

(No Model.)

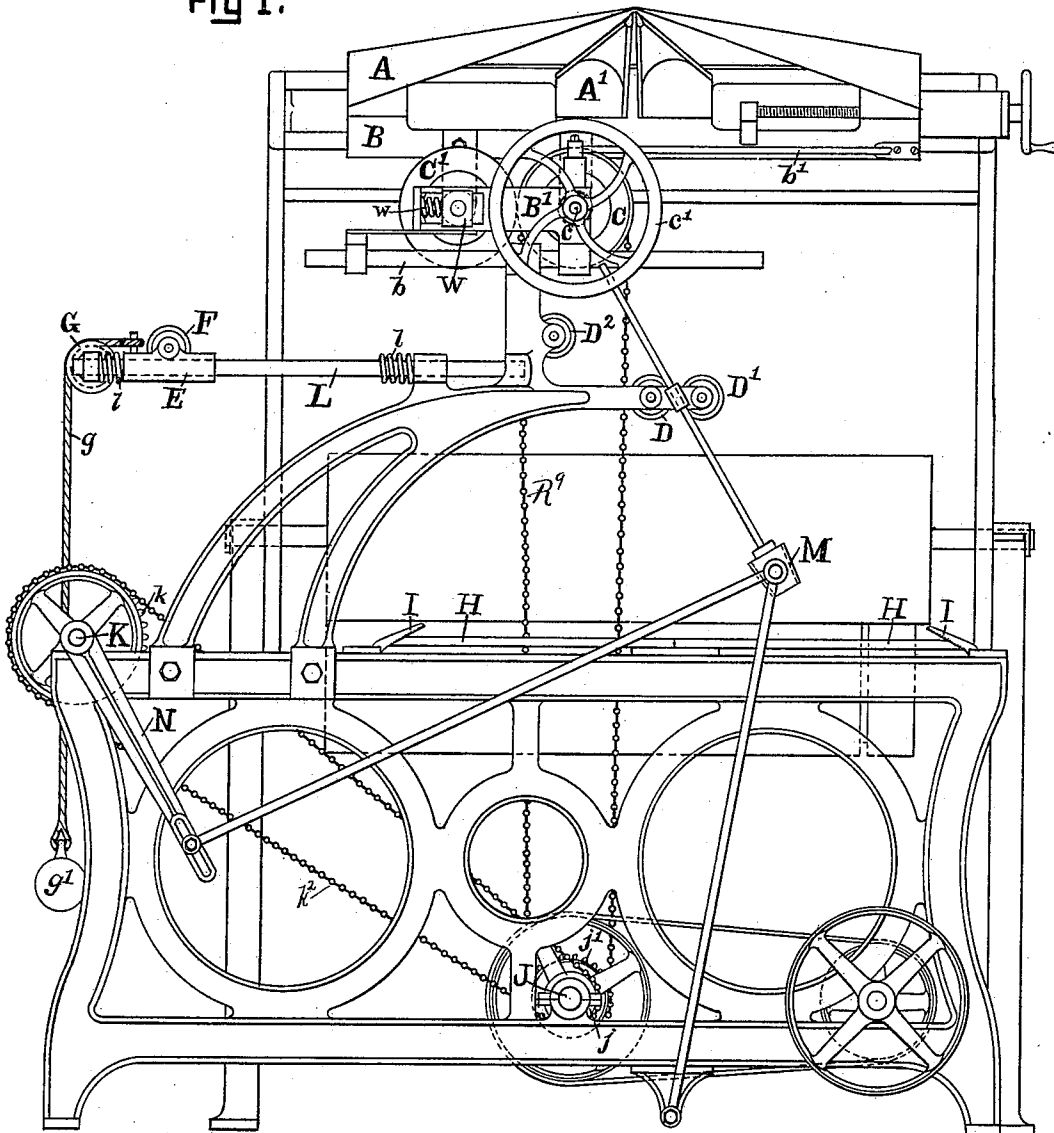
3 Sheets—Sheet 1.

