

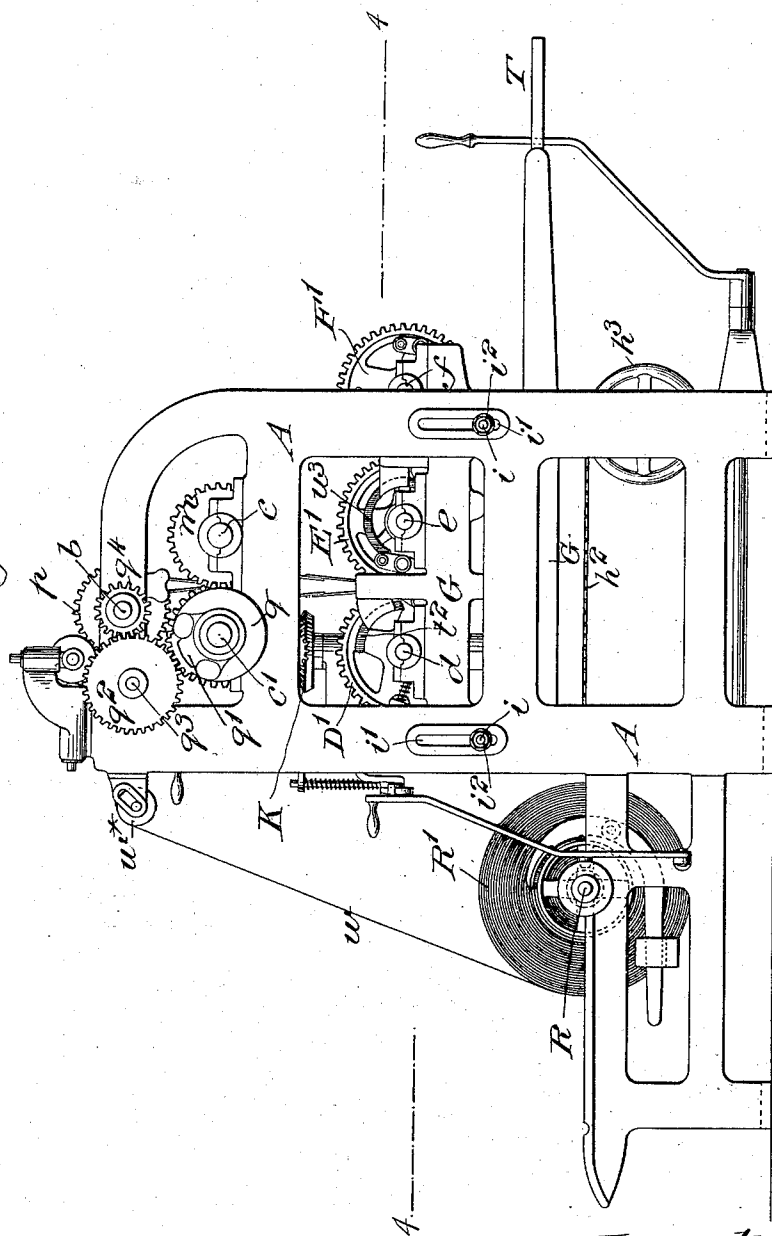
E. H. COTTRELL.
MACHINERY FOR CUTTING AND FOLDING FABRICS.

APPLICATION FILED OCT. 4, 1901.

NO MODEL.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
George Bang Jr
Henry Thome.

