C. G. RICHARDSON.

CLOTH SHEARING MACHINE.

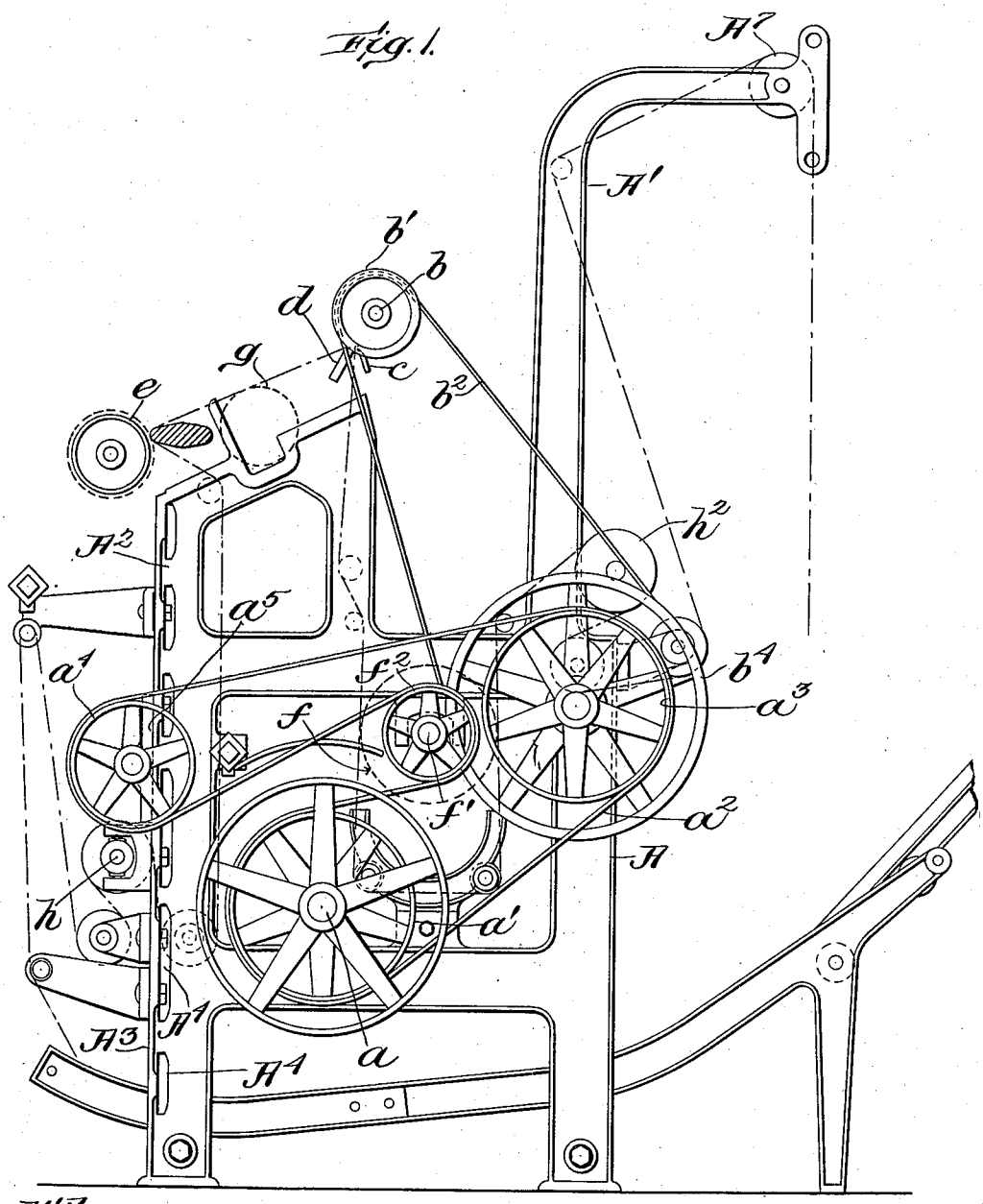
APPLICATION FILED FEB. 10, 1908.

1,152,048.

Patented Aug. 31, 1915.