A. H. SUTTON.
CLOTH FOLDING MACHINE.

No. 466,024.

Patented Dec. 29, 1891.

Fig 1.



WITNESSES.

Frank. Miller.

Albert H. Bates.

INVENTOR.

Andrew H. Sutton
By his attorneys
Watson & Thurston

(No Model.)

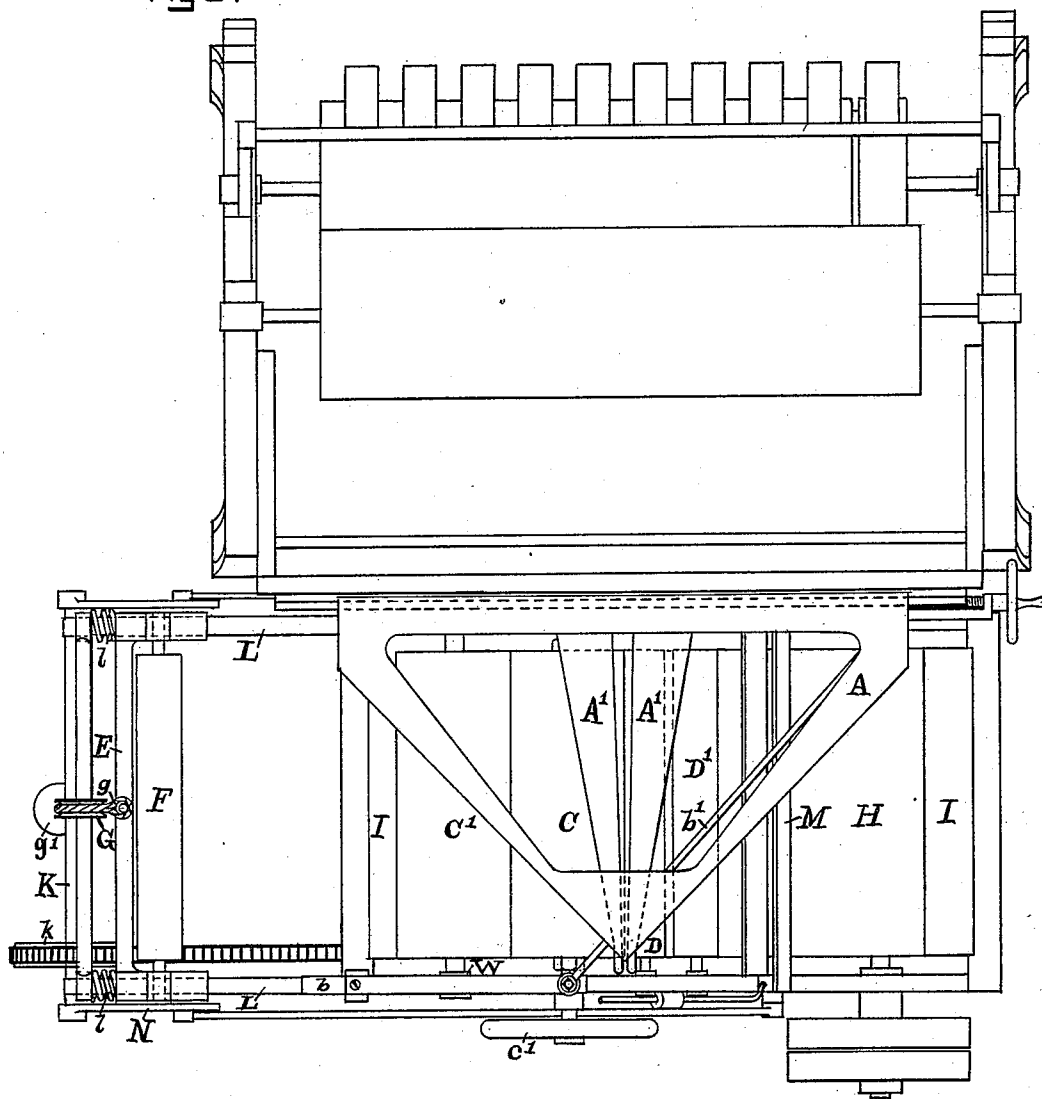
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A. H. SUTTON.
CLOTH FOLDING MACHINE.