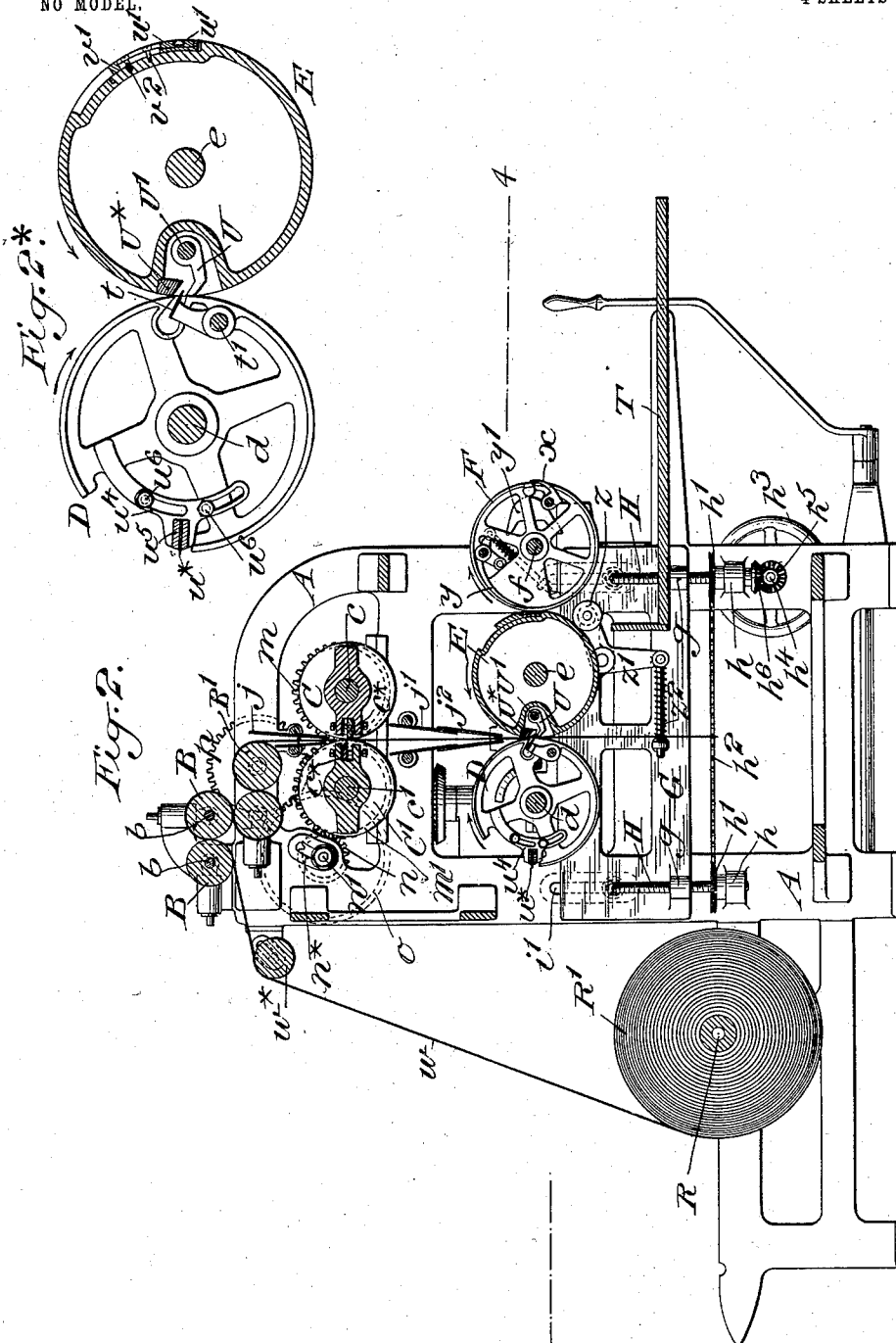
Inventor:
Edgar H. Cottrell
by attorney
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MACHINERY FOR CUTTING AND FOLDING FABRICS.

APPLICATION FILED OCT. 4, 1901.

4 SHEETS—SHEET 2.

NO MODEL.



Witnesses:
 George Barry Jr.
 Henry Thorne.