5 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
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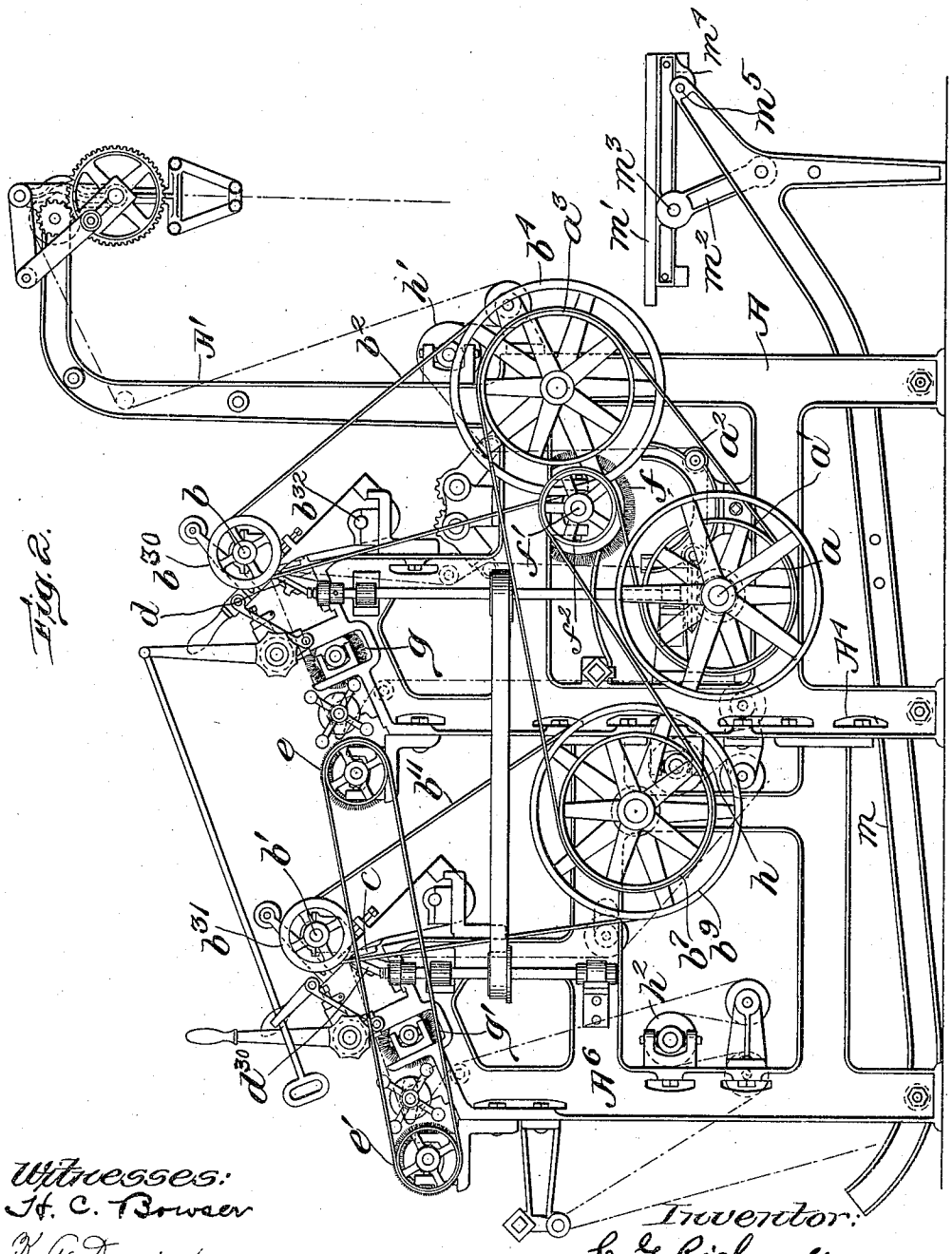

Fig. 2.

