

(No Model.)

3 Sheets—Sheet 1.

S. K. WHITE & S. T. LOCKWOOD.

CLOTH FOLDING MACHINE.

No. 370,835.

Patented Oct. 4, 1887.

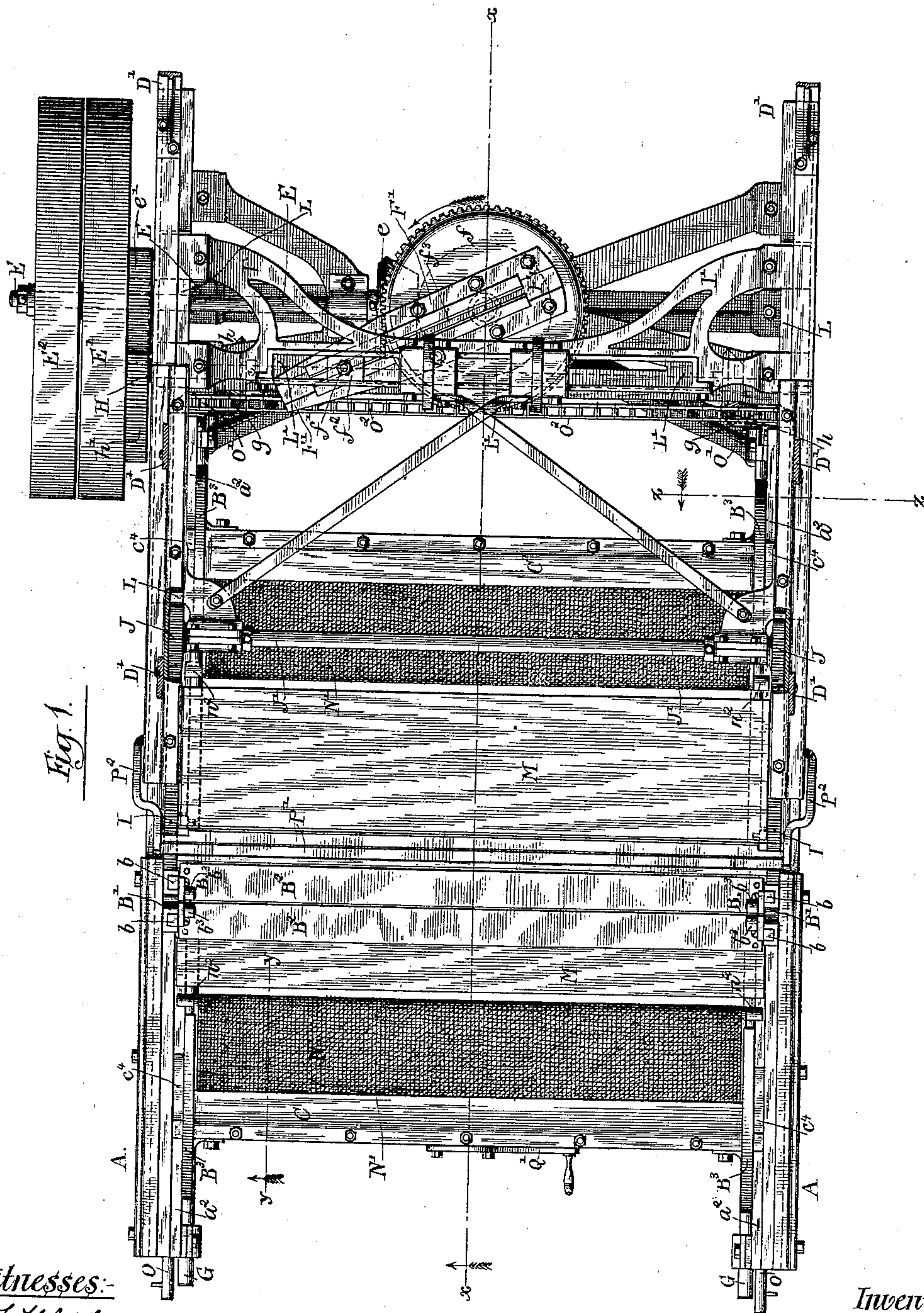


Fig. 1.

Witnesses:
Louis M. Whitehead.
C. C. Poole

Inventor:-
Samuel K. White
by:- Samuel T. Lockwood
M. E. Davenport
Attorney.-

(No Model.)

