(No Model.) 4 Sheets—Sheet 1.

R. T. SMITH.

CLOTH FOLDING MACHINE.

No. 492,116. Patented Feb. 21, 1893.

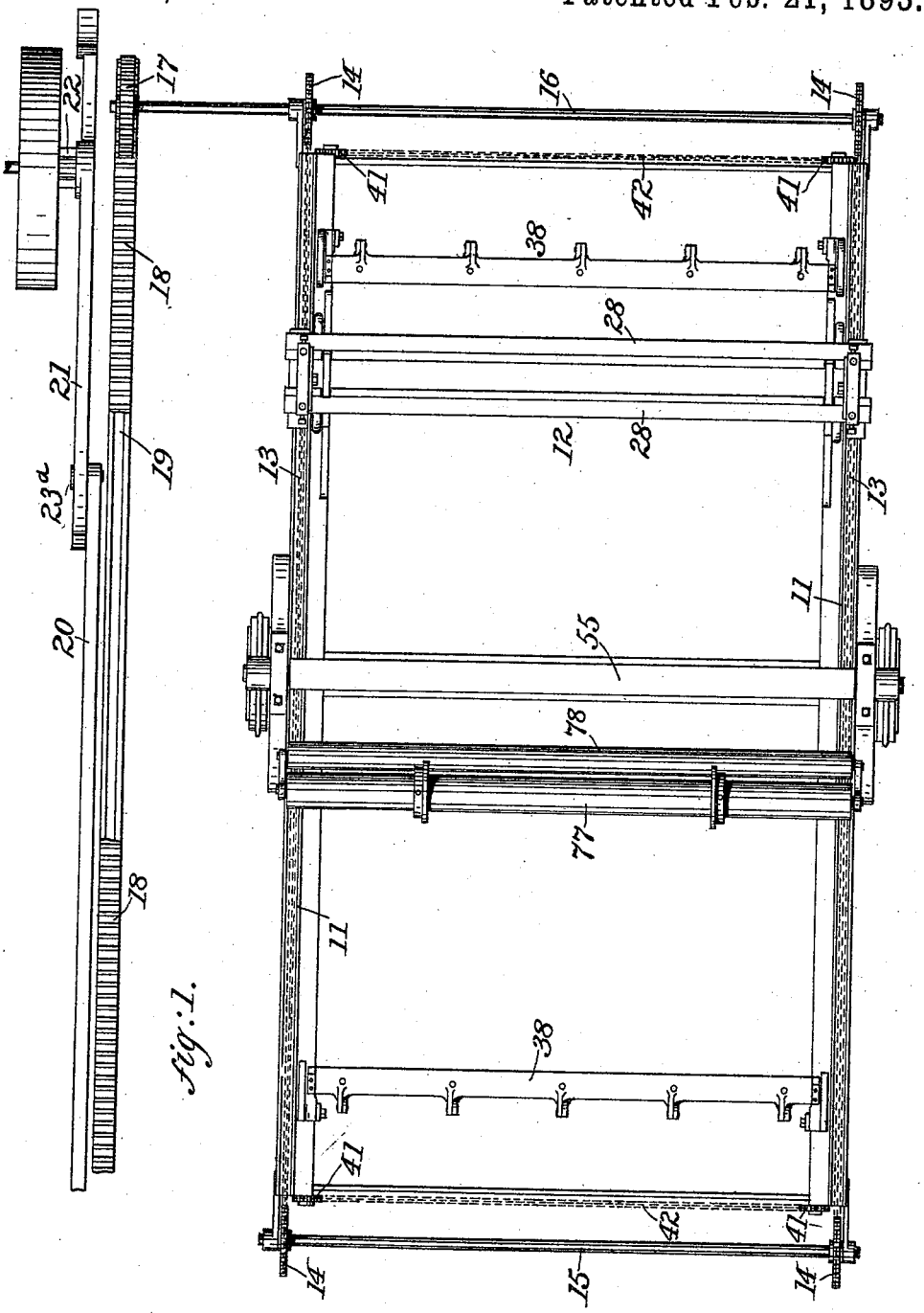

Fig. 1.