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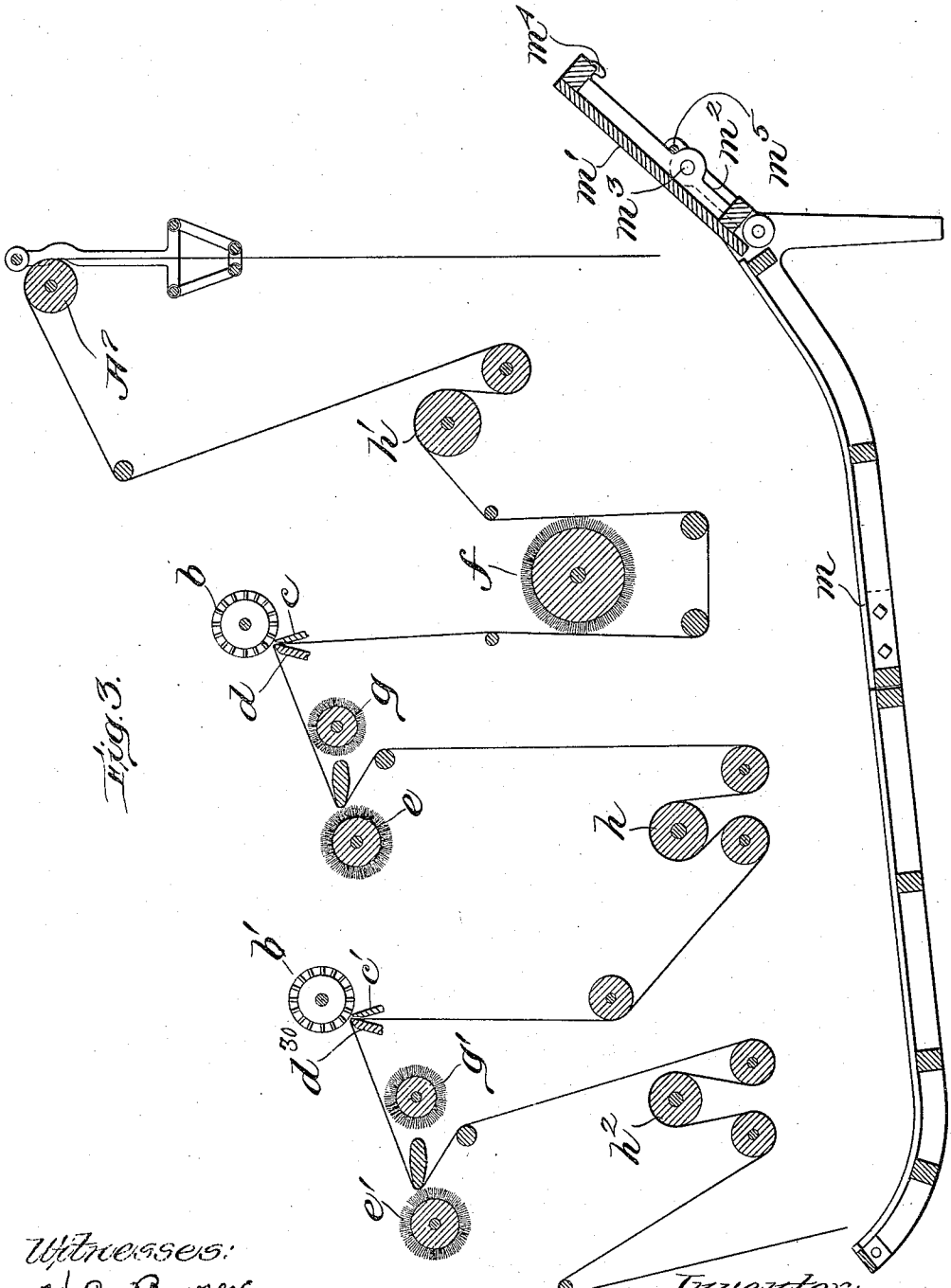

Fig. 3.