Inventor:
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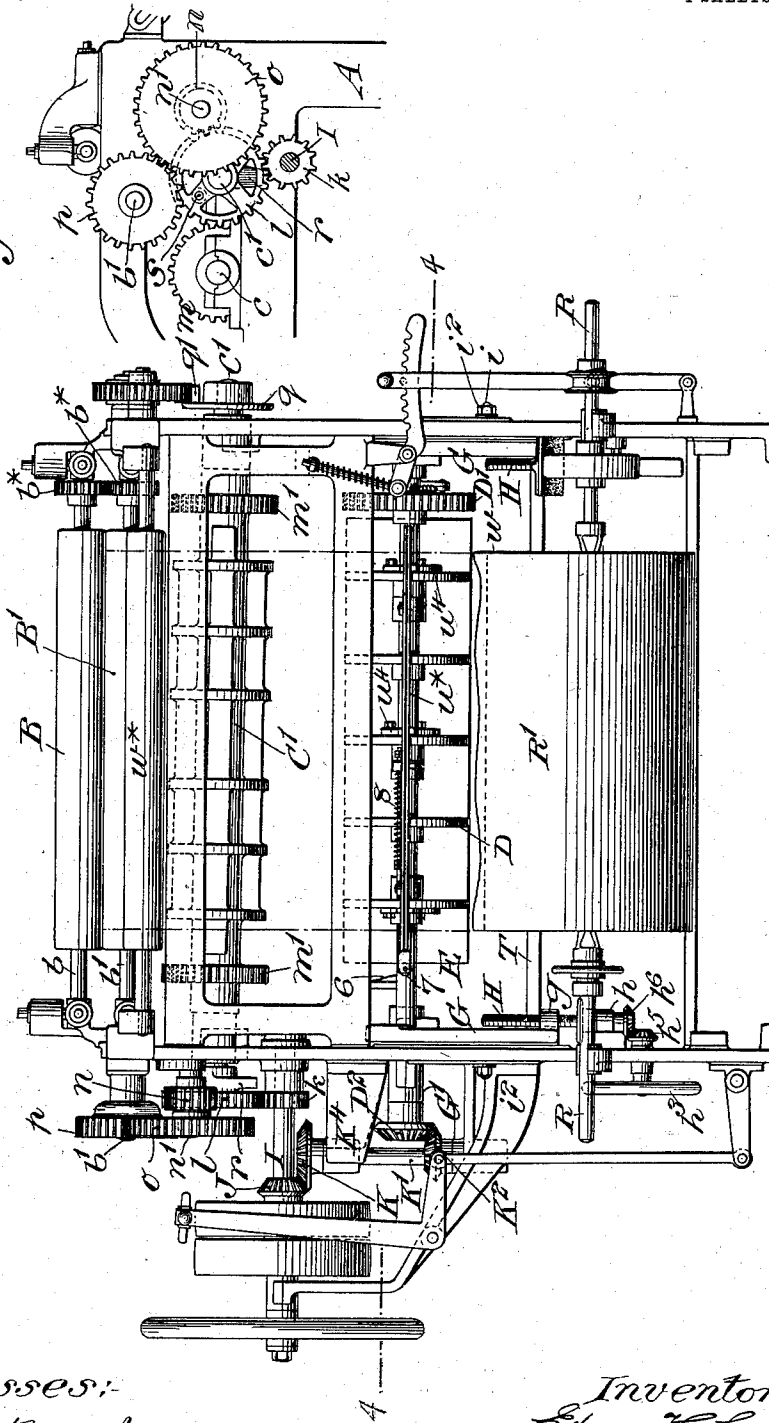
APPLICATION FILED OCT. 4, 1901.

NO MODEL.

4 SHEETS—SHEET 3.

Fig. 3.*

Fig. 3.