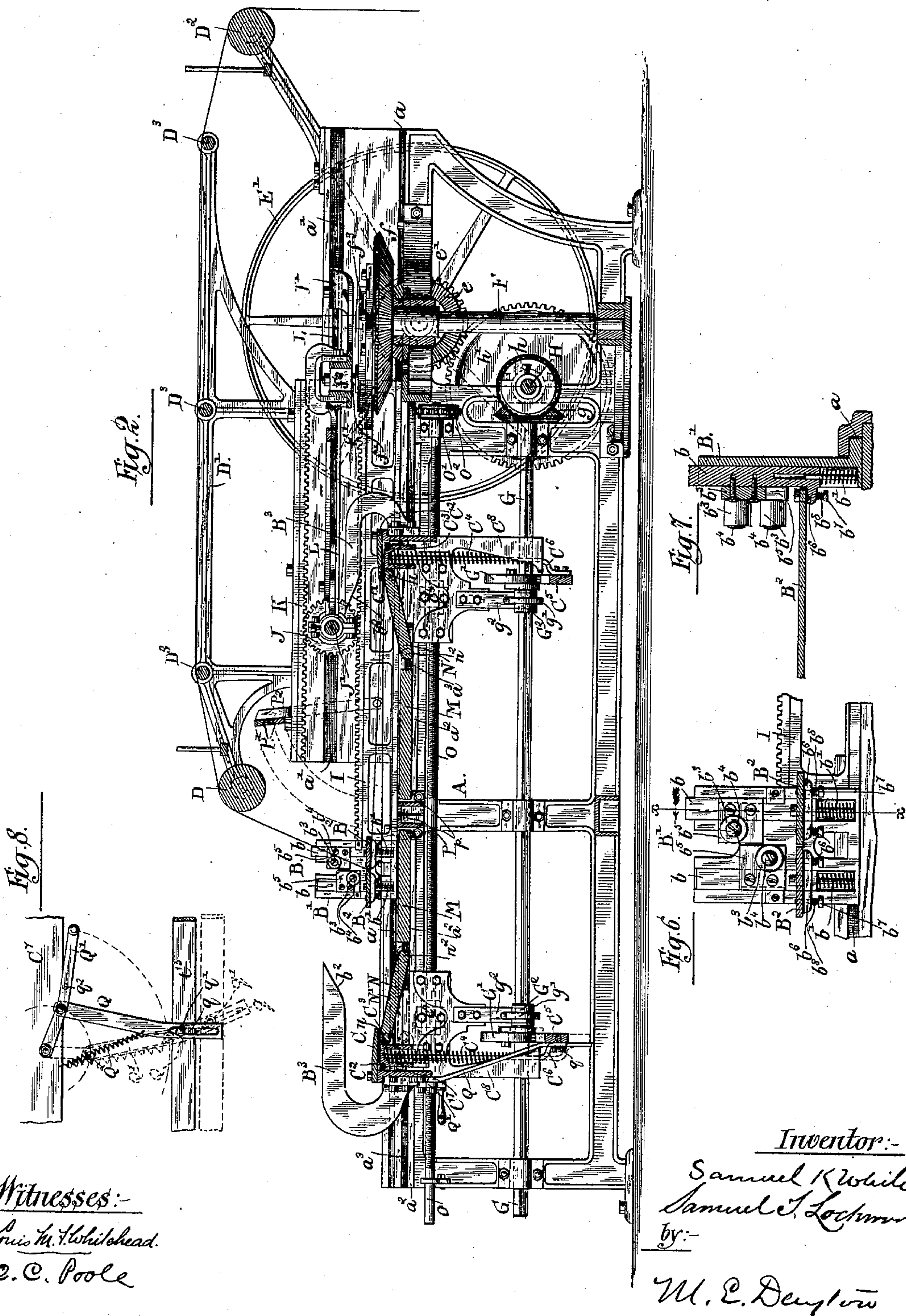
3 Sheets—Sheet 2.

S. K. WHITE & S. T. LOCKWOOD.

CLOTH FOLDING MACHINE.

No. 370,835.

Patented Oct. 4, 1887.



Witnesses:-
Louis M. Whitehead.
C. C. Poole

Inventor:-
Samuel K. White
Samuel T. Lockwood
by:-
M. E. Dwyer

Attorney:-

(No Model.)

3 Sheets—Sheet 3.

S. K. WHITE & S. T. LOCKWOOD.

CLOTH FOLDING MACHINE.

No. 370,835.

Patented Oct. 4, 1887.

Fig. 3.