Witnesses:
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A. N. Jesbera

Inventor:
Roswell T. Smith
By his Attorney
William B. Greeley

(No Model.) 4 Sheets—Sheet 2.

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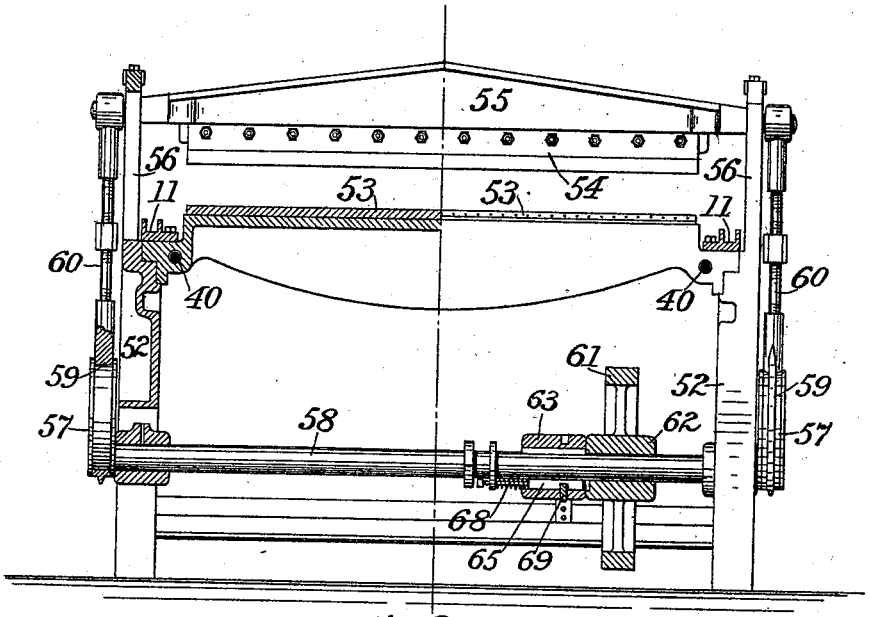

fig: 2.