Witnesses:
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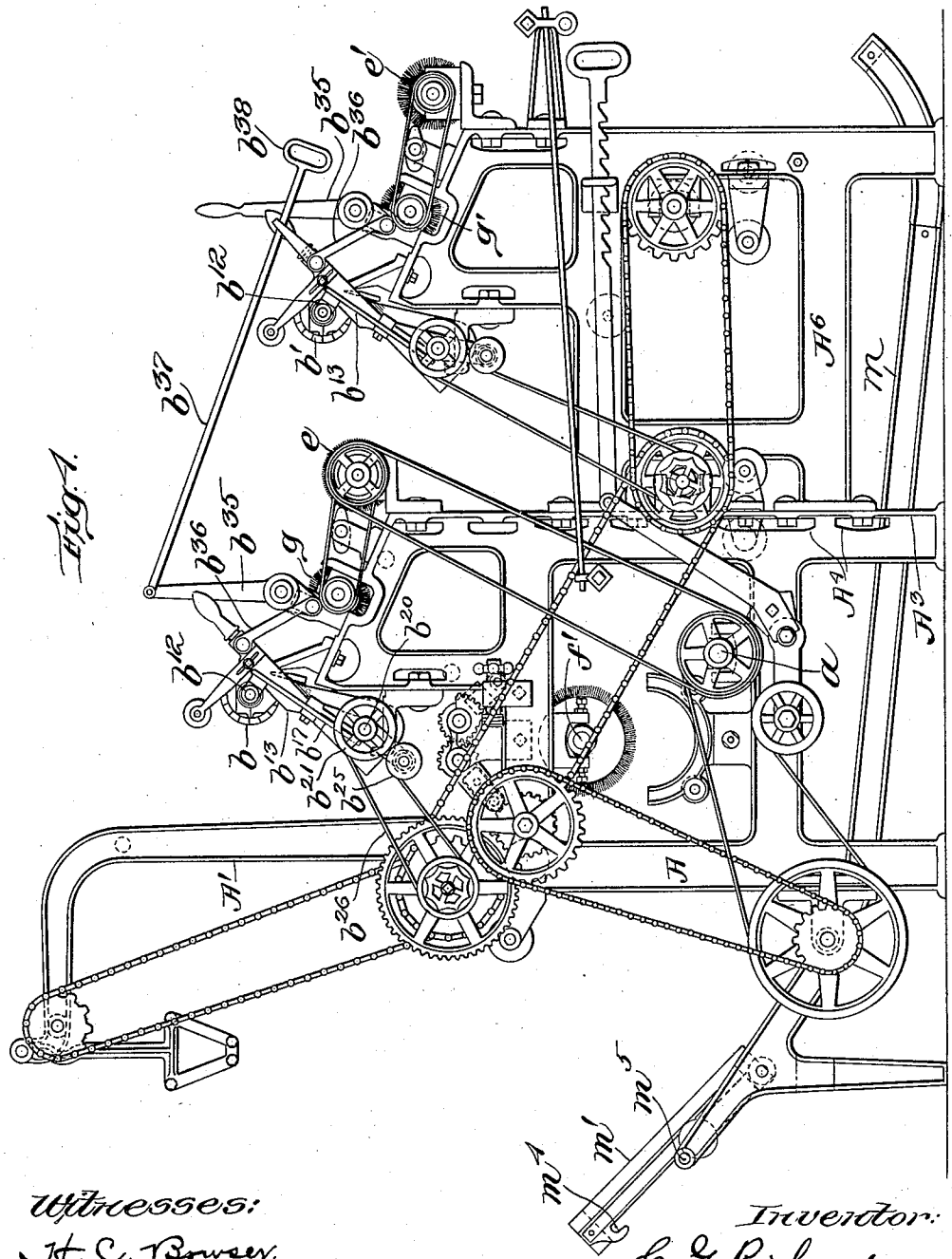

Fig. 4.

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5 SHEETS—SHEET 5.

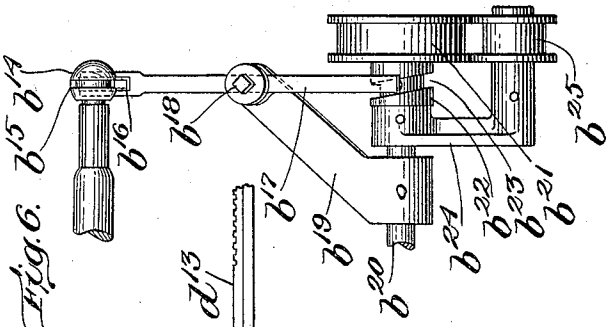

Fig. 6.

Fig. 7.