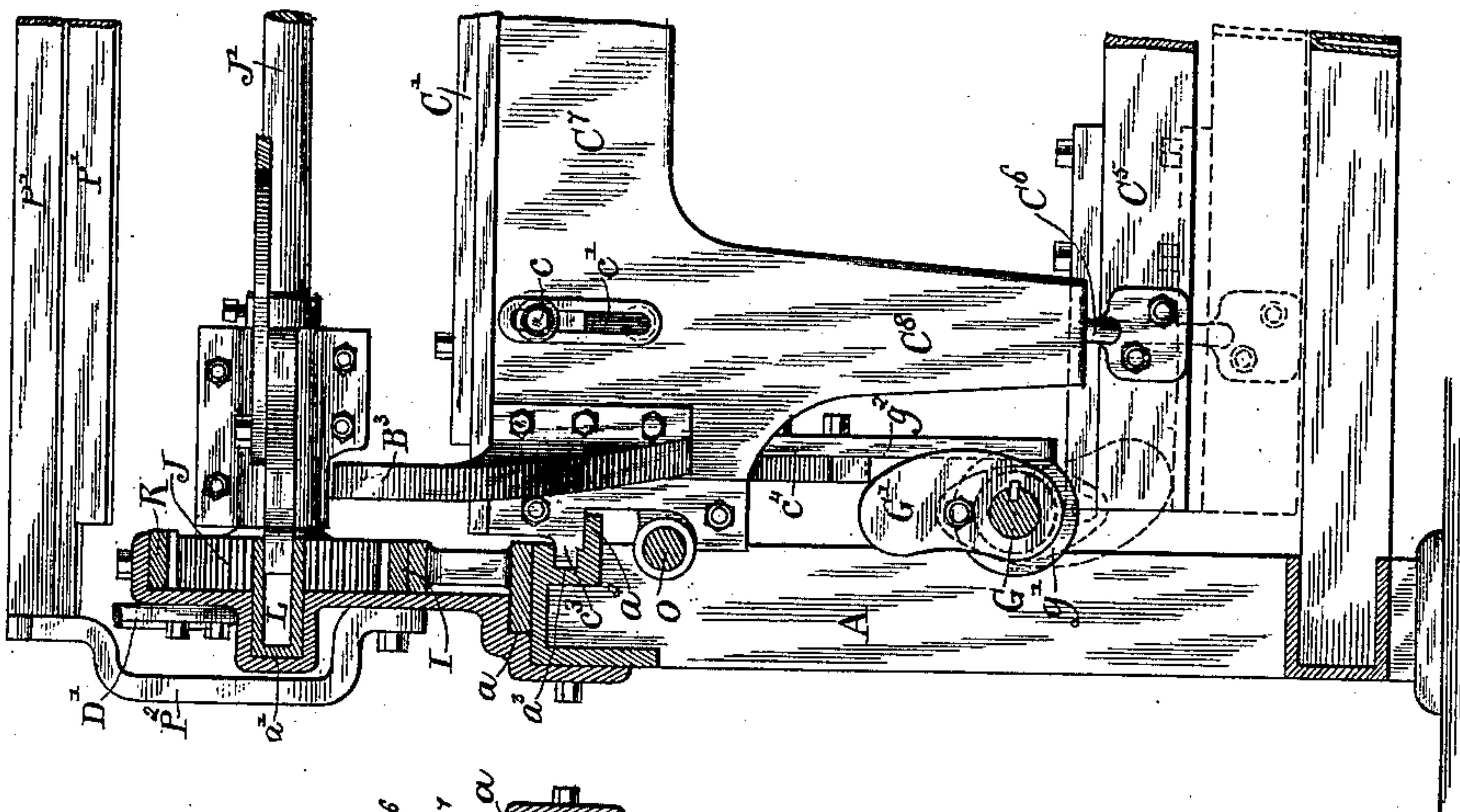


Fig. 4.

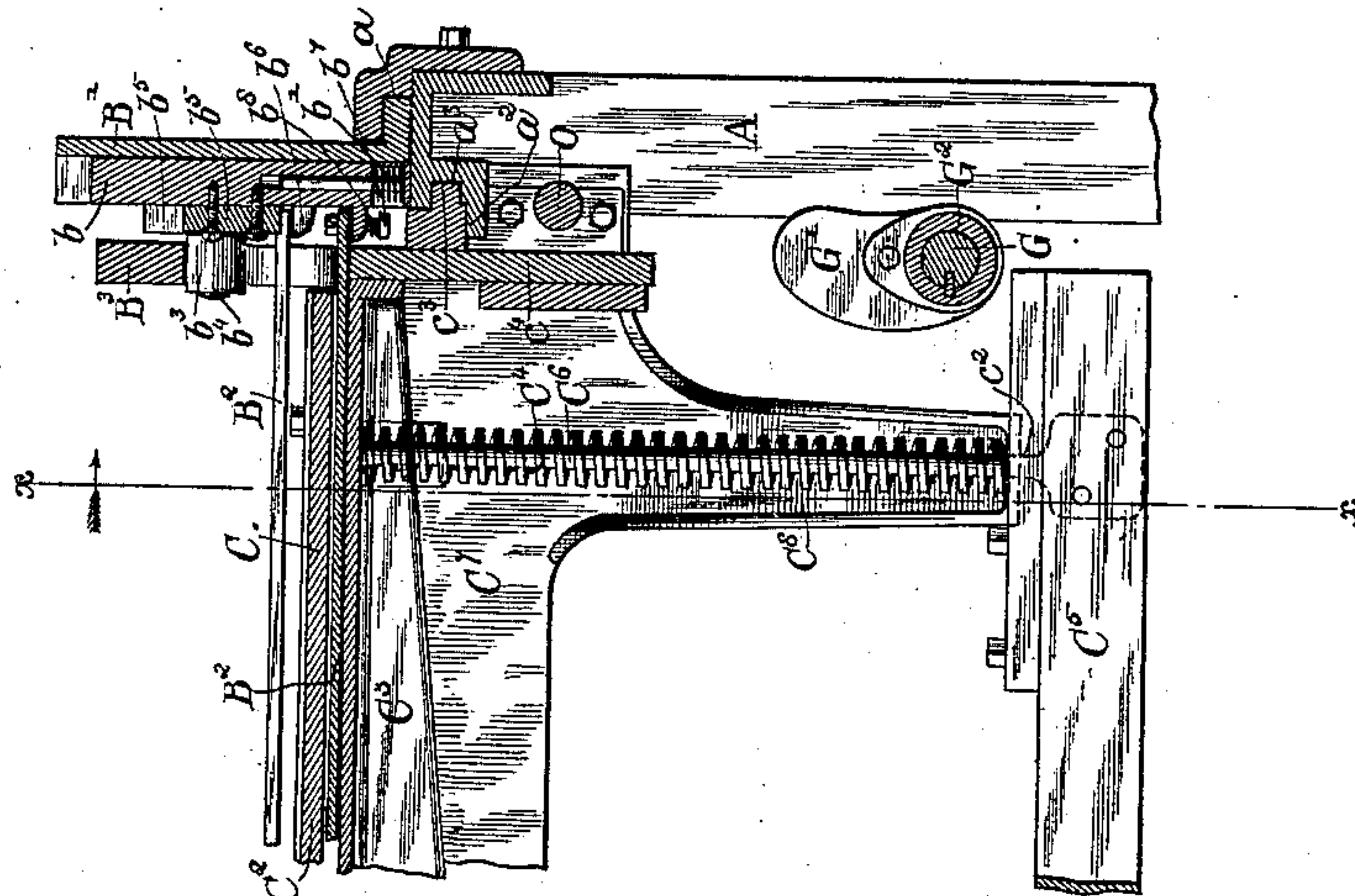
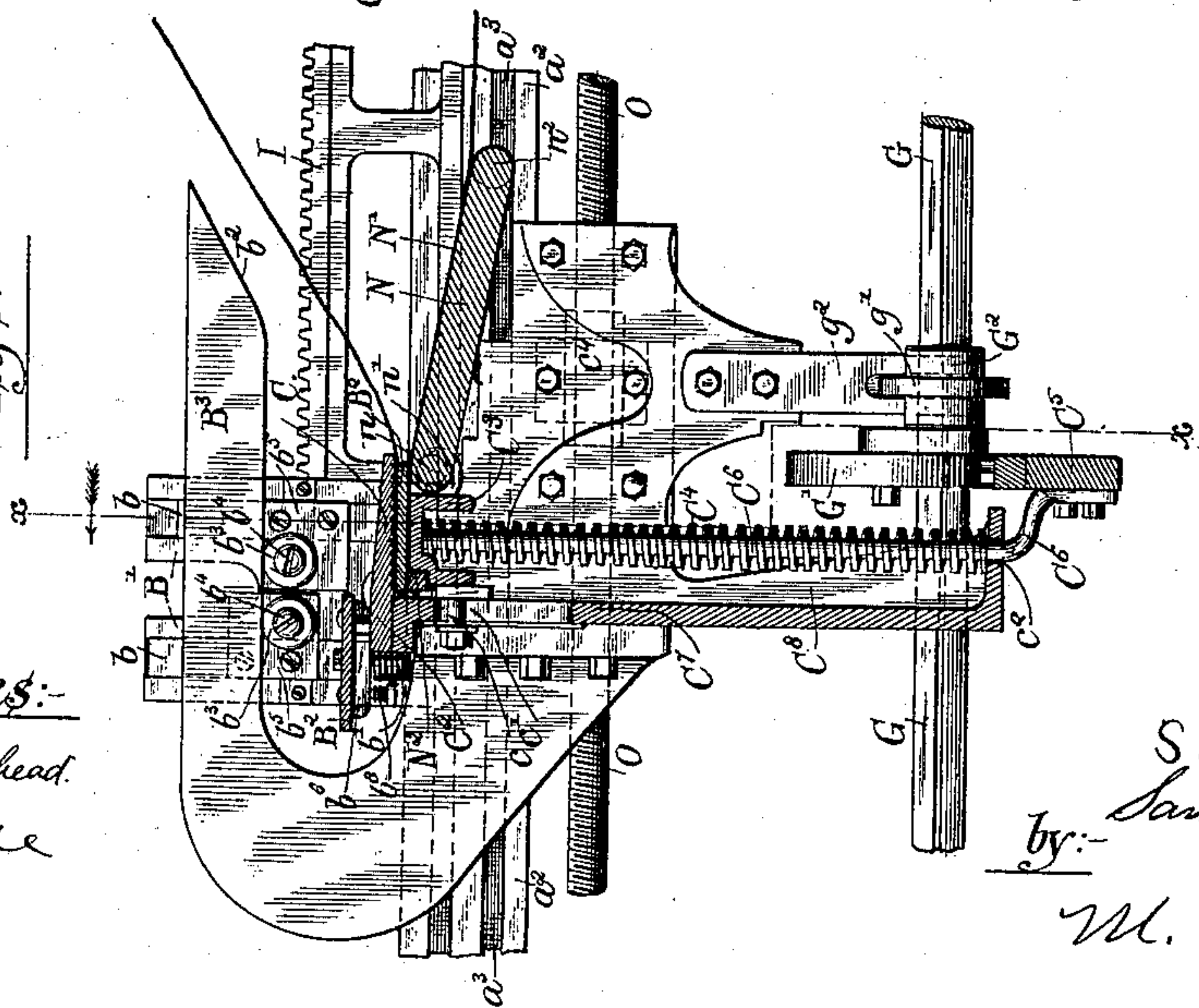