Witnesses:
George Barry Jr.
Henry Thome

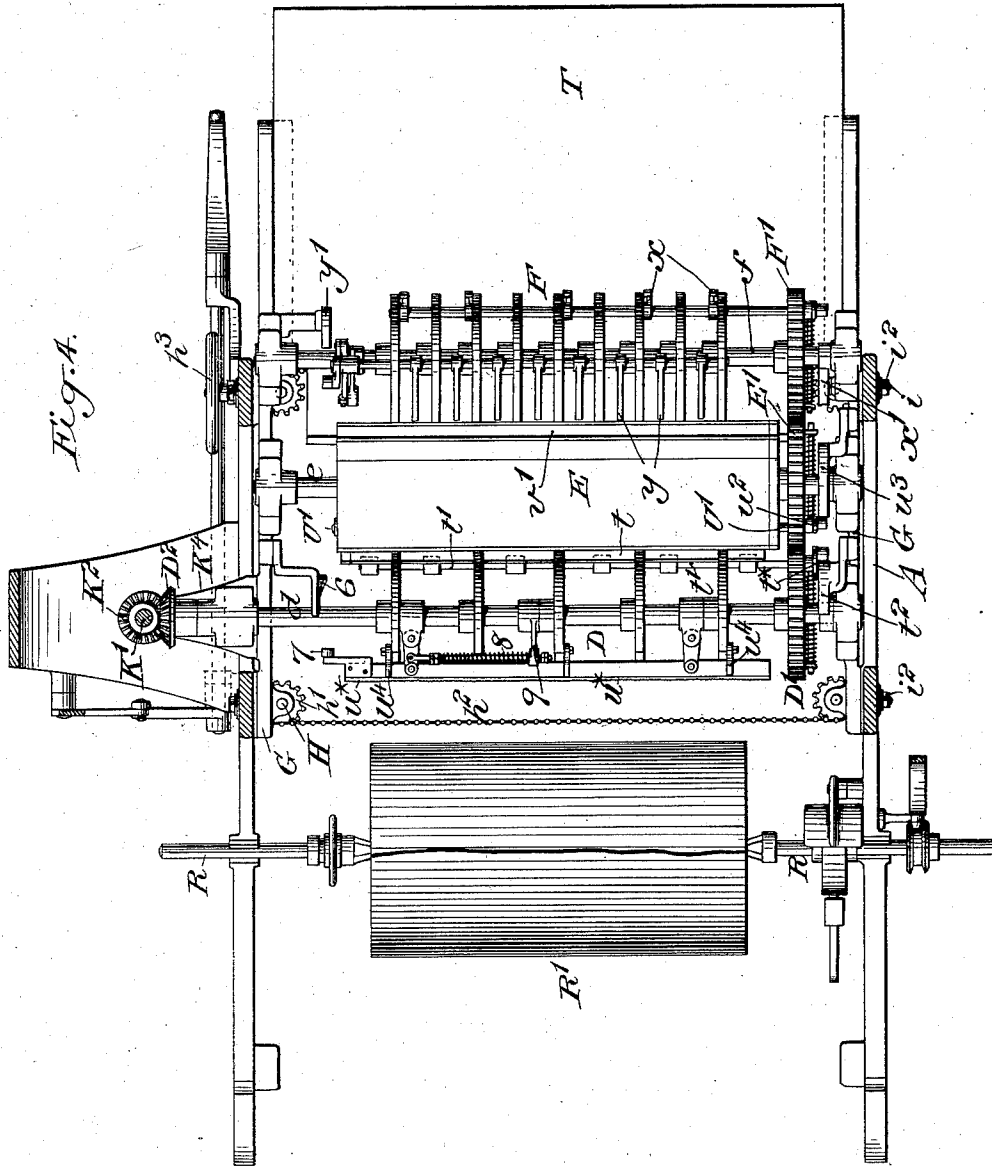
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MACHINERY FOR CUTTING AND FOLDING FABRICS.

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NO MODEL.

4 SHEETS—SHEET 4.



Witnesses:
 George Barry Jr.
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UNITED STATES PATENT OFFICE.

EDGAR H. COTTRELL, OF STONINGTON, CONNECTICUT, ASSIGNOR TO C. B. COTTRELL & SONS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

MACHINERY FOR CUTTING AND FOLDING FABRICS.

SPECIFICATION forming part of Letters Patent No. 743,061, dated November 3, 1903.

Application filed October 4, 1901. Serial No. 77,577. (No model.)

To all whom it may concern:

Be it known that I, EDGAR H. COTTRELL, a citizen of the United States, and a resident of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Machinery for Cutting and Folding Fabrics, of which the following is a specification.

This invention relates more particularly to machines for cutting sheets from a web of cloth or paper and once folding each so cut sheet suitably for the manufacture of a bag.

The present improvement has for its object a convenient provision for adapting such a machine to the cutting of sheets of various lengths for bags of different sizes and the folding of the so cut sheets at the proper part of their length, according to the requirement of the capacity of the bags to be produced; and with this object in view the improvement consists in the several features hereinafter described and claimed, whereby the said object is attained and the efficiency of the machine is increased.