No. 466,024.

Patented Dec. 29, 1891.

Fig 2.



WITNESSES.

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(No Model.)

3 Sheets—Sheet 3.

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Fig 4.

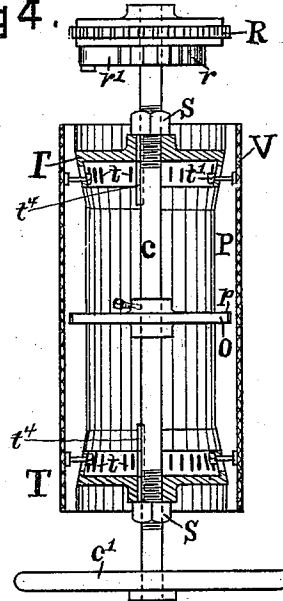
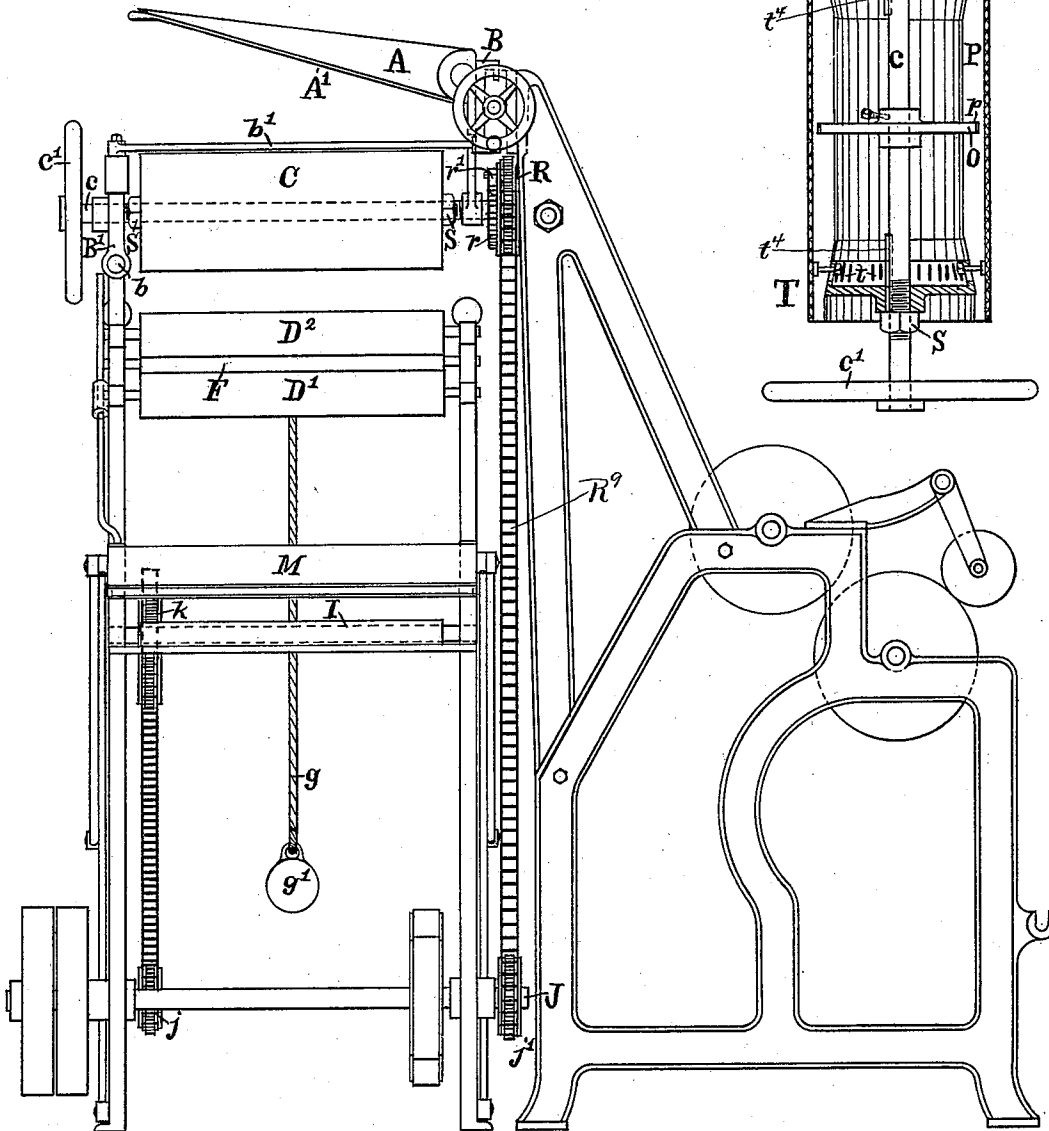