Fig. 5.



Witnesses:-

Louis M. Whitehead.

C. C. Poole

Inventor:-

Samuel K. White

by:- Samuel T. Lockwood

W. E. Deaton

Attorney:-

UNITED STATES PATENT OFFICE.

SAMUEL K. WHITE AND SAMUEL T. LOCKWOOD, OF CHICAGO, ILLINOIS;
SAID LOCKWOOD ASSIGNOR TO SAID WHITE.

CLOTH-FOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 370,835, dated October 4, 1887.

Application filed March 1, 1886. Renewed June 29, 1887. Serial No. 242,863. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL K. WHITE and SAMUEL T. LOCKWOOD, of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Cloth-Folding Machines; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improvement in cloth-folding machines; and it consists in the matter hereinafter described, and pointed out in the appended claims.

The machine herein illustrated is more especially intended for use in folding cloth in the process of making bags; but the principal features of construction thereof are applicable to machines for folding cloth for other purposes, as will hereinafter appear.

The invention may be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a plan view of a cloth-folding machine illustrating our invention. Fig. 2 is a central longitudinal section of the same, with parts in elevation, taken upon line *xx* of Fig. 1. Fig. 3 is an enlarged detail cross-section of a part of the folding devices at one end of the machine, taken upon line *yy* of Fig. 1 and *xx* of Fig. 4. Fig. 4 is a detail section of the parts shown in Fig. 3, taken upon line *xx* of said figure. Fig. 5 is an enlarged detail cross-section of the machine, taken upon line *zz* of Fig. 1. Fig. 6 is an enlarged view of the movable cloth carrier or folder in the position shown in Fig. 1. Fig. 7 is a sectional view of the same, taken upon line *xx* of Fig. 6. Fig. 8 is a detail view of a device for actuating by hand the clamp for holding the folded edges of the cloth.

As illustrated in the said drawings, A is the machine-frame.

B is a reciprocating cloth carrier or folder, consisting, as shown, of end castings or frames B' and parallel folding-bars B² B², between which the cloth web passes in the act of folding, and C C' are stationary cloth-clamps located at either end of the path of the cloth-

carrier, and adapted to automatically engage and hold the folded edges of the cloth delivered to them by the folder-bars B² B² in the reciprocatory movement of the cloth-carrier.

