 2 is a right-hand side elevation thereof, the harness-frames being shown, but the operative mechanism therefor being omitted to save making the drawings complex, the harness mechanism not being of my invention, the cords f^5 being also omitted from the loom sides. Fig. 3 is an enlarged detail in plan view looking down upon the grinding mechanism, the grinding-wheel operating upon the blade; and Fig. 4 is a section in the line x , Fig. 3.

The loom frame A is and may be of suitable shape to sustain the working parts, said frame having suitable bearings for the different parts to be described. The frame has a cross-shaft A' to which is applied the power

for driving the loom. The shaft A' has fast on it a toothed gear A²⁰, shown by dotted lines, which engages the pinion A²¹, also shown by dotted lines fast on the crank shaft A²², which, through the connecting rods A⁵, vibrates the lay A⁶ carrying the usual reed. The crank shaft has at one end a pinion A⁴, which engages an intermediate gear A³, which in turn engages a toothed gear A² fast on a shaft A^x parallel with the main shaft, said shaft having fast upon it, as herein shown, at one end a cam-plate f^{16} .

In the loom herein to be described I have represented by diagram eight sets of harness frames, 1, 2, 3, 4, 5, 6, 7, 8, sets 1 to 4 inclusive being supposed to receive the pile warp threads p , while sets 5 to 8 inclusive are supposed to receive in their heddles the body warp threads w . I have not shown any means for operating these harness frames, but they may in practice be actuated in any usual manner common to looms for weaving double fabric, and so, also, I have not herein shown the shuttles for carrying the weft, but it will be understood that there will be two shuttles each depositing its own thread in the body warps, and locking alternately with said body warps the pairs of the pile warp threads.

The frame-work has suitable bearings to receive the journal of the beam B containing the body warps w , from which are to be made both backs for the double fabric, said body warps being led over guide rolls B', B², and thence over a vibrator or whip-roll B³ connected with a rock shaft B⁴ and normally held up to support the body warp threads under more or less tension, by a weight, as B⁵, connected to an arm projecting from the shaft carrying the vibrator, another arm as B⁶, connected with said vibrator, being instrumental in controlling the let-off devices co-operating with the roll B to let off the body warps at the proper speeds.

I shall not further describe the let-off for the body warp beam B, as the same may be of any usual or suitable construction.

The body warps, after passing over the vibrator B³, are separated into two halves or planes, so that some of them will constitute one and the others another back for the double fabric, and in accordance with my invention the said body warps, separated or di-

vided into two planes for two backs, are for the first time passed over dividing rods C, C', said dividing rods being adjustably mounted in a suitable stand or bracket C², supported
 5 by part of the frame-work of the loom, said dividing rods being adjustable toward and from each other vertically so as to separate the body warps for the two backs more or less according to the length of the pile required,
 10 the let-off to be described for the pile warp threads being at the same time made to let off the pile warps more or less rapidly according to the length of pile desired.

In the upper part of the frame-work I have
 15 mounted two pile warp beams D, D', and on the beam D I have wound, say, the warp threads going to the harness frames 1 and 4, and on the beam D' the pile warp threads going to the harness frames 2 and 3, it being un-
 20 derstood that threads 1 and 2 are to be opened and crossed in pairs, and threads 3 and 4 opened and crossed in pairs during the operation of weaving, and consequently I have so arranged the pile warp threads that the in-
 25 dividual threads of each pair come from a different warp beam, such winding or mounting of the threads on the warp beams enabling me to insure a better and more uniform delivery than when both the threads of a pair are
 30 taken from the same beam, my improved arrangement of the threads of the pairs on different warp beams also enabling me to more easily and better form the lease, the lease rods being represented by letters *a*, *a*.