The invention is embodied in the machine illustrated by the accompanying drawings, in which—

Figure 1 is a side elevation of the machine; Fig. 2, a vertical section of the same parallel with the sides thereof. Fig. 2* represents a transverse section corresponding with Fig. 2, but on a larger scale, of the tucking-reel and folding-cylinder; Fig. 3, a rear elevation of that end of the machine which is at the left in Fig. 1; Fig. 3*, a side view of the principal train of gearing of the machine, which is arranged on that side of the machine which is to the left in Fig. 3; Fig. 4, a horizontal section of the machine, taken approximately on the line 4 4 of Figs. 1, 2, and 3.

A is the stationary framing of the machine, in the upper part of which are stationary bearings for the shafts $b b'$ of feeding-rollers $B B'$ and the shafts $c c'$ of the cutter-reels $C C'$. On the lower part of this framing are the stationary bearings for the spindles R of a roll R' from which the web w to be cut is supplied, the said web passing over a guide-roll w^* to the rollers $B B'$. Below the cutter-reels $C C'$ the shaft d of a tucking-reel D , the shaft

e of a folding-cylinder E , and the shaft f of a delivery-reel F are all arranged in bearings on a carriage G . This carriage is fitted to slide vertically within the framing A and is adjustable upward and downward therein toward and from the cutter-reels by means of four upright screws H , which are fitted to turn without moving longitudinally in bearings in brackets h , affixed to the framing A , and the threads of which work in nuts g , affixed to said carriage. The said screws H are severally furnished with sprocket-wheels h^1 , which receive an endless chain h^2 , so that all may be caused to turn together uniformly by means of a hand-wheel h^3 on a short shaft h^4 , which turns in a bearing on the framing A and which carries a bevel-gear h^5 , gearing with a bevel-gear h^6 on one of said screws. For the purpose of securing this adjustment according to the size of the cut sheets to be folded and the distance from the cutters at which the fold is to be made the carriage G has projecting from each side of it two screw-threaded studs i , which project through slots i^1 in the sides of the framing A and are fitted with clamping-nuts i^2 outside of the framing A . The said carriage also carries the delivery-table T , which is at the opposite end of the machine to the roll R' . Between the feed-rollers $B B'$ and the cutter-reels $C C'$ there is a fixed upright guide-trunk j for guiding the web w to the cutters $c^* c^*$ of the reels $C C'$, and between the cutter-reels and the tucking-reel D and folding-cylinder E there is arranged another upright guide-trunk $j^1 j^2$ for guiding the web to the said reel and cylinder. This guide-trunk $j^1 j^2$ is made of two lengths, of which the upper one, j^1 , is fixedly attached to the framing A and the lower one, j^2 , is carried by the adjustable carriage, so that it will always be adjusted with said carriage to keep its exit always at the same distance from and as near as possible to the tucking-reel and folding-cylinder.

The several rollers $B B'$, reels $C C' D F$, and cylinder E all derive their necessary rotary motion from a driving-shaft L . (See Figs. 3 and 3*.) On this shaft L is a spur-gear k , which gears with a spur-gear l on the shaft c' of the cutter-reel C' for the purpose of driv-

ing the cutter-reels, the two shafts of which are geared together by gears m and m' . The said gear l also gears with a pinion n , which turns loosely on a stud n' , secured on the framing A and which carries a spur-wheel o , which gears with a spur-wheel p on the shaft b' of one of the feed-rollers B'. The other feed-roller B' and those B are driven by gearing $b^* b^*$ from the said shaft b' . The amount of material cut by the web by each operation of the cutters $c^* c^*$ is regulated by the relative speeds of the feed-rollers and the cutter-reels. If it be desired to cut a longer or shorter sheet for a larger or smaller bag, the gear o is replaced by a larger or smaller gear, and the stud n' is adjusted downward or upward in the slot n^* , provided for it in the framing A, so that while the pinion n is always in gear with l the larger gear attached to it will gear with p on the first feed-roller. By having a set of gears of proper different sizes sheets of any desired length may be cut from the web. The cutter-reels and their cutters may be of any suitable kind; but I prefer to use those which are the subject of United States Letters Patent of C. B. Cottrell, No. 391,949.