D is a guide-roller, preferably located over the path of the cloth-carrier, and from which the web of cloth passes to bars B² of said carrier. Said roller is, as shown, mounted at one end of an elevated frame, D', Fig. 2, located over the machine-frame, and provided with a second guide-roller, D², and supporting cross-bars D³, over which the cloth web is guided to the carrier from a loose pile or bolt located in any convenient place.

The frame D' is omitted in the plan view, Fig. 1, of the accompanying drawings, in order to enable the parts beneath it to be more clearly shown.

The cloth-carrier B is actuated from a main driving-shaft, E, provided, as shown, with the usual fast and loose pulleys, E' and E², through the medium of a vertical shaft, F, driven from the main shaft by bevel-gear *e* and *f* upon the shafts E and F, respectively, and connected with the said cloth-carrier by devices hereinafter described. The clamping devices are also actuated from the shaft E through the medium of longitudinal shafts G, located one at either side of the machine-frame and driven by means of bevel-gear *g g* and *h h* from a cross-shaft, H, actuated from the main driving-shaft E by means of gears *e'* and *h'*, as clearly shown in Figs. 1 and 2.

In the particular form of the cloth-carrier B herein shown the side frames or castings B', which are located opposite each other at either side of the machine-frame, are held at their lower ends in longitudinal guide-grooves *a*, formed in the side pieces of the machine-frame, as clearly shown in Figs. 2, 3, 4, 6, and 7. These frames or castings B' B' are reciprocated by devices constructed to retain them accurately opposite each other, the ends of the two parallel folding-bars B² being connected with the said castings in such manner as to be vertically movable thereon, for a purpose which will hereinafter appear.

The cloth-carrier, consisting of the end castings B' B' and folding-plates B² B², may be actuated in any suitable manner from the

shaft F to give it a reciprocating movement between the clamping devices C C'. A preferred device for this purpose is, however, herein shown, which is constructed as follows: The
 5 said castings B' B' are cast upon or attached to horizontal rack-bars I, extending from the said castings toward the end of the machine adjacent to the driving-shaft and having bearings in the guide-groove *a a*, said bars being
 10 desirably made in the form of vertically-deep, flanged, and apertured castings, having their flanged lower edges engaged with the guide-grooves. By this construction the racks proper are brought considerably above the guides, as
 15 necessary in the construction shown to give room for other parts of the folding mechanism.

Engaged with the rack-arms I are two gear-wheels, J, which intermesh at their opposite
 20 sides with stationary rack-bars K, engaged opposite to and parallel with the rack-bars I. Said gear-wheels are mounted upon a cross-shaft, J', having bearings in a frame, L, which is given a reciprocating movement by suitable
 25 connection with a crank-pin, *f''*, upon a crank-arm, F', attached to the upper end of the shaft F.

As herein shown, the frame L' is mounted to slide in guide-grooves *a'* in the machine-frame, and is actuated from the shaft F by means of
 30 a transverse slot, L', in the frame L', with which the crank-pin *f'* is engaged, the crank-pin preferably being provided with a slide-block, *f''*, fitted in the said slot L'. The part of the frame L in which the slot L' is formed is, of
 35 course, in this construction, located in a plane above that of the crank-arm F' and the upper end of the shaft F, so that the frame may pass freely backward and forward over the latter as it is moved by the crank.

40 In the operation of the devices above described it is entirely obvious that when the frame L is moved through a certain distance the gear J, being engaged with the stationary rack K, and being given thereby a circumferential movement equal to their bodily movement,
 45 will cause the racks I and the cloth-carrier to move through a distance equal to twice the space traversed by the said frame. In the use of a single crank with connections constructed in the usual manner it would obviously be necessary to employ a crank-arm of
 50 twice the length of that herein shown in order to obtain the same extent of throw in the cloth-carrier B as is obtained by the construction illustrated, and the latter, therefore, possesses important advantages in enabling the machine to be made very compact, so that it will take
 55 up much less room and require much less weight in the parts than would otherwise be necessary.

The clamping devices C C' comprise, as their essential parts, stationary upper clamping plates or jaws, C², and lower vertically-movable clamping-plates, C³, which are moved
 65 relatively to the upper jaws in such manner that the jaws of a clamp are opened when the cloth-carrier approaches the clamp and are

closed so as to grip the fold of cloth thrust between the jaws by the folder-bars B² at the moment the latter reaches the extreme limit
 70 of its movement toward the clamp. The bars B² B² are, as shown, located in a plane above the upper clamp-plate, C², and means are provided for automatically moving said bars in
 75 such manner that the bar remote from the clamp will be lowered or depressed into position to enter between the jaws of the clamp as the cloth-carrier approaches the latter, the parts being so located that the bar adjacent to
 80 the clamp-plate C² will pass freely over and the lowered bar will pass closely beneath the said plate, so as to carry the fold of cloth between the said plate and the movable plate or
 85 jaw C³. Such vertical movement of the carrier-bars B² is obviously necessary in order to enable the cloth fold to be carried between the clamp-jaws, for the reason that the cloth web passing from the guide-roller D between the
 90 folder-bars B² will be drawn over the bar nearest the middle of the path of the carrier, the bar over which the cloth is drawn being
 95 the one which is remote from the clamp toward which the carrier is moving, as will be made clear by an inspection of Figs. 2 and 3. The clamp-jaws are constructed to act with a
 100 yielding pressure, and are moved in such manner as to close upon the bar and cloth at the moment the carrier has reached the limit of its movement toward the clamp. One or both
 105 jaws of said clamp is preferably roughened, and the bars B² B² are made smooth, so that when the carrier begins its backward movement, and the bar engaged with the jaws is thereby released therefrom, said bar will slip
 110 from between the folds of the cloth and the folded edge of the latter will be with certainty gripped in the clamp.