35 The pile warp threads from the two beams D, D', are passed about a leading roll D², then over a let-off beam D³, then again over a leading roll D⁴, at which point the pile warp threads are led, say, the threads to go through
 40 harness 3 over a rod *c*, those to harness frame 2 over a rod *c'*, those to harness frame 1 over a rod *c*², and those to harness frame 4 over a rod *c*³, each of said rods constituting a rock shaft having a depending arm supporting a
 45 second rod, as *e*, *e'*, *e*², *e*³, each of said rock shafts having a suitable arm as *d*, *d'*, *d*², *d*³, upon which is hung a proper weight, shown in Fig. 2, said rods *e*, *e'*, *e*², *e*³, constituting parts of a whip-roll, each supporting and control-
 50 ling one of the sets of pile warps, said rods being arranged one behind the other to occupy a position substantially midway the dividing rods *c*, *c'*, so that the pile warp threads are so held and presented that the points,
 55 where the said warp threads are separated by the lease rods, stand substantially midway the length of the pile.

The arrangement described of the pile warp threads wholly at one side of the whip roll
 60 supporting the body warp threads, enables the pile warp threads to be brought into proper position to be put into the double fabric by being passed through only one set of backing warps.

65 The let-off mechanism for controlling the speed of rotation of the let-off beam D³ may

be of any usual or suitable construction common to this class of loom.

The double fabric when separated by cutting the pile midway its length, will be taken
 70 away from the loom by the usual take-up rolls E, which may be of any usual construction and be operated in any usual manner.

The knife *f*, for cutting the pile, is represented in Fig. 3 as adjustably connected to a
 75 knife-bar or plate *f'*, jointed to a carriage *f*², adapted to be reciprocated in a suitable groove *f*³ in a bar *f*⁴ extended across the loom, said carriage having connected to it at opposite
 80 ends suitable cords *f*⁵, which, in practice, will be led down at opposite sides of the loom frame, as shown in Fig. 1, and be attached to like drums *f*⁶, one at each end of a shaft *f*⁷,
 85 having a suitable pinion *f*⁸ adapted to be engaged by the teeth on a slide bar *f*⁹, which may be reciprocated in suitable bearings *f*¹⁰, by means of a link *f*¹² pivoted to the lower end of
 a lever *f*¹³ having a suitable roller or other stud *f*¹⁴, shown by dotted lines in Fig. 2, which enters the cam groove *f*¹⁵ in the outer face of
 90 the cam plate *f*¹⁶ fast on the shaft A^x, the said cords *f*⁵ being led about said drums *f*⁶ in opposite directions, so that as said drums are rotated in one and then in the other direction,
 95 both simultaneously in the same direction, one cord will be wound and the other unwound to thus effect the reciprocation of the carriage.

The plate *f'* to which the knife *f* is attached is acted upon by a spring *g*, which normally serves to keep the plate *f'* pressed down to-
 100 ward the beam *f*⁴, the said plate having suitable adjusting screws *g'* which may be screwed more or less through the plate, the ends of the regulating screws resting on the bar *f*⁴, the
 105 adjustment of the screws *g'* determining the proper position for the cutting edge of the knife or blade *f* as is necessary in order to adapt it to cut the pile centrally.

The backward and forward adjustment of the blade to compensate for wear thereof due
 110 to grinding, is controlled or effected by or through the screws *g*³.

To keep the knife sharp so that it may cut the pile properly and smoothly, as is necessary to do good work, I have added to the ma-
 115 chine a pair of grinding rolls *h*, *h'*, they being concaved at their peripheries, the said rolls being connected to shafts *h*², *h*³, having their bearings in a carrier *h*⁴ pivoted at *h*⁵ on a stud extended from the loom side, said carrier hav-
 120 ing a stud *h*⁶ to which is connected a rod *h*⁷, preferably in two parts, so that it may be lengthened or shortened, a turn buckle being interposed between the two ends of the rod,
 125 the lower end of the rod being adjustably connected to an elbow lever *h*⁸ pivoted at *h*⁹, the opposite end of the said elbow lever having attached to it a rod *h*¹⁰ which is jointed to a lever *h*¹² pivoted at *h*¹³ and provided with a
 130 suitable roller or other stud which is acted upon by the periphery of the cam *f*¹⁶, the said cam, the shape of which is best shown in Fig.

2, effecting the raising and lowering of the carrier.