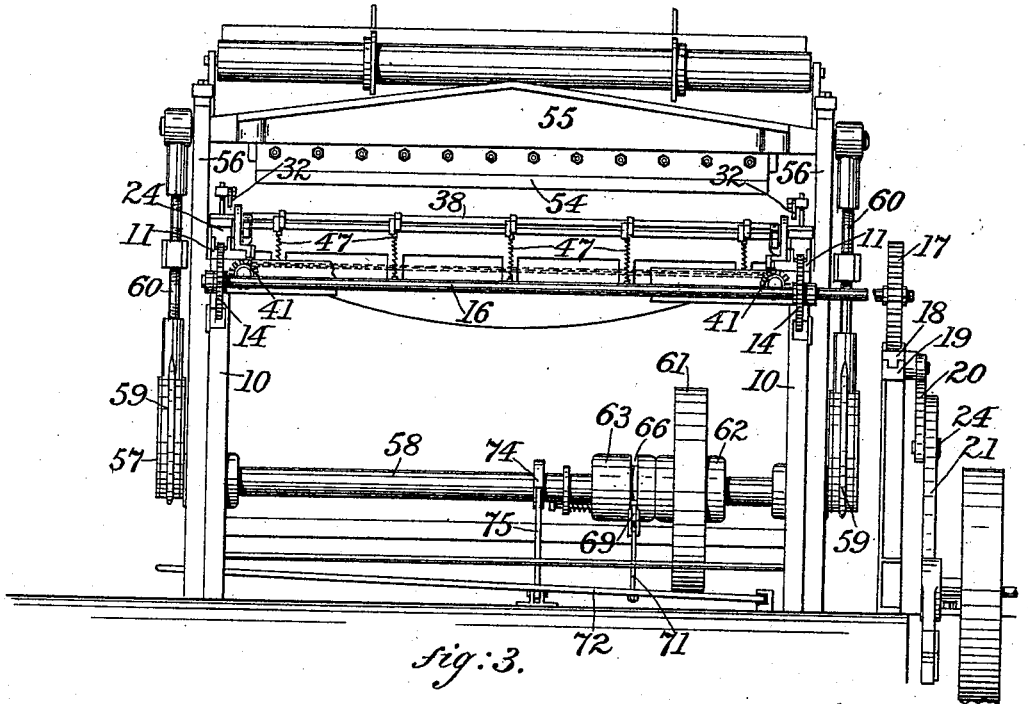

fig: 3.

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(No Model.) 4 Sheets—Sheet 3.

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CLOTH FOLDING MACHINE.

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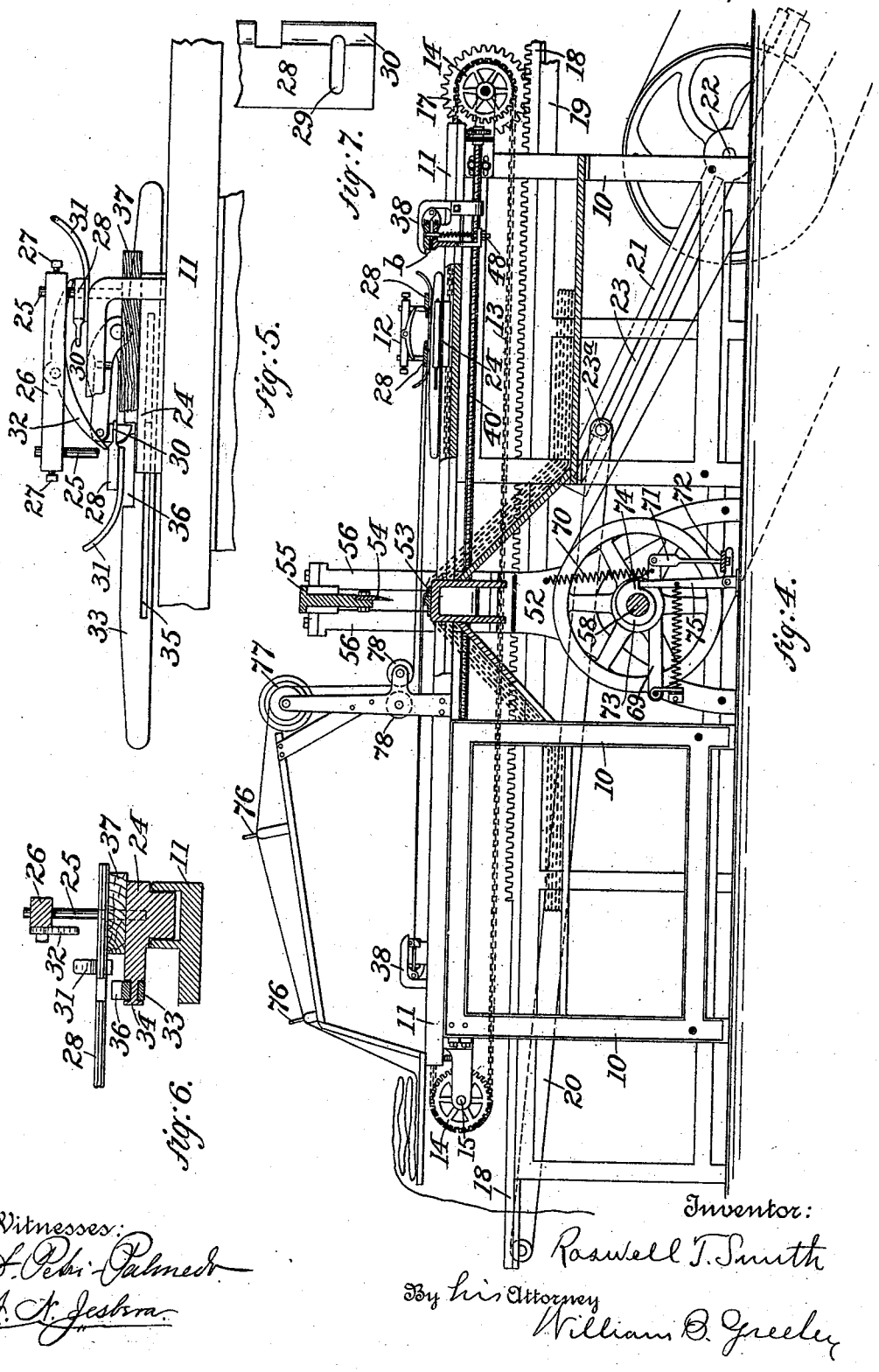