In the particular construction of the parts above mentioned in the machine herein shown the bars B² B² are attached at their ends to
 115 sliding blocks *b b*, mounted in vertical guide-grooves in the castings B' B', and are sustained at the upper limit of their movement by springs *b' b'*, applied between the lower
 120 ends of said blocks *b b* and stationary parts of said castings. The slides *b b* are moved downwardly in opposition to the action of the springs *b' b'* by means of inclined or cam surfaces *b² b²* upon parts of the machine-frame adjacent to the clamps constructed to act upon
 125 suitably-located projections upon the slides *b b*, said cam-surfaces, in the particular construction shown, being formed upon stationary bent bars B³ B³, adapted to engage anti-friction rollers *b³*, mounted upon pins *b⁴*, fixed in
 130 plates *b⁵*, attached to the said slides. The bars B³, adjacent to the clamp C', are, as shown, located in a lower plane than those at the ends of the clamp C, and the roller *b³*, which is actuated by the said bar, is correspondingly located,
 135 so that the bars and rollers at opposite ends of the machine may operate without interfering with each other.

The lower clamp plates or jaws, C³, of the

clamps C and C' are held at the upper limit of their movement by means of spiral springs C⁴, and are thrown downwardly at the required intervals by the action of cams G', attached to the shafts G upon the ends of vertically-movable cross-pieces C⁵, connected with the clamp-plates by vertical rods C⁶. The said cams G' are preferably made of the shape indicated in Figs. 4 and 5, and are adapted to throw the said clamp-plate C³ downward somewhat rapidly upon the approach of the cloth-carrier, and to suddenly release the said plate so as to permit it to promptly engage the cloth at the moment the bar B² of the carrier has fully entered between the jaws of the clamp.

The bars B² B² are preferably united with the slides b b by a spring-connection permitting a slight upward yielding of the bars when the movable clamp-plates C³ are thrown upwardly toward them, such yielding of the bars obviously being desirable in order to enable the roughened under face of the clamp-plate C² to properly engage the cloth. In the particular construction herein shown, the slides b b are provided with horizontal projections or flanges b⁶, forming seats for the bars B² B², and to which the said bars are connected by means of vertical bolts or studs b⁷, secured in the bars and extending downwardly through apertures in the flanges b⁶, said bolts being provided upon their lower ends with heads or collars, between which and the flanges are placed coiled springs b⁸, acting to hold the bars movably in contact with the flanges and adapted to permit the bars to yield upwardly for the purpose set forth. Any lateral movement of the said bars is more effectually prevented by studs b⁹, inserted through the bars and into the flanges b⁶, as clearly shown in Figs. 6 and 7.

In order to prevent the weight of the folded cloth between the clamps from drawing the folded ends thereof out of the clamps when the latter are opened to admit the folder-bars B², transverse boards or planks M are preferably placed upon the frame between the clamps, upon which the folds may rest. The surface formed by these boards is so located as to come in the same plane with the lower clamps, C³, when the latter are at the lower limit of their movement, and in order to prevent the folded edges of the cloth from slipping from the said lower clamp-plates when the latter are moved vertically, movable planks N are preferably employed, which are attached at one edge to and move with the clamp-plates and are supported at their opposite edges upon a level with the boards M. By this construction continuous surfaces are formed upon which the ends of the folded cloth adjacent to the clamps may rest, and in order to effectually avoid liability of the cloth slipping backwardly upon the boards N, by reason of the shaking movement of the outer edge thereof, said board is preferably covered with a layer, N', of bagging or other kind of cloth, rubber, or similar mate-

rial, upon which the cloth being folded will not readily slip.

In the particular construction herein shown in the parts mentioned the boards N are provided at their ends with laterally-projecting pins, as indicated in dotted lines at n, Fig. 3, constructed to engage ears n', cast upon the plate C³. Said boards, also, are shown as sustained at their opposite or inner ends by means of pins n² resting upon a ledge, a², of the machine-frame, upon which the ends of the boards M are also supported. The layer N' upon the board N is preferably extended from the said board over the surface of the clamp-plate C³, and is secured to a wooden strip, N², secured in a rabbet in the edge of said plate, as shown in Fig. 3. The said plate C³ is preferably made of cast metal and provided with depending flanges at both edges to give the requisite stiffness thereto. Said plate also is, as shown, held or guided in its vertical movement by means of studs c, passing through vertical guide-slots c', formed in a transverse metal casting, C', to the upper flanged edge of which the clamp-plate C² is bolted, and which is provided with downwardly-projecting parts C⁸, having guide-bearings c² at their lower ends for the rods C⁶, forming supports for the lower ends of the springs C⁴, as clearly shown in Figs. 3 and 4.

In beginning the operation of folding in the machine described the cloth is placed over the guide-rollers D and D², and the end thereof passed through the slot between the folder-bars B² B². When the machine is started, the end portion of the cloth passing around one of the folder-bars will be carried thereby into one of the clamps, C or C', and gripped. In the succeeding movement of the carrier toward the opposite clamp, the cloth will be drawn through the folder-bars and laid or extended horizontally over the boards M and N to the opposite clamp, where another fold will be similarly gripped. When the carrier again reaches the clamp in which the end first gripped is held, the clamp will be opened and receive another fold without effecting the release of the end first gripped, for the reason that the first layer of cloth will be sustained upon the boards M and N, and there will be nothing to cause the withdrawal of said end from between the clamp-jaws. In the continued action of the machine successive layers or folds of cloth are laid over the boards M and are gripped in the clamps in the manner described until a pile or stack of sufficient size is formed, when the folded cloth is removed from the machine.