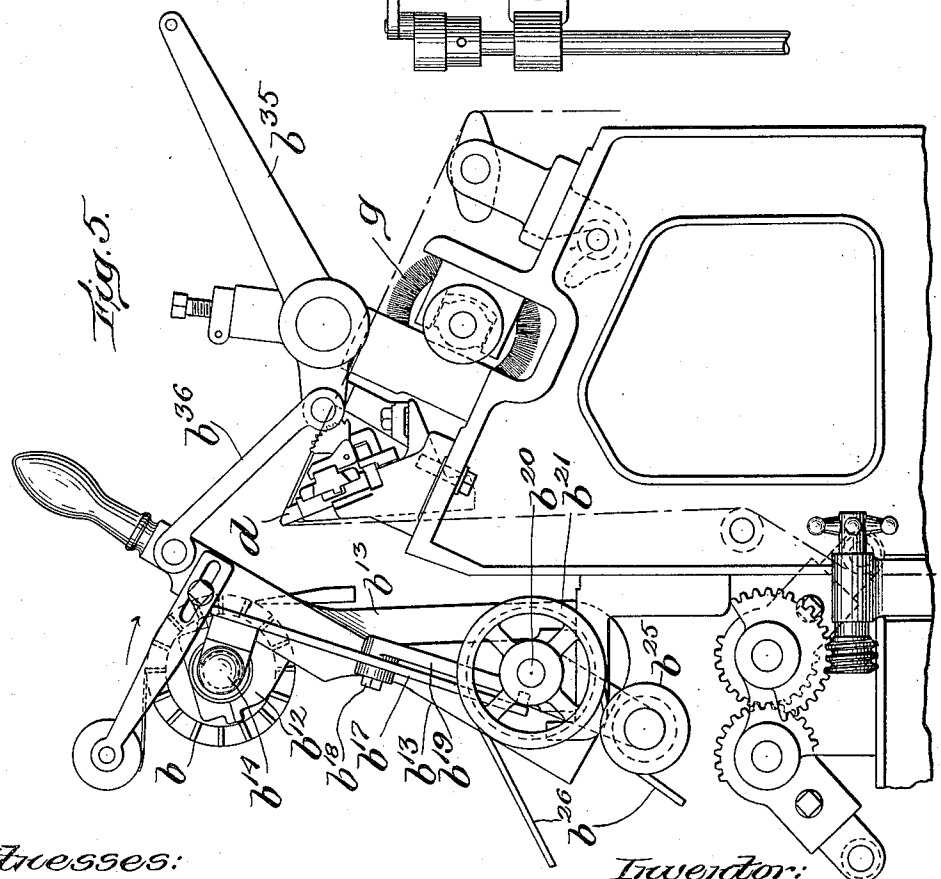

Fig. 5.

Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES G. RICHARDSON, OF SPRINGFIELD, VERMONT.

CLOTH-SHEARING MACHINE.

1,152,048. Specification of Letters Patent. Patented Aug. 31, 1915.

Application filed February 10, 1908. Serial No. 415,012.

To all whom it may concern:

Be it known that I, CHARLES G. RICHARDSON, citizen of the United States, and resident of Springfield, county of Windsor, Vermont, have invented certain new and useful Improvements in Cloth-Shearing Machines of which the following is a specification.

This invention relates to machines for shearing the nap of cloth or other textile fabrics and has for its object the improvement and simplification of various parts of such machines and for a further object the provision of a construction whereby a single shear may be utilized in connection with an attachment to form a double shear, thereby effecting a substantial economy in floor space and expense.

The various features of the invention will be hereinafter explained and described in detail and will be defined in the claims forming part of this specification.

In the accompanying drawings I have illustrated the preferred mode of embodying the principles of my invention, omitting therefrom such details of construction as are not necessary to a full comprehension of the characteristic features of the present invention.

Figure 1 is an elevation of the right hand end of a single shear constructed according to my invention. Fig. 2 is a similar view of said shear with the attachment connected which converts it into a double shear. Fig. 3 is a diagrammatic view in similar elevation to illustrate the course of the cloth as it travels through the machine. Fig. 4 is an elevation of the left hand end of the double shear arrangement. Fig. 5 is an enlarged detail showing the details of construction of the shear or fly blade controlling mechanism and also of the cloth rest. Fig. 6 is a detail in elevation of the fly blade reciprocating means as viewed from the rear of the machine. Fig. 7 is a similar detail of a portion of the mechanism for adjusting the length of the cloth rest.

Referring first to the single shear construction shown in Fig. 1, I provide an upright frame A having at its rear an upward extension A′ at whose upper end is formed the plicator or folder shown in detail in Fig. 2 suspended in the usual manner. The front legs A^2 of the frame are formed with a lateral web A^3 behind which are provided a series of elongated slots A^4 to receive the bolt heads of the bolts which secure to the frame various brackets for supporting different parts of the mechanism, also for receiving bolts which serve to firmly connect the supplemental frame A^6 of the double shear attachment rigidly with the frame of the single shear.

In the frame A is mounted the main driving shaft a of the machine and to the right hand end of said driving shaft a is secured a pulley a' over which the main driving belt a^2 passes and by which said driving belt is driven in order to transmit motion to a counter shaft pulley a^3 which is compounded with a pulley b^4 which acts through the medium of belt b^2 to rotate the fly blade or rotary shear b. The shaft f' of the laying or smoothing brush f is also driven by the main belt a^2 which passes over pulley f^2 on the right hand end of said shaft f'. This belt also passes over the guide pulley a^4 which is carried by a detachable bracket a^5 bolted to the front edge of the right hand frame A. By this arrangement of pulleys and belts the driving belt a secures a large surface contact with the driving pulley a' and also with the pulley f^2 on the laying brush shaft, while making it possible to vary the relative speeds of the laying brush and of the shear independently of each other, since pulleys of different diameter may be substituted for pulley f^2 and also for the compound pulley a^3 b^4 to vary independently either the number of revolutions of the fly blade or of the laying brush, while maintaining the same speed of the driving shaft and driving belt a^2.