At the time of the cutting of the web it is necessary that the movement of the cutters shall be at the same speed as that of the web; but as the speed of the web relatively to that of the driving-shaft is varied by the changes of the gear o , as before described, and the gearing between the driving-shaft and the cutter-shafts is such that the latter always make the same number of revolutions relatively to the former I make the driving-gear l loose on the cutter-shaft c' and provide for the driving of the said shaft by said gear an arm r , (see Figs. 3 and 3*,) which is fixed on the said shaft, and a stud or lateral projection s on said gear, which runs behind said stud. This permits the shaft and cutter-reels to receive when rendered necessary for the cutting of longer sheets a sufficiently accelerated movement relatively to and independent of the gear at the time of the operation of the cutters. For the purpose of this accelerated movement there is provided on the shaft c' a disk q , carrying a toothed sector q' , (see Figs. 1 and 3,) which properly arranged relatively to the cutters engages with and receives motion during the operation of the cutters from a gear q^2 , turning on a fixed stud q^3 on the framing, the said gear q^2 deriving motion from a gear q^4 on the shaft b of one of the feed-rollers B. The said gears $q^2 q^4$ and the pitch radius of the sector are so properly proportioned that the said sector receiving motion from the gear q^2 causes the cutters to be driven at the same speed as the web. After the cutting operation the sector q' having passed out of engagement with the gear q^2 leaves the arm r on the cutter-shaft free to be overtaken by the stud s on the gear l , and the cutter-reels are again driven by the said gear until the

time for the next cutting operation, when the accelerated driving by the gear q^2 and sector q' again takes place. The accelerating devices above described are the subject of United States Letters Patent of C. B. Cottrell, No. 431,201, and are only here described to show their connection with the present invention.

The tucking-reel D, the folding-cylinder E, and the delivery-reel F are all geared together to rotate at the same speed by spur-gears D' E' F', and for the purpose of driving them there is provided on the driving-shaft I a bevel-gear J, which gears with a bevel-gear K on an upright shaft K', on which there is also another bevel-gear K². The gear K receives motion from the bevel-gear J, and K² gives motion to a bevel-gear D² on the shaft of the tucking-reel. The said shaft K' has its upper bearing in a stationary bracket K⁴ on the framing A. The bevel-gear K² has its hub fitted to turn in, but is confined vertically to, a bracket G' on the said carriage G, and the shaft K' is so fitted to the said gear K² with a spline and groove that the said gear will remain engaged with said shaft, while the said gears K² and D² remain engaged as they move up and down with the carriage and the reels and cylinders D F E.

It will be observed that by the mounting of the tucking and folding and delivery devices and the delivery-table all on one carriage, which is adjustable toward and from the cutters, as hereinafter described, the adjustment of the said devices and table for the cutting of sheets of various lengths is effected without disturbing the cooperative relation between said devices and table, while the system of gearing above described the provision for the driving of the said several devices adjusts itself automatically as the devices themselves are adjusted.

The tucking-reel D is fitted, as best shown in Fig. 2*, with a tucking-blade t , which swings on a spindle t' , which runs lengthwise through the reel and operates to tuck the paper or cloth between the grippers U U* of the folding-cylinder E, and thus commence the folding operation. The gripper U is fixed in the cylinder lengthwise thereof, and the grippers U*, which have a swinging movement, are carried by a spindle U', which runs lengthwise through the cylinder. The tucking-blade t is operated in the rotation of its reel D by means of an arm t^* on one end of its spindle running against a stationary cam t^2 , attached to the framing A. The folding-grippers U are operated in the rotation of their cylinder E by means of an arm u^2 on one end of their spindle U', which runs against a cam u^3 , stationary on the framing A. Under the folding-cylinder there is arranged a pressing-roller z , (see Fig. 2,) carried by elbow-levers z' , pivoted to the sides of the carriage. To one of these levers there is applied a spring z^2 for the purpose of keeping the roller z pressed up toward the cylin-