In order to facilitate the removal from between the clamp-jaws of the folded edges of the cloth, means may be provided for throwing and holding downwardly the lower clamp-plate, C³, against the action of the lifting-springs beneath it. A device for this purpose is shown in Fig. 8, such device consisting of a bar, Q, provided with a longitudinal slot, q,

in the lower end, and connected with the cross-bar C^5 by means of a stud, q' , inserted through the slot, and a hand-lever, Q' , pivoted to the casting C^7 and the lever Q . A spring, Q^2 , is applied to hold the bar Q at the upper limit of its movement, the stud q' and slot q being so arranged that when the bar is in this position the stud will be in the upper part of the slot, so that the bar C^5 and the stud will be free to move downwardly when the clamp is opened in the operation of the machine. The lever Q' stands usually horizontal, and the parts are so arranged that by swinging said lever downwardly the bar Q will be moved downward and the bar C^5 depressed sufficiently to free the cloth held in the clamp. The said lever is preferably provided with a stop or pin, q^2 , adapted to engage the bar Q when the pivot between the bar and lever has been carried slightly past a straight line drawn through the stud q' and the pivoted axis of the lever, so that the bar C^5 may be locked in position to hold the clamp open while the folded cloth is being removed from the machine.

A construction is herein provided in the clamp C and C' and the devices for operating the latter, whereby these parts may be moved bodily toward and from each other upon the machine-frame for the purpose of changing the length of the folds in the cloth when desired, devices being also provided for adjusting the throw of the cloth-carrier to correspond with the position of the clamps. To permit such bodily movement of the clamps, the castings C^7 , upon which the clamps are sustained, are mounted to slide longitudinally upon the machine-frame, and screw-shafts O , held in a suitable bearing constructed to prevent longitudinal movement therein, and provided at their opposite end portions with right and left hand screw-threads, are engaged with the said castings, so that by turning the screw-shafts the castings and the clamps thereon may be moved equally toward or away from each other. In connection with the clamps made bodily adjustable in this manner, the crank-pin f' of the crank-arm F' is made adjustable in a slot, f^3 , in the said arm, so that the throw of the crank may be adjusted to correspond with the distance apart of the clamps.

As herein shown and preferably constructed, the screw-shafts O are provided with sprocket-wheels O' , over which is trained a chain belt, O^2 , whereby both shafts may be turned equally by power applied to one of them. The screw-shafts, as has also been shown, are connected with the castings C^7 by passing through threaded apertures in lugs c^4 upon said castings, and the latter are provided with ribs c^3 entering guide-grooves a^3 , formed in the side pieces of the frame parallel with and below the grooves a . When the clamps are made adjustable in the manner described, the cam-bars B^3 are bolted to the castings C^7 , as shown, so as to move with the latter and to always re-

tain their proper position relatively to the clamp-plates.

Each of the cams G' , by which the clamp-plates are actuated, instead of being fixed upon the shaft G , is desirably constructed to slide longitudinally but not to rotate upon the said shafts, the connecting device for this purpose herein shown consisting of a spline and groove, and the cam is provided with a collar or sleeve, G^2 , provided with an annular projection or rib, g' , which is engaged by a downwardly-projecting part, g^2 , rigidly connected with the casting C^7 , whereby when the said casting is moved the cam is carried with it, and is thereby always retained in operative position with relation to the bar C^5 .

The operation of adjusting the throw of the cloth-carrier to the distance apart of the cloth-clamps may be readily accomplished when the space between the clamps is to be increased by first setting the clamps the desired distance apart, placing the crank-arm F' parallel with the sides of the machine, loosening the crank-pin f' in the slot of the crank-arm, and then moving the frame L , together with the crank-pin, until the bar B^2 of the cloth-carrier has fully entered between the clamp-plates C^2 and C^3 . In lessening the distance between the clamps, so as to make shorter folds, the crank-arm is placed in the same position and the crank-pin loosened, when, by moving the clamps toward each other, the cloth-carrier and the frame L , together with the crank-pin, may be shifted accurately into position for operation.

A machine constructed generally as above described may obviously be used in mills for folding goods, or in any other place where such machines may be employed. The machine herein shown, however, is more especially intended for use in preparing bagging or other cloth in the manufacture of bags to facilitate the folding and cutting of the cloth preparatory to sewing the bags. For this purpose the said machine is provided with a knife-guide, P , arranged transversely of the machine midway between the clamps C and C' , said knife-guide being herein shown in the form of two parallel bars, p , bolted at their ends to the side pieces of the frame and slightly separated to provide a guide-slot for a knife or cutter.

In a machine made for forming bag-blanks the distance between the clamps is made equal to twice the width of a finished bag, so that by cutting across the middle of the pile of folded cloth a series of folded bag-blanks are formed of proper size, and only requiring sewing upon one side and end to make a finished bag.

In order to facilitate the cutting of the several layers or thicknesses of cloth in the manner described, a second upper knife-guide, P' , is preferably used, herein shown as formed by two transverse bars secured upon arms P^2 , pivoted to the machine-frame in such manner that the said guide P' may be thrown up out

of the way during the operation of folding, and lowered into position with its guide-slot accurately over the guide-slot of the lower guide, P, prior to the operation of cutting. The upper guide is preferably constructed to rest with its weight upon the pile of cloth when lowered, so as to hold the layers in a compact mass and prevent them from shifting during the operation of cutting.

10 The essential feature of novelty in the folding devices is that whereby, in connection with cloth-clamping devices, the separately-movable folder-bars are alternately lowered to engage the said clamping devices. The movement of the said bars relatively to the clamps, as set forth, may obviously be accomplished otherwise than by the particular mechanism shown, and our invention is not therefore limited to the said particular mechanisms, except as the latter are specifically claimed herein.