The course or travel of the cloth through the single shear is indicated by the broken line in Fig. 1. As shown the cloth after passing over several idler guide rolls passes around the larger portion of the periphery of the cloth feed or drawing roll h, thence passing around other guide rolls it is carried into contact with the rotary nap raising brush e whose surface at the line of contact moves in the same direction as the travel of the cloth exposed to it but at a higher speed. The cloth then passes over a rotary clearing brush g which serves to remove from its under side any flocks or foreign substance adhering thereto before the cloth passes over the cloth rest d and by the

ledger blade c adjacent thereto which coacts with the rotary fly blade b to shear off the top ends of the nap. From the cloth rest d the cloth is guided so as to pass downward in front of and in contact with the laying brush f, thence it is guided toward the rear so as to pass upward in contact with the rear side of the laying brush, whence it is guided to pass around a second drawing or feed roll h', thence around other guide rollers to the delivery roll A^7 from which it is delivered to the plicator of the machine.

The supplemental frame which forms the attachment by which the single shear is converted into a double shear, is provided with a feed roll h^2 corresponding to the initial feed roll h of the single shear and also has a rotary nap-raising brush e' and an under clearing brush g' to act upon the cloth on the way to the supplemental cloth rest d^{30} adjacent to the supplemental rotary fly blade b'.

The supplemental frame carries on its right hand end a pulley b^7 over which the main driving belt a^2 passes in place of being passed over the idler pulley a^4 which has previously been removed from the single shear in order to make room for the pulley b^7 which takes its place in the double shear and occupies aproximately the same relative position. This pulley b^7 is compounded with a pulley b^9 which through the medium of a belt b^{11} drives the supplemental rotary fly blade or shear b', this pulley b^9 corresponding in the supplemental frame to the pulley b^4 of the single frame which drives the fly blade b. It will thus be seen that both fly blades are driven by separate belts b^{11} b^2 from similar pulleys b^9 b^4 which are compounded respectively with pulleys b^7 and a^3 both of which last named pulleys are driven directly by the main driving belt a^2.

The supplemental frame or attachment is not provided with any laying brush as it is not desired to lay or brush down the nap between the shearing operations of the two fly blades. The course of the cloth through the machine will be clear in considering Figs. 1, 2 and 3 together. It will thus be seen that by simply connecting the supplemental frame or attachment to the single shear, the machine is converted into a double shear without other alteration than the removal of the idler pulley a^4 at the front of the single shear frame and the making of the necessary belt connections. Moreover, by driving the compound shear driving pulleys and the laying brush pulley directly from a single main belt, any desired ratio of speed between the main shaft, the fly blades and the laying brush can be made by a mere change of the pulleys acted upon by the main belt, while securing the same speed for both fly blades. Moreover, this arrangement of the driving belt is equally effective for either the double or the single shear combination.

It has been the practice to cause the fly blades to reciprocate axially when in operation in order to evenly distribute wear. It is desirable or necessary at times to throw the fly blades back to arrest the shearing. One of the characteristic features of my present invention consists in the construction and arrangement by which both the reciprocation and the rotation of the fly blade is automatically arrested when it is thrown back from the cloth. This feature of the invention will be best understood by reference to Figs. 4, 5 and 6. According to the form of my invention shown in the drawings the journals of the fly blades b are supported in bearing b^{14} carried by pivoted frames b^{13}. At one end the journal is extended to form an enlarged head b^{14} provided with a peripheral groove b^{15} which receives the forked end b^{16} of the lever b^{17} which is fulcrumed at b^{18} on the arm b^{19} which is carried by the pivoted stud b^{20}. On the outer end of this stud is a loose pulley b^{21} having an inwardly extending hub b^{22} provided with a cam groove b^{23} engaging the lower end of the lever b^{17} to cause its oscillation. A short arm b^{24} secured to the pivoted stud b^{20} carries a loose belt tightening pulley b^{25} over which passes the belt b^{26} which drives the pulley b^{21}. The frame b^{13} is operated by a hand pull at its upper end to be swung toward the front of the machine to bring the fly blade into operative position or to be swung toward the rear of the machine to lift the fly blade from the cloth. Obviously this latter movement serves to relieve the belt b^{26} of the tension of the pulley b^{25} which is swung away from the belt by this movement so that the belt simply idles without driving the pulley b^{21} and lever b^{17}. Hence the reciprocation of the fly blade is arrested automatically when the fly blade is thrown back out of operative position away from the cloth rest d.