Fig 3.



WITNESSES.

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INVENTOR.

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UNITED STATES PATENT OFFICE.

ANDREW H. SUTTON, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO
EDWARD P. WATSON, OF SAME PLACE.

CLOTH-FOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 466,024, dated December 29, 1891.

Application filed May 28, 1890. Renewed November 23, 1891. Serial No. 412,717. (No model.)

To all whom it may concern:

Be it known that I, ANDREW H. SUTTON, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Cloth-Folding Machines, of which the following is such a full, clear, and exact description as will enable others skilled in the art to which it appertains to make and use the same.

There are many fabrics which for years have been packaged for market by first folding the web longitudinally, commonly called "plicating" it, and then laying the plicated fabric in folds of equal length, usually of one yard. Such packages are easy to handle, and the length of the fabric therein contained is easily calculated. For these reasons, and for the additional reason that the trade is familiar with this style of package, it is probable that these goods packaged in any other manner would be unsalable.

Various machines of more or less practical value have been devised for folding cloths. Some of these machines plicate—that is, fold lengthwise—the entire web, and in these machines, after it is plicated, it is commonly wound upon a roll or board. Other machines have been devised whereby the cloth is drawn from a roll or pile and laid in folds of equal length, as above described. I am also aware of the British Patent No. 4,578 of 1889, granted to J. H. Riley, which shows a machine with which the fabric may be plicated and then laid in folds of equal length, as above described.

My invention relates to the class of machines shown in said British patent—that is to say, machines in which the cloth is plicated lengthwise of the web and then laid in folds of substantially equal lengths without any intermediate handling.

My invention consists in the combinations, sub-combinations, and details of construction, which are hereinafter described, and definitely pointed out in the claims.

Referring to the drawings, which show a machine in which the invention herein described is practically embodied, Figure 1 is an end elevation of that end of the combined machine at which the folding mechanism is located. Fig. 2 is a top plan view thereof.

Fig. 3 is a side elevation thereof; and Fig. 4 is a central longitudinal sectional view of an expansion-roll, which is one of the pair of rolls whereby the fabric is drawn through the plicating part of the device and fed to the folding part of the device.

The plicating part of the machine (shown in the drawings) is substantially such a device as is shown in Letters Patent No. 359,584, granted March 15, 1887, to R. R. Watson, executrix of P. H. Watson, deceased. The folding part of the machine is of the general character of the device shown in the Letters Patent No. 13,543, granted September 11, 1855, to J. T. Elliot, and Letters Patent No. 32,761, granted July 9, 1861, to J. T. Elliot; or, more exactly, it is substantially what is known as "the Elliot cloth-folding machine," which involves the invention of the Letters Patent above named and numerous improvements subsequently made.