Fig. 7.

Fig. 5.

Fig. 6.

Fig. 4.

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(No Model.) 4 Sheets—Sheet 4.

R. T. SMITH.

CLOTH FOLDING MACHINE.

No. 492,116. Patented Feb. 21, 1893.

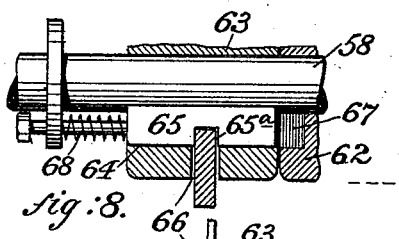

Fig.: 8.

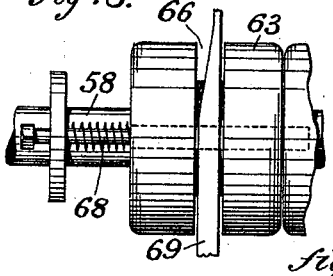

Fig.: 9.

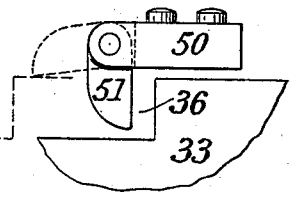

Fig.: 10.

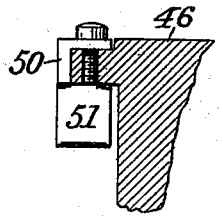

Fig.: 11.

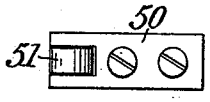

Fig.: 12.

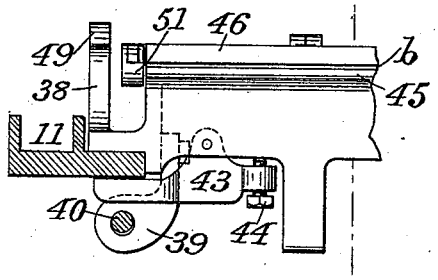

Fig.: 13.

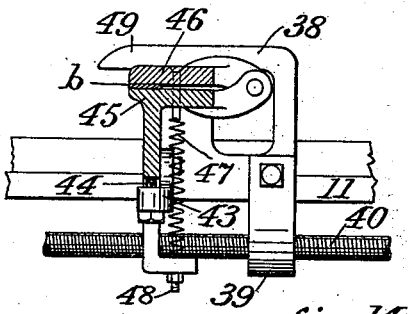

Fig.: 14.

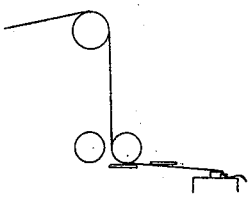

Fig.: 15.

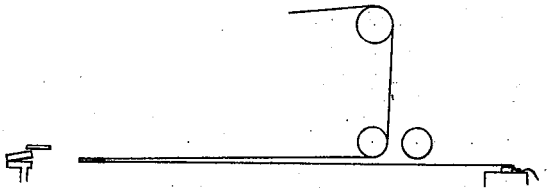

Fig.: 16.