The pulley by which the fly blade is driven shown at b^{30} in Fig. 2, is driven by belt b^2 while the fly blade b' is driven in the same way by pulley b^{31} and belt b^{11}. As the centers or axes of movement of the frames b^{13} carrying the fly blades are between the centers of the fly blade shafts and their respective driving pulleys b^4 b^9 and much nearer to the axes of the fly blades, it will be seen that the throwing back of the fly blades serves also to bring the fly blades nearer to the pulleys b^4 b^9 and consequently relieves the tension of the belts which rotate the fly blades so that these belts will idle until the fly blades are thrown down again in operative position to cause the proper driving tension upon the respective belts. Hence the mere act of raising the fly blades serves to render the belts which rotate and

the belts which reciprocate them, inoperative, while the lowering of the fly blades to operative position serves to automatically tighten those belts to set the fly blades once more in normal position.

To make it possible to control the movement of both fly blades to and from operative position from the front of the machine, the two levers b^{35} which have connection by means of links b^{36} with the upper end of the fly blade frames b^{13} are provided with handles or pulls to be operated from the front end of the machine, the rearmost fly blade having its handle b^{38} connected by means of rod b^{37}.

The scray or runway m for the cloth beneath the machine is of the usual construction except as to the table portion thereof. Instead of being pivoted to fold back directly upon an axis at its rear end, the table m' is supported by two swinging arms m^2 the ends of which are pivoted to the rigid end portion of the scray m and to the opposite sides of the table m' intermediate of its front and rear ends as shown at m^3. At its rear edge the table m' is provided with inwardly projecting hooks m^4 so that when the table is swung downward into receiving position shown in Fig. 2 the hooks m^4 engage the transverse rod m^5 in order to hold the table in horizontal position. By this construction the smooth top of the table always remains uppermost either when in receiving position as in Fig. 2 or in the position shown in Fig. 3, in which it forms an inclined extension of the scray to deflect the cloth into the body of the scray. This construction moreover makes it convenient for the operator to draw the first edge of the cloth, which is passed through the machine under the table above the cross rod m^5 to stitch together the two ends so as to enable the cloth to feed itself automatically into the machine on successive operations according to the usual practice.

What I claim is:—

1. A cloth shearing machine embracing in combination a main drive shaft, a laying-brush shaft, a laying brush mounted thereon, a rotary fly blade, a compound pulley, a belt directly connecting one element of said compound pulley with said fly blade shaft, a main transmission belt driven directly from said main shaft and passing over the other element of said compound pulley and also over the pulley on the laying-brush shaft with which pulley the outside face of said transmission belt is in contact so as to rotate said laying-brush shaft in the opposite direction to the rotation of the main shaft and the fly-blade shaft, substantially as described.

2. In a cloth shearing machine the combination with a main driving pulley of a rotary fly blade with its coöperating cloth rest, the fly blade pulley, a ledger blade, a laying brush arranged to smooth the nap of the cloth after it passes from the shear, the laying-brush pulley and driving means embracing a compound pulley a main driving belt having operative engagement with the main driving pulley, the laying brush pulley and one member of a compound pulley, the other member of said compound pulley being operatively connected with the fly blade to rotate the same, substantially as described.

3. In a cloth shearing machine the combination of the main driving pulley for driving the main belt of the machine, a driven pulley mounted forward of the said main pulley, a fly blade, a compound pulley mounted to the rear of the main pulley, means for transmitting power from said compound pulley to the fly blade, a laying-brush mounted intermediate of the compound pulley and said forward pulley, a driving pulley secured thereto and a driving belt arranged to engage the main pulley, the compound pulley and the forward pulley with one face, and to engage the laying-brush pulley with its reverse face, substantially as described.

4. A cloth shearing machine embracing in its construction a rotary fly blade and a rotary laying-brush, a compound pulley, means for transmitting power therefrom to the fly blade, a main driving pulley, a forward guide pulley, a driving belt arranged around and in engagement with the main driving pulley, the guide member, and one member of the compound pulley and having its reverse face looped around the laying-brush pulley to form a driving contact with the major portion of its circumference, substantially as described.

5. In a cloth shearing machine the combination of two separable frames, a rotary fly blade and a compound driving pulley therefor mounted in each frame, a main driving shaft mounted in one frame, a pulley thereon a rotary laying brush with its driving pulley mounted in the same frame, and a single driving belt having direct connection with the main driving pulley, the laying brush pulley and the corresponding members of the compound pulleys, substantially as described.

6. A scray for a cloth shearing machine embracing a fixed body portion, a pair of arms pivotally mounted at the receiving end of the scray and having their free ends pivotally connected with a receiving table, said table having at its outer end means for engaging a fixed part of the scray to sustain it in a horizontal position, said arms serving when folded back to their outermost position to position said table to form an extension for deflecting the cloth into the scray, substantially as described.