Referring to Fig. 2, it will be noticed that the cam f^{16} has parts of three different radii. When the portion of the cam of greatest radius operates to move the lever h^{12} , the grinder h acts upon the blade f . When the surface of next smaller radius acts the carrier h^4 is put in such position that neither roll will act upon the blade, and when the portion of the cam of least radius moves the lever h^{12} then the roll h' acts upon the under side of the blade. During the time that the carriage with the knife is being reciprocated across the loom and back, the portion of the cam of next to the largest radius works and causes the carrier to occupy such a position as to put the grinding rolls in such position that the blade may come into or go out from between the two grinding rolls without touching either of them, but when the blade, having cut the pile, arrives at the end of its stroke the carrier h^4 is moved quickly first in one direction and then in the other, while the carriage having the blade stands still, so that the blade is ground at the top and then at the bottom alternately, and then the carrier is moved to leave the blade free to start when the carriage containing the blade is again to be actuated. In this way the blade is ground and touched up at every complete to and fro movement of the carriage, and it is always kept sharp.

To rotate the grinders h, h' , I have provided the shaft h^2 with a pulley m , and the shaft h^3 with a pulley n , and I have driven the said pulleys both by one belt m' , said belt being crossed in the manner shown, and deriving its motion from the sheave m^2 fast on a shaft m^{12} provided with a pawl-carrier m^{13} having a spring-pressed pawl m^{14} which is engaged by a ratchet wheel m^{15} fast to a pulley m^{16} loose on shaft m^{12} , the pulley m^{16} being rotated by a belt m^3 extended over a pulley m^4 on a suitable shaft A' , herein represented as the main shaft, said sheave being indicated by dotted lines in Figs. 1 and 2.

The rotation of the ratchet wheel in one direction will turn the shaft m^{12} to rotate the grinders, but when the loom shaft is reversed and the ratchet m^{15} is reversed it clicks under the pawl and the grinding mechanism is not actuated.

The belt m' is kept taut, notwithstanding the rising and falling of the carrier h^4 , by means of two small like sheaves r , mounted side by side upon a suitable pin or stud carried by an arm r' normally held up by a spring r^2 .

Having described my invention, what I

claim, and desire to secure by Letters Patent, is—

1. In a loom for weaving double pile fabric, the following instrumentalities, viz:—a whip-roll to sustain the body warp, sets of harness frames, and dividing rods for supporting the body warps for each back between said whip-roll and said harness frames, to operate substantially as described.

2. In a loom for weaving double pile fabric for plush, a warp-beam to supply the body warp, a whip-roll over which said body warps are led on their way to the harnesses, dividing rods for supporting independently the body warp threads for each back at a point between said whip-roll and the harness frames, two pile warp-beams located above the level of the fabric at the cloth making point and upon which warp beams the different threads of the pairs of pile warp threads are wound, as described, a take-up beam controlling all the pile warp-threads, a series of movable whip rolls, one for each set of pile warp threads, said whip rolls being located above the whip roll supporting the body warp threads, whereby the pile warp threads are led directly between the body warp threads of but one back and to the weaving point, substantially as described.

3. In a loom for weaving double fabric for plush, a carriage, means to reciprocate it, the plate f pivoted thereon, an adjustable blade mounted upon said plate, and a spring to normally depress the plate and blade, combined with an adjustable regulating device carried by said blade to control the position of said plate and the blade secured thereto with relation to the back of the fabric to thereby enable the pile to be cut centrally between said backs, substantially as described.

4. In a loom for weaving fabrics for plush, a reciprocating carriage provided with a blade to cut the pile, a carrier having two shafts each provided with a grinding roll having attached sheaves, a shaft m^{12} , a sheave m^2 thereon, a cross belt extended from sheave m^2 to the sheaves on the shafts carrying the grinding roll, and means to rotate the shaft m^{12} during the forward running of the loom and leave it at rest during the backward running of the loom, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HERBERT JAMES HOPE.

Witnesses:

GEO. W. GREGORY,
LAURA T. MANIX.