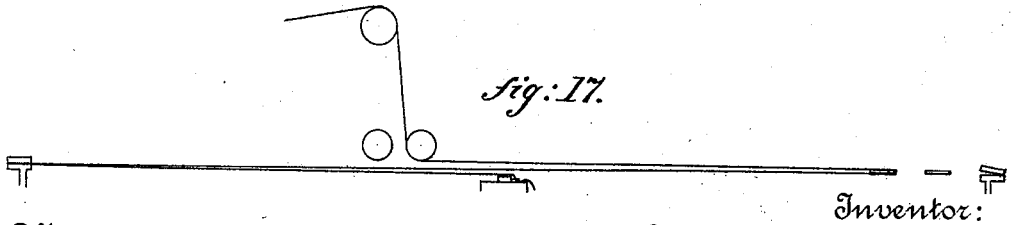

Fig.: 17.

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UNITED STATES PATENT OFFICE.

ROSWELL T. SMITH, OF NASHUA, NEW HAMPSHIRE, ASSIGNOR TO CHARLES H. PARSONS, OF BROOKLYN, NEW YORK.

CLOTH-FOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 492,116, dated February 21, 1893.

Application filed March 16, 1892. Serial No. 425,099. (No model.)

To all whom it may concern:

Be it known that I, ROSWELL T. SMITH, of Nashua, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Cloth-Folding Machines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, making a part of this specification.

The object of my invention is to produce an improved machine for folding fabrics in a web into any desired lengths but with great exactness and uniformity so that such lengths when sewed may form bags of uniform capacity.

It is also my object to enable the operation to be performed with great rapidity and to enable the double lengths in which the machine folds the fabric to be cut in two across their middle line without removing the folded fabric from the machine and thereby disarranging the folds.

The invention consists in the combination and arrangement of parts as hereinafter described and claimed.

In the accompanying drawings: Figure 1 is a plan view of the improved machine: Fig. 2 is a transverse vertical section of the machine, the section being taken partly through the bed of the cutter and partly at one side of the bed: Fig. 3 is an end view of the machine, looking toward the right in Fig. 1: Fig. 4 is a side elevation of the machine partly in section and partly broken out: Fig. 5 is a detail end view of the folding-frame, partly broken out: Fig. 6 is a vertical section of one end of the same: Fig. 7 is a plan view of one end of one of the folding-bars: Fig. 8 is a detail view in sectional elevation of the mechanism for driving the cutter blade: Fig. 9 is an elevation of the same: Figs. 10, 11, 12 are detail views of part of the means for moving the upper clamping jaw: Figs. 13 and 14 are detail views showing the means for supporting and shifting the clamping jaws: Figs. 15, 16 and 17 are diagrams illustrating the operation of the machine.

The main frame 10, which may be of any suitable construction, supports near the top and at each side the longitudinal ways 11, 11, upon which a folding-frame 12 is adapted to be reciprocated. This frame, which will be described more in detail hereinafter, is fastened at each end to endless chains 13, 13, which pass over and are driven by sprocket wheels 14, 14, carried by the shafts 15, 16, which are supported to rotate in bearings at the extremities of the frame. The sprocket-wheels at one end of the machine may be loose upon the shaft 15 but those at the other end of the machine are fast upon their shaft 16 and are the drivers for the chains. Rotation alternately in opposite directions may be imparted to the shaft 16 by any convenient means, but I prefer to fix to the shaft a gear 17 which is engaged by a longitudinally reciprocating rack 18 which may be supported by a suitable slide-way 19 at one side of the machine. The rack is reciprocated through a link 20 from a crank 21 which is carried by a shaft 22. The crank arm is slotted, as shown at 23, to permit the adjustment of the crank pin 23^a therein so that the length of stroke and of the reciprocations of the frame 12 may be varied as desired.