I will now proceed to describe in detail the combined machine, as shown in the drawings, and in particular those additions to and modifications of the devices above named, whereby they are adapted to operate successively upon the same web, without intermediate handling, to the end of producing a package of the character above described. Referring for this purpose to the parts by letters, A represents the triangular plicating-frame, and A' the guiding-fingers, both of which are attached to and project from a transversely-movable carriage B, substantially as and for the purpose set forth in the prior patent, No. 359,584, above referred to.

C C' represent rolls parallel to each other and journaled at one end in the carriage B, and arranged so close together that a fabric introduced between them will be drawn through the plicating-machine as said rolls, or one of them, is revolved. The other end of each of said rolls is journaled in a movable carriage B', mounted upon a suitable rod or guideway b, along which said carriage is movable. A brace b', extending from said carriage B' to the carriage B, preserves the two movable carriages in the same relative position, whereby the rolls are always parallel and are adapted to revolve freely in their bearings in said carriages.

The folding device is arranged below the rolls C C' in such a position that the fabric may be laid upon its table after passing through said rolls without being turned transversely from its course. Between the folding device and the rolls C C' are arranged a shunt-roll D² and two shunt-rolls D D', supported in suitable bearings in the frame and arranged parallel to each other and to the rolls C C'. Intermediate the shunt-roll D² and the two shunt-rolls D D', above mentioned, is a tension-carriage E, mounted upon suitable guide-rods L and slidable, as occasion may require, upon said guide-rods. Upon this tension-carriage a roller F is mounted, which roller is and always remains during the movement of the carriage parallel to the shunt-rolls. Attached to this tension-carriage is a cord or rope g, which passes over a sheave G and has a suitable weight g' attached to its depending end, whereby a constant and continuous force is applied to the tension-carriage, tending to draw it as far as may be.

It is believed that it is unnecessary to describe in detail the cloth-folding mechanism shown in the drawings, because it is, in the form shown, well known, and has been on the market for years.

Among the essential characteristics of the machine I believe to be the table H H and the clamps I I, one at each end of said table. Either the clamps or the ends of the table must be movable under a proper application of force, so that the folded ends of the fabric may be forced between them, and the movable element must be provided with means (springs or weights or other equivalents) whereby a continuous force is exerted, tending to force each of said clamps and the end of the table to which it is adjacent together.

The machine must also be provided with a reciprocating slotted bar M, through the slot of which the fabric is threaded, whereby said fabric is drawn first toward one end of the table and then toward the other, and at each end forced between the end of the table and its adjacent clamp, where it is held.

In the frame of the cloth-folding machine is mounted a transverse shaft J, to which the power for driving the combined mechanism is applied in any suitable manner. A sprocket-wheel j, secured to this shaft, and a sprocket-wheel k, secured to the shaft K, (also mounted on the frame of the machine,) are connected by a drive-chain K², whereby the crank-arm N is revolved, thereby imparting to the slotted bar M its reciprocating motion, as above set forth. On that end of the shaft J which is adjacent to the plicating mechanism is secured another sprocket-wheel j', and upon the shaft c of the roller C is mounted a sprocket-wheel R, which is connected with the sprocket-wheel j' by means of a drive-chain R², whereby the roll C is revolved for the purpose of drawing the cloth through the plicating mechanism and feeding it at the proper

rate to the folding mechanism. The sprocket-wheel R is mounted loosely on the shaft c, and a ratchet-wheel r is fixed to said shaft adjacent to said sprocket-wheel. A pawl r' is secured to the sprocket-wheel and adapted to engage with the ratchet-wheel, whereby the shaft c and its roller are revolved by the revolution of the sprocket-wheel. On the outside end of the shaft c is a hand-wheel c', whereby the roller C may be revolved for the purpose of threading the machine independently of the other mechanism when the pawl r' is not in engagement with the ratchet-wheel r.