7. A scray embracing in combination a body portion having oppositely disposed fixed sloping sides and a transverse fixed rest, a table connected therewith by means of two pivotal axes, one of which is fixed and the other movable, the distance between said axes being shorter than the distance from the fixed axis to said transverse rest whereby the top of the table may be swung into horizontal position to form a shelf or may be moved back to be supported in an oblique position to deflect the cloth into the scray, substantially as described.

8. A scray for a cloth shearing machine embracing in combination a fixed body portion, pivoted arms on opposite sides thereof at its receiving end, a table pivotally connected with said arms intermediate of its front and rear edges, said table having at its rear edge a projecting hook to engage a fixed part of the scray to retain it in horizontal position, substantially as described.

9. In a cloth shearing machine the combination of the cloth rest, a rotary reciprocating fly blade arranged adjacent thereto to shear the cloth, means for rotating and means for reciprocating said fly blade, and means whereby the rotating and reciprocating mechanism is rendered inoperative by the movement of the fly blade away from the cloth rest, substantially as described.

10. In a cloth shearing machine the combination of the cloth rest, a rotary reciprocating fly blade arranged adjacent thereto to shear the cloth, said fly blade being mounted in a pivoted frame to permit its movement toward and away from the cloth rest, means for reciprocating and for rotating said fly blade, and means operated by the movement of the swinging frame to render the rotating and reciprocating means inoperative when the fly blade is moved away from the cloth rest, substantially as described.

11. In a cloth shearing machine the combination of a cloth rest, a rotary reciprocating fly blade mounted in a pivoted frame by which said fly blade is moved to or from said cloth rest, a belt driven pulley having operative connection with said fly blade to reciprocate the same, means controlled by the movement of the pivoted fly blade frame to tighten and render operative said belt when the fly blade is advanced to operative position and to slacken and render inoperative said belt when the fly blade is moved away from the cloth rest, substantially as described.

12. In a cloth shearing machine the combination of the rotary fly blade, a tilting frame in which said fly blade is mounted, a belt-driven pulley mounted on said tilting frame and having operative connection with the fly blade to reciprocate the same, an idler pulley also carried by said tilting frame and arranged to exert a tension on the belt when the fly blade is in operative position and to release the tension when the fly blade is thrown back, substantially as described.

13. In a cloth shearing machine the combination of the tilting frame, the reciprocating fly blade mounted therein, a belt-driven pulley mounted coaxially with said tilting frame and having operative connections for reciprocating said fly blade, a belt tightening device carried by the tilting frame and arranged to form a tension contact with the driving belt when the frame is tilted to operative position and to relax the tension on said belt when the frame is tilted to inoperative position, substantially as described.

14. In a cloth shearing machine the combination of a main frame, a main driving shaft mounted in said frame, a main driving pulley on said shaft, a compound pulley mounted on said frame, a rotary fly blade belted from one member of said compound pulley, an oppositely rotated laying brush, a supplemental frame adapted to be attached to the first frame, a second compound pulley mounted on said supplemental frame, a rotary fly blade mounted in said supplemental frame and belted to one member of said second compound pulley, a main driving belt passing successively over one member of each compound pulley, a main driving pulley and a pulley on the reversely rotated laying-brush shaft, whereby the laying brush and the fly blades may be rotated in opposite directions at appropriate speeds.

15. In a cloth shearing machine the combination of the cloth rest, a rotary reciprocating fly blade arranged adjacent thereto to shear the cloth, means for rotating, and means for reciprocating said fly blade, and means whereby the reciprocating mechanism is rendered inoperative by the movement of the fly blade away from the cloth rest, substantially as described.

16. In a cloth shearing machine the combination of the main frame, the main shaft mounted thereon, a rotary laying brush mounted therein, a rotary fly blade also mounted therein, a main shaft pulley, a compound pulley having belt connection with the fly blade, a guide pulley mounted in a support detachably secured to the main frame, and a main belt having driving engagement respectively with the main shaft pulley, the guide pulley and compound pulley aforesaid and the laying brush pulley, whereby the laying brush and the fly blade may be driven at appropriate speeds in opposite directions.

17. In a cloth shearing machine the combination of two supporting frames, means for rigidly but detachably securing said frames together, a main drive shaft and a

rotary laying brush mounted in one of said frames, a rotary fly blade and a compound pulley having belt connection therewith mounted in each of said frames, the main belt being driven by said main shaft and having direct engagement with the aforesaid compound pulleys and having reverse engagement with the laying-brush pulley whereby the fly blades are rotated in one direction and the laying brush in the opposite direction, substantially as described.

In witness whereof, I have subscribed the above specification.

CHARLES G. RICHARDSON.

In the presence of—
HELEN L. SULLIVAN,
A. BEATRICE BURKE.