The frame 12 consists of two end pieces 24, 24, see Figs. 5 and 6, which slide on the ways 11 and to which the chains 13 are attached. Each end piece 24 has erected thereon two pins 25, 25, which are united at the top by a bar 26, the latter being adjustable on the pins and held in adjusted position by set screws 27, 27. The pins serve to hold to the end pieces two plates 28, 28, which extend from one end piece to the other and are slotted near their ends, as at 29, to receive the pins loosely and to permit of some lost motion of the plates with respect to the end pieces. The plates preferably have their inner, proximate edges reduced in thickness as shown at 30 and each is provided at each end with an upwardly and outwardly projecting shoe 31. A lever 32 is pivoted at its middle to the bar 26 with its ends overlying the opposite plates 28. A sliding dog 33, having tapered ends, is loosely connected to each end piece 24, the engagement being effected by a headed projection 34 on the end piece which enters a slot 35 in the dog so that as the end piece reciprocates the dog shall have some lost mo-

tion. The dog is also provided on its upper edge with a recess 36. The ends of the plates may rest upon a thin piece of wood 37, if desired, to lessen the noise made by the plates when the machine is in operation.

At each end of the path of the reciprocating frame 12 is placed a clamp 38 (see Figs. 1, 4, 13 and 14), which rests upon the slide-ways 11, and is formed with a threaded projection 39, for engagement with a screw-shaft 40. Such a shaft is supported in bearings at each side of the machine and preferably extends the full length of the machine, the two halves being oppositely threaded. The screw-shafts bear at their ends the sprocket-wheels 41 which are connected, at each end, by the chains 42 so that the two clamps may be adjusted readily with respect to the limit of motion of the frame 12 and at the same time their parallelism may be preserved. After adjustment each clamp may be securely fastened in position by a pivoted dog 43 one end of which is provided with a set-screw 44 which may be turned against the under side of the clamp to force the other end against the under side of the slide-way 11. Each clamp consists of a fixed lower jaw 45 and a hinged upper jaw 46. The upper jaw may be made sufficiently heavy to effect its purpose but preferably it is held firmly against the lower jaw by a series of springs 47 whose tension may be regulated by bolts 48. Each end of each clamp is provided with a fixed cam finger 49 above the plane of the upper jaw 46 and extending slightly in front of the same and in line with the corresponding shoe 31 of the proximate plate 28, while the upper jaw has pivoted to an arm 50 and in line with the sliding dog 33 a cam-dog 51 which can swing no farther back than the position indicated by full lines in Fig. 10 but can swing upward and forward into the position indicated in the dotted lines in the same figure.

Midway between the ends of the machine, upon suitable standards 52, is supported the cutter mechanism. As before stated this is arranged so that the folds of the fabric may be cut transversely on their middle line as they are laid without being disturbed. To this end the cutter bed 53, preferably of brass, is placed wholly between the ways 11, 11 and below the plane in which the plates 28 travel. The cutter itself consists of a blade 54 beveled to its edge from each side and secured to a cross-bar 55 which is guided in its movements by vertical ways 56, 56. The actuating means for the cutter are connected to the bar 55 outside of the ways 11, 11, so that the fabric may be laid back and forth between the cutter and its bed without obstruction. Any suitable means may be employed for operating the cutter at such times as it may be desired. I have shown for this purpose two eccentrics 57 mounted upon a shaft 58 and having their straps 59 connected by rods 60 with the ends of the cross-bar 55. Loosely mounted on the shaft 58 is a heavy wheel 61 which may be driven in any convenient manner. A collar 62 is fixed to the shaft at one side of the wheel 61 to prevent lateral displacement. The wheel is adapted to be clutched to the shaft, when desired, to produce a single rotation of the latter. For this purpose a sleeve 63 is fixed to the shaft adjacent to the hub of the wheel 61 and is recessed longitudinally, as at 64, to receive a sliding key 65 and is grooved circumferentially, as at 66, to such a depth as to cut into the recess 64. The hub of the wheel is recessed, as at 67, to receive the end of the key 65 when it is desired to impart the rotation of the wheel to the shaft. The key is pressed toward the recess 67 by a spring actuated plunger or pin 68, but is held from movement by a latch 69 which rests in the groove 66 and engages a notch 65^a in the key. The latch may be held normally in the groove by a spring 70 and may be withdrawn therefrom by a link 71 and treadle 72. The end of the latch is tapered, as shown in Fig. 9, so that when allowed to return to the groove 66, it may operate by its engagement with the notch 65^a as the shaft rotates to withdraw the key and release the wheel from the shaft. In order to check the rotation of the shaft 58 while the knife 54 is in its highest position I affix to the shaft a ring 73 having a shoulder 74. While the shaft is at rest this shoulder is engaged by one arm of a spring-pressed elbow-lever 75. The other arm of said lever underlies the treadle 72 by which the lever is operated to release the shaft. As soon as pressure is removed form the treadle the lever 75 moves into the path of the projection 74 to stop the shaft and at the same time the latch 69 withdraws the key 65 from the recess 67 in the wheel 61 and so releases the wheel from the shaft.