We claim as our invention—

1. The combination, with two cloth-clamps located in the same horizontal plane and a horizontally-reciprocating cloth-carrier provided with horizontally-arranged and vertically-movable folder-bars, of springs upon the cloth-carrier applied to sustain the folder-bars in a plane above the cloth-clamps, and stationary cam-surfaces upon the machine-frame engaging and thrusting downwardly the said folder-bars, whereby at each reciprocatory movement of the cloth-carrier one folder-bar is caused to enter and the other to pass over one of the cloth-clamps, substantially as described.

2. The combination, with the cloth-clamps of a folding-machine, comprising upper stationary clamp-plates and lower movable plates, and means for actuating said movable plates, of a reciprocating cloth-carrier comprising side frames or castings, B' B', vertically-movable blocks b b, mounted upon said castings, folder-bars B² B², connected with said blocks, and means for moving said blocks vertically to bring the bars into position for engagement with the clamps, said bars having upwardly-yielding connection with the blocks, substantially as and for the purpose set forth.

3. The combination, with the cloth-clamps of a folding-machine, comprising upper stationary clamp-plates and lower movable plates, and means for actuating said movable plates, of a reciprocating cloth-carrier comprising folder-bars B² B², side frames or castings, B' B', vertically-movable blocks b b, mounted upon said castings and provided with flanges or projections forming seats for the folder-bars, springs b³, applied to normally hold the said bars in contact with the said seats, and means for moving said blocks vertically to bring the bars into position for engagement with the clamps, substantially as and for the purpose set forth.

4. The combination, with a reciprocating cloth-carrier, of cloth-clamps comprising upper stationary plates, C², lower vertically-movable plates, C³, springs applied to throw the

movable plates upwardly, longitudinal bars C⁵, rods C⁶, connecting the said bars with the plates C², and rotating cam-shafts G, provided with cams G', acting upon said bars C⁵, substantially as and for the purpose set forth.

5. The combination, with the cloth-carrier and cloth-clamps, each comprising two horizontal plates or jaws, of which the lower one is vertically movable, of boards N, sustained at one of their edges upon the machine-frame and flexibly connected at their opposite edges with the said movable clamp-plates, substantially as and for the purpose set forth.

6. The combination, with the cloth-carrier and cloth-clamps, each comprising two horizontal clamp plates or jaws, of which the lower one, C³, is vertically movable, of boards N, sustained at their edges upon the machine-frame and flexibly connected with the movable clamp-plate, and a sheet or layer of cloth, rubber, or similar material covering the upper surface of the boards and clamp-plates, substantially as and for the purpose set forth.

7. The combination, with the reciprocating cloth carrier or folder of a folding-machine, of means for actuating the folder, consisting of a stationary rack-bar, a reciprocating frame, a crank connected with the said frame for actuating the latter, a gear-wheel mounted in the frame and engaged with the stationary rack-bar, and a second rack-bar connected with the cloth-carrier and engaged with the gear-wheel, substantially as described.

8. The combination, with the cloth-carrier of a folding-machine, of actuating devices for said carrier, consisting of a rotating shaft and crank, a reciprocating frame provided with a transverse slot engaged with the crank-pin, a stationary rack-bar, a gear-wheel mounted in the frame and engaged with the said stationary rack-bar, and a second rack-bar connected with the cloth-carrier and engaged with the said gear-wheel, substantially as described.

9. The combination, with the cloth-carrier of a folding-machine, of actuating devices for said carrier, consisting of a rotating crank-shaft, a reciprocating frame provided with a transverse slot engaged with the crank-pin, a stationary rack-bar, a gear-wheel mounted upon the frame and engaged with the said stationary rack-bar, and a second rack-bar connected with the cloth-carrier and engaged with the gear-wheel, the said crank-pin being adjustable longitudinally of the crank-arm, whereby the throw of the crank may be adjusted, substantially as described.

10. The combination, with the machine-frame and upper and lower clamp-plates, of transversely-arranged vertical plates or castings C', having sliding connection with the machine-frame, affording rigid support to the upper stationary clamp-plates, and bearings for the lower movable plates, and means for moving said casting upon the frame for the purpose of adjustment, substantially as described.

11. The combination, with the machine-

frame, cloth-clamps, and frames or castings C', supporting the said clamps and having sliding connection with the machine-frame, of longitudinally-arranged shafts G, cams G' for actuating the clamps, having sliding connection with the shafts, means connecting the said cams with the clamps, whereby the said clamps are actuated by the cams, and arms or projections upon the castings C', engaged with the cams for shifting the latter upon the shafts when the said clamps are moved, substantially as described.

12. The combination, with the machine-frame, the movable clamp-jaw C³, and bar C⁵, connected with the latter, of a bar, Q, and lever Q', pivotally connected with the said bar C⁵ and the machine-frame and with each other, and a stop constructed to limit the rotation of the lever in one direction, substantially as and for the purpose set forth.

13. The combination, with the frame, the cloth-clamps, and cloth-carrying devices of a folding-machine, of a transversely-arranged knife-guide located upon the machine-frame between said clamps and adjacent to the cloth held therein, whereby the several folds of cloth held in the clamps may be severed by a knife

moved along the said guide, substantially as described.

14. The combination, with the cloth-clamps and cloth-carrying devices of a folding-machine, of a stationary transversely-arranged knife-guide attached to the machine-frame between the cloth-clamps and below the cloth layers held in the clamps, a second movable guide adapted to be placed over the cloth and the lower guide, and means sustaining said movable guide in position parallel with the stationary guide, substantially as described.

15. The combination, with the cloth-clamps of a folding-machine, of a lower stationary knife-guide attached to the machine-frame, and an upper movable knife-guide pivotally supported upon the said frame, substantially as described.

In testimony that we claim the foregoing as our invention we affix our signatures in presence of two witnesses.

SAMUEL K. WHITE.

SAMUEL T. LOCKWOOD.

Witnesses:

C. CLARENCE POOLE,

M. E. DAYTON.