In operation the cloth passes over the plicating-frame A, through the guiding-fingers A', under the roll C, and over the roll C', (thereby passing between the rolls,) around the shunt-roll D², around the roll F on the tension-carriage, between the shunt-rolls D D', and through the slot in the reciprocating slotted bar M. It is essential to the successful operation of the combined mechanism described that the cloth shall be drawn through the plicating mechanism and fed to the folding mechanism at such a rate that there shall be neither too much nor too little cloth for the folding mechanism to operate upon. Therefore the size of the rolls C and the rapidity with which they are revolved must be carefully regulated with respect to the speed at which the cloth-folding mechanism operates, and this is done roughly by the proper proportioning of the sprocket-wheels above mentioned.

In order that the machine shall be adapted to operate upon cloths of different thicknesses, a more accurate adjustment is required. For the purpose of securing this finer adjustment the roll C is made expansible and is constructed as follows: On its shaft are two cone-shaped frames T T, which are connected therewith by splines t'. These cones are moved toward each other by nuts S S. The cones are provided with slots t, and through each of these slots passes a pin t', which pins are secured to strips of wood P, lying parallel to the shaft. Each of these strips near its center is provided with a transverse slot p, and a disk O, secured to the shaft c, engages in said slots. When it is desired to increase the diameter of the roll C, the nuts S are screwed toward each other, thereby moving the cones T nearer together and moving the various strips outward and away from the shaft. The disk O, by its engagement with the slots p, holds the strip in a suitable position to secure an even adjustment. A rubber sleeve V surrounds the strips and thus provides a smooth and substantial cylindrical surface, whatever be the diameter, within reasonable limits of the roll. The shaft of the roll C' is journaled in boxes W, which are slidable in suitable guides toward and from the roll C. Springs w w are provided and suitably arranged for exerting a constant pressure against said boxes, tending to move them toward the roll C, whereby the fabric,

whatever be its thickness, will be held against the roll C, and thereby drawn through the plicating mechanism.

Upon the rods L L, and preferably at both ends thereof, are arranged the springs *l l*, against which the tension-carriage F may strike as it is drawn backward and forward upon the said guide-rods L. These springs serve as buffers to decrease the jar and wear and tear of the machinery.

Assuming the adjustment to have been properly made, and that the fabric has been threaded into the machine when the pawl *r*' and ratchet-wheel *r* are disconnected, the parts operate together as follows: The fabric is drawn through the plicating-machine by the revolution of the roller C. From this point it is drawn by the operation of the reciprocating slotted bar M. During most of the travel of this bar the cloth is drawn taut; but during a part of its travel it loosens its tension upon the cloth, and this looseness or slack is taken up through the operation of the tension-carriage by its attached weight.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the plicating-frame A, the guide-fingers A' A', a driven expansion-roll C, a loosely-mounted roll C', and means for pressing one of said rolls toward the other,

with a tension-carriage, guides for the same, a roll mounted on said tension-carriage, means for actuating the tension-carriage, and a table having end clamps, a reciprocating slotted bar, and shunt-rolls adapted to guide the cloth, substantially as and for the purposes specified.

2. The combination of the plicating-frame A, the guide-fingers A' A', a driven roll C, means for varying the diameter of said roll, a roll C', slidable boxes in which said roll C' is journaled, and springs thrusting said boxes toward the roll C, with a tension-carriage, a roll mounted thereon, means for actuating said tension-carriage, a table having end clamps, a reciprocating slotted bar, and shunt-rolls adapted to guide the cloth, substantially as and for the purpose specified.

3. The herein-described feeding-roll, consisting of a shaft *c*, the slotted cones T T, a disk O, the strips *p*, nuts S S, and an elastic sleeve, substantially as and for the purpose specified.

4. The combination of the guide-rods L L, the tension-carriage mounted thereon, mechanism for actuating the tension-carriage, and the buffer-springs *l l*, substantially as and for the purpose specified.

ANDREW H. SUTTON.

Witnesses:

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REGINALD YOUNG.