In the operation of the machine the fabric is led over suitable guides 76, 77 and is passed between two guide-rollers, 78, 78, which are placed near the middle of the machine and just above the plane in which the plates 28 reciprocate. The end of the web is then fastened on a line below such path, preferably to the bed-plate 53 of the cutting mechanism. The length of stroke of the frame 12 having been adjusted as desired, by shifting the position of the crank-pin 23^a in the slot 23, and the position of the clamps 38 having been correspondingly adjusted by rotating the screw shafts 40, the machine may be set in motion. The parts being then in the position indicated in Fig. 15 with the frame 12 moving to the left, the web runs over the edge of the right hand plate 28. As the frame approaches the clamp 38 the dog 33 strikes the swinging dog 51 and raises the upper jaw of the clamp to allow the plate which carries the web to insert the fold between the jaws, after which the shoes 31 of the left-hand or foremost plate 28 ride upon the fixed cam fingers 49 and lift the plate above the clamp and out of the way of the rearmost plate 28. At the same time one end of the lever 32 rises and the other is

thereby pressed upon the web-carrying plate forcing the same down into its lowest position so that it may enter properly between the jaws of the clamp. At the instant the fold is carried the proper distance between the jaws the end of the recess 36 reaches the dog 51 and allows the jaw to drop upon the fold of the web with the plate within it. The movement of the frame is now reversed and the plate 28 is withdrawn from the fold which is retained between the jaws of the clamp, the jaws being provided with some suitable frictional material, indicated at *b* in Figs. 4 and 14, while the edge of the plate is made very smooth and tapering. The cam dog 51 yields freely as it is struck by the shoulder of the recess so that the upper jaw of the clamp is not disturbed. The lost motion of the plate 28 upon its pins permits the upper jaw to settle firmly upon the fold of the web before the plate is pulled away while the lost motion of the sliding dog 33 is a simple and effective expedient to secure the opening and closing of the jaws at the proper time. The left-hand plate 28, which now becomes the rearmost, drops to its normal position as it is drawn from the cam fingers 49 and as the frame passes beyond the guide-rolls toward the right it in turn takes up the web and introduces it between the jaws of the right-hand clamp as indicated in Fig. 17. The action is the same in both cases and as the frame returns again to the left the opening of the jaws of the dog 33 releases the fold already formed and allows it to fall upon a bed or table which may be supported between the frames.

It will be observed that the folds all lie at their middle over the bed-plate 53 of the cutting mechanism, so that when a sufficient number of folds have accumulated the cutter may be operated to cut them in the proper manner to form bags without disturbing them and that as the cutter moves with a vertical stroke directly upon the folds they are not disarranged, but lie evenly, as indicated by dotted lines in Fig. 4.

It will be understood that various features of the construction shown in the drawings and described above may be modified in many ways without departing from the spirit of my invention. Accordingly I do not intend to limit myself to the exact details shown.