der and confining the folded sheets thereto as they pass toward the delivery-reel. The tucking-reel D is fitted with a longitudinally-reciprocating blade u^* , preferably serrated, which runs through its whole length in guides in hangers u^4 , affixed to certain of the disks of the reel, and the folding-cylinder has affixed to it two blades w , preferably serrated, between which in the rotation of the reel and the cylinder the blade u^* operates with a shear-like action to complete the severance of the web, which may have been only, especially in the case of cloth, imperfectly effected by the rotary cutters $c^* c^*$. The reciprocating movement of the blade u^* in one direction is produced by a stationary cam 6 on one side of the framing, against which runs a roller 7, attached to one end of said blade, the said movement in the other direction being produced by a coil-spring 8, which connects the said blade with an arm 9 on the shaft d .

The tucking-reel and folding-cylinder, with their grippers and blades above described, are all like those employed in other cutting and folding machines except that for the purpose of adapting them to the cutting of sheets of varying lengths the blades u^* and w are made adjustable at different distances from the tucking-blade and folding-grippers. This adjustment of the blade u^* is provided for by making the hangers u^4 , which carry the blade-holder u^5 , adjustable on the leaves or disks of the reel in the direction of arcs of circles concentric with the shaft d , arc-formed slots being provided in said hangers for the passage of the screw-bolts u^6 , which clamp the hangers to said disks or leaves. The corresponding adjustment of the blades w is provided for by securing said blades to or in an arc-formed plate v' , which is received upon a recessed part of the cylinder and is adjustable circumferentially thereon. The said plate v' is clamped to the cylinder by screws v^2 , which are screwed thereinto and pass through slots in the said plate, the heads of the said screws being countersunk into said slots, so as to be flush with the face of the cylinder.

The delivery-reel F is of a well-known kind, having grippers x for taking the folded sheets from the cylinder E and delivery-grippers y for throwing off the sheets from said reel onto the table T. These grippers are operated, respectively, as the reel rotates by means of stationary cams x' and y' on the framing.

What I claim as my invention is—

1. In a cutting and folding machine, the combination with a cutting device, of rotary folding devices and delivery devices and a delivery-table all adjustable together in cooperative relation with each other toward and

from said cutting device, substantially as and for the purpose herein described.

2. In a cutting and folding machine, the combination with a cutting device, of a carriage located under said cutting device and adjustable to and from it, folding devices and a delivery-reel and delivery-table all on said carriage, and means for adjusting said carriage toward and from the cutting device, substantially as herein described.

3. The combination with a tucking-reel and folding-cylinder and their respective cooperating tucking-blade and folding-grippers, of two cooperative cutting-blades one on said reel and the other on said cylinder and the two adjustable circumferentially, on said reel and cylinder respectively, at different distances from the tucking-blade and folding-grippers, substantially as and for the purpose herein described.

4. The combination with a tucking-reel and folding-cylinder and their respective cooperating tucking-blades and folding-grippers, of two cooperative cutting-blades one on said reel and the other on said cylinder and means for producing a longitudinal reciprocating movement of one of said cutting-blades in a direction lengthwise of the reel and cylinder, substantially as herein described.

5. The combination with a tucking-reel and folding-cylinder and their respective cooperating tucking-blades and folding-grippers, of two cooperative revolving cutting-blades one revolving with said reel and the other with said cylinder, a spring applied to one of said cutting-blades for drawing it lengthwise in one direction parallel with the length of the reel and cylinder and a stationary cam for producing the movement of said blade in the opposite direction by its own revolution, substantially as herein described.

6. In a cutting and folding machine, the combination with a cutting device, of a tucking-reel furnished with a tucking-blade and a folding-cylinder furnished with folding-grippers, said reel and cylinders being adjustable together at different distances from the cutting device, and cooperating cutters on said reel and cylinder adjustable toward and from the said tucking-blade and folding-grippers respectively according to the distance of said reel and cylinder from said cutting device, substantially as herein described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 2d day of October, 1901.

EDGAR H. COTTRELL.

Witnesses:

EDGAR A. TREDWELL,
J. W. DICKINSON.