I claim as my invention—

1. In a cloth-folding and cutting machine, the combination with a cutter having a vertical stroke and its bed and supports for said cutter, of ways within said supports, a cloth-folding frame, and means to reciprocate said frame on said ways between the cutter and its bed, substantially as shown and described.

2. In a cloth-folding machine, the combination of a reciprocating, cloth-folding frame, means to vary the length of the reciprocations of said frame, clamps to co-operate with said frame and hold the folds, means to cause each clamp to release the previous fold as a new one is presented, and means to adjust the positions of said clamps, substantially as shown and described.

3. In a cloth-folding machine, the combination with a cloth-folding frame and means to reciprocate said frame, of a stationary clamp to receive and hold the fold, and means to open said clamp to release a previous fold as the frame approaches, substantially as shown and described.

4. In a cloth-folding machine, the combination with stationary clamps adapted to receive and hold the folds of cloth, of a cloth-folding frame and means to reciprocate it between said clamps, said frame consisting of end pieces and two plates loosely connected to said end pieces and normally in the plane of the said clamps, and means to elevate the foremost plate above the clamp as the frame approaches the same, substantially as shown and described.

5. In a cloth-folding machine, the combination with stationary clamps adapted to receive and hold the folds of cloth and cam fingers supported above said clamps, of a cloth-folding frame and means to reciprocate it between said clamps, said frame consisting of end pieces, two plates loosely connected to said end pieces and normally in the plane of said clamp, and upwardly inclined shoes to co-operate with said cam fingers and elevate the foremost plate as the frame approaches the clamp, substantially as shown and described.

6. In a cloth-folding machine, the combination with stationary clamps adapted to receive and hold the folds of cloth, of a cloth-folding frame and means to reciprocate it between said clamps, said frame consisting of end pieces and two plates loosely connected to said end pieces and normally in the plane of said clamps, means to elevate the foremost plate as the frame approaches the clamps, and levers supported by the end pieces with their ends overlying the plates, whereby as one plate is elevated the other is pressed down, substantially as shown and described.

7. In a cloth-folding machine, the combination with a cloth-folding frame and means to reciprocate it, of a clamp to co-operate with said frame and having a movable jaw, a cam-dog connected to said jaw, and a dog carried with said frame and adapted to co-operate with said cam dog to open the clamp and having a recess to receive said cam dog and allow the clamp to close, substantially as shown and described.

8. In a cloth-folding machine, the combination with a cloth-folding frame and means to reciprocate it, of a clamp to co-operate with said frame and having a movable jaw, a pivoted cam dog carried by said jaw, a dog carried with said frame and adapted to co-operate with said cam dog to open said clamp and having a recess to receive said cam dog and allow the clamp to close, substantially as shown and described.

9. In a cloth-folding machine, the combination with a cloth-folding frame, of means to

reciprocate the same, the said means consisting of a crank, a link or pitman, a rack, a pinion and shaft driven by said rack, sprocket-wheels on said shaft, chains driven by said wheels and connected to said frame, and carrying wheels for said chains, substantially as shown and described.

10. In a cloth-folding machine, the combination with a cutter having a vertical stroke upon its bed and a cloth-folding frame reciprocating over the bed of the cutter, of means to reciprocate said frame, said means consisting of a crank, a link or pitman, a rack, a pinion and shaft driven by said rack, sprocket-wheels on said shaft, chains driven by said wheels and connected to said frame, and carrying wheels for said chains, substantially as shown and described.

11. In a cloth-folding machine, the combination with a reciprocating cloth-folding frame and stationary clamps to receive and hold each successive fold until a new one is presented, of means to reciprocate said frame, said means consisting of a crank, a link or pitman, a rack, a pinion and shaft driven by said rack, sprocket-wheels on said shaft, chains driven by said wheels and connected to said frame, and carrying wheels for said chains, substantially as shown and described.

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

ROSWELL T. SMITH.

Witnesses:

C. L. LOVELAND,

J. C. WHEELER.