

E. L. COLLON.

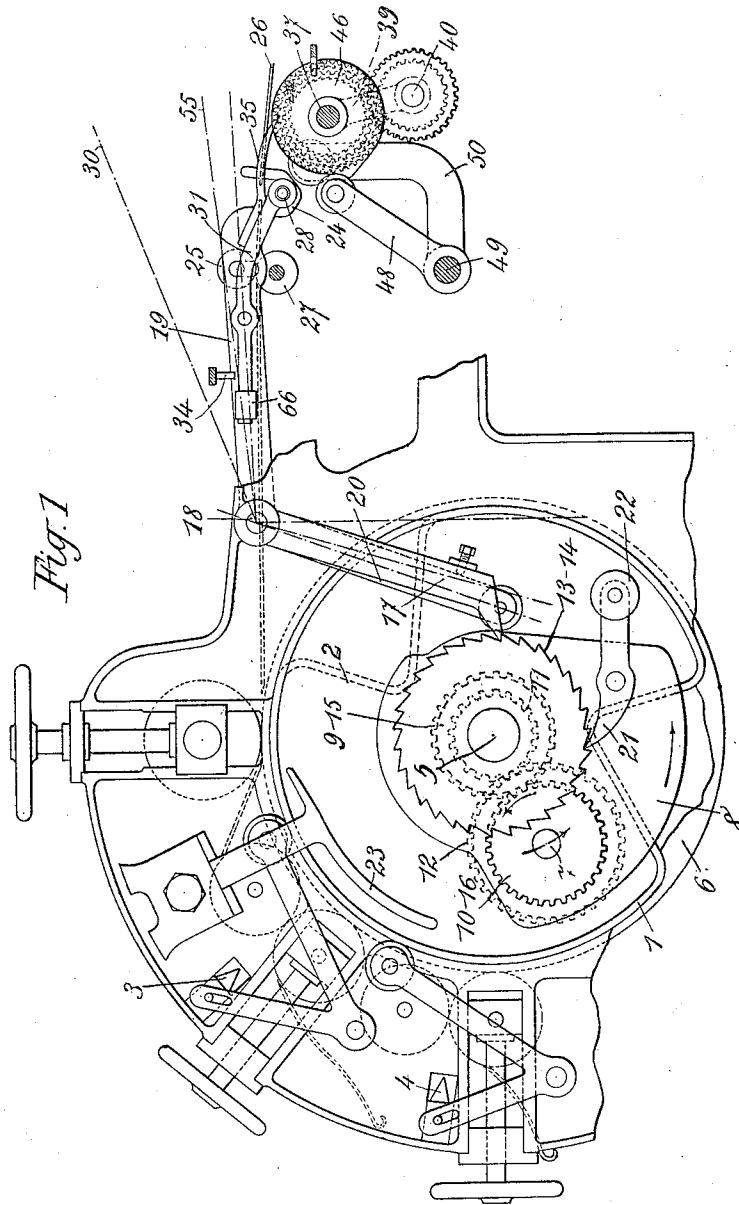
MACHINE FOR FOLDING LINEN, CLOTH, AND OTHER MATERIALS.

APPLICATION FILED NOV. 21, 1910.

Patented July 9, 1912.

3 SHEETS—SHEET 1.

1,031,915.



Witnesses,
B. Rommers
M. H. Darg

Inventor,
Eugene Louis Collon,
By *Henry Orth* Att'y.

Fig. 2

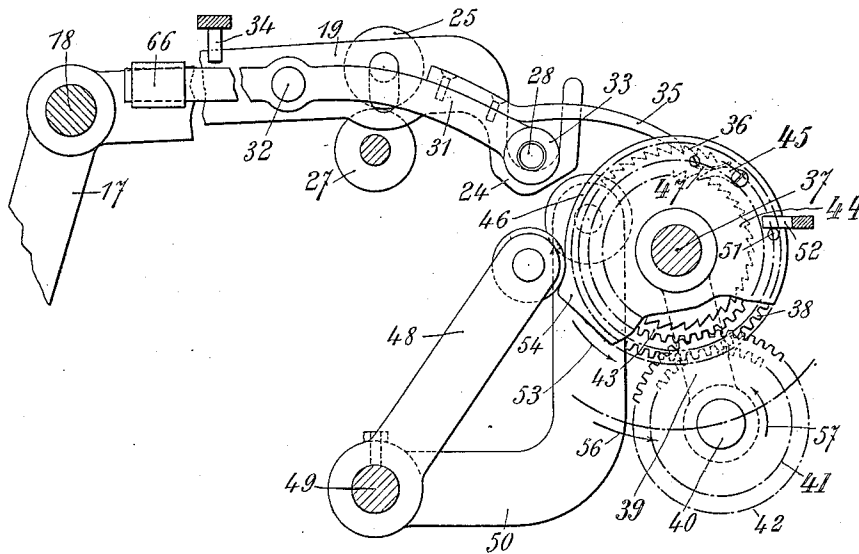
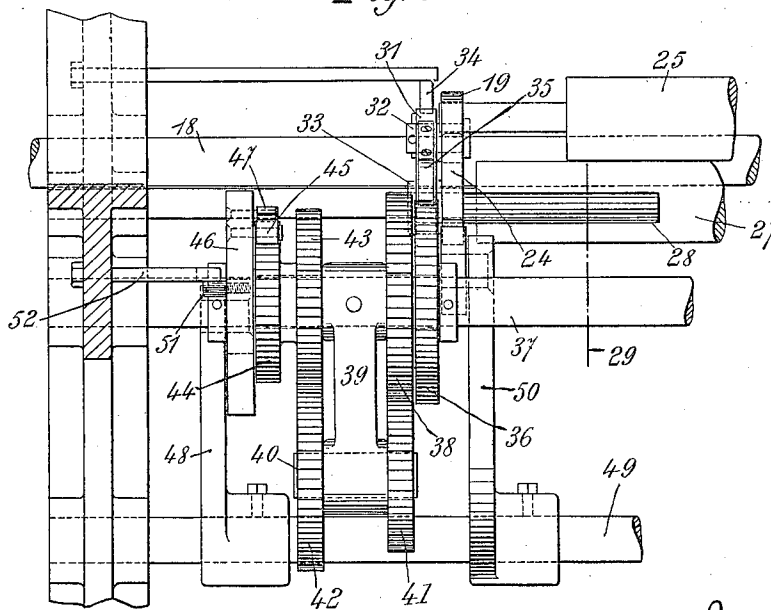


Fig. 3



Witnesses.

B. Kommers
M. H. Darg

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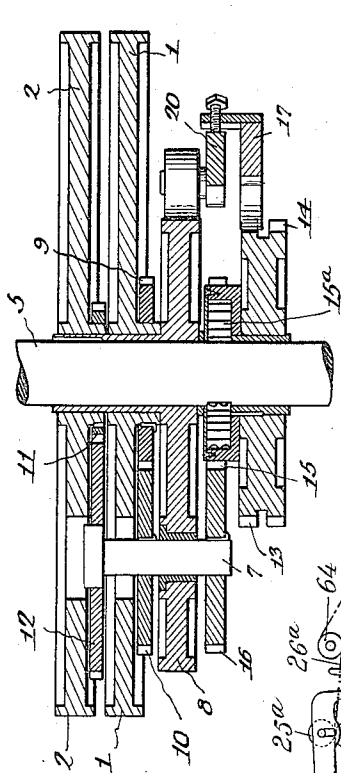


Fig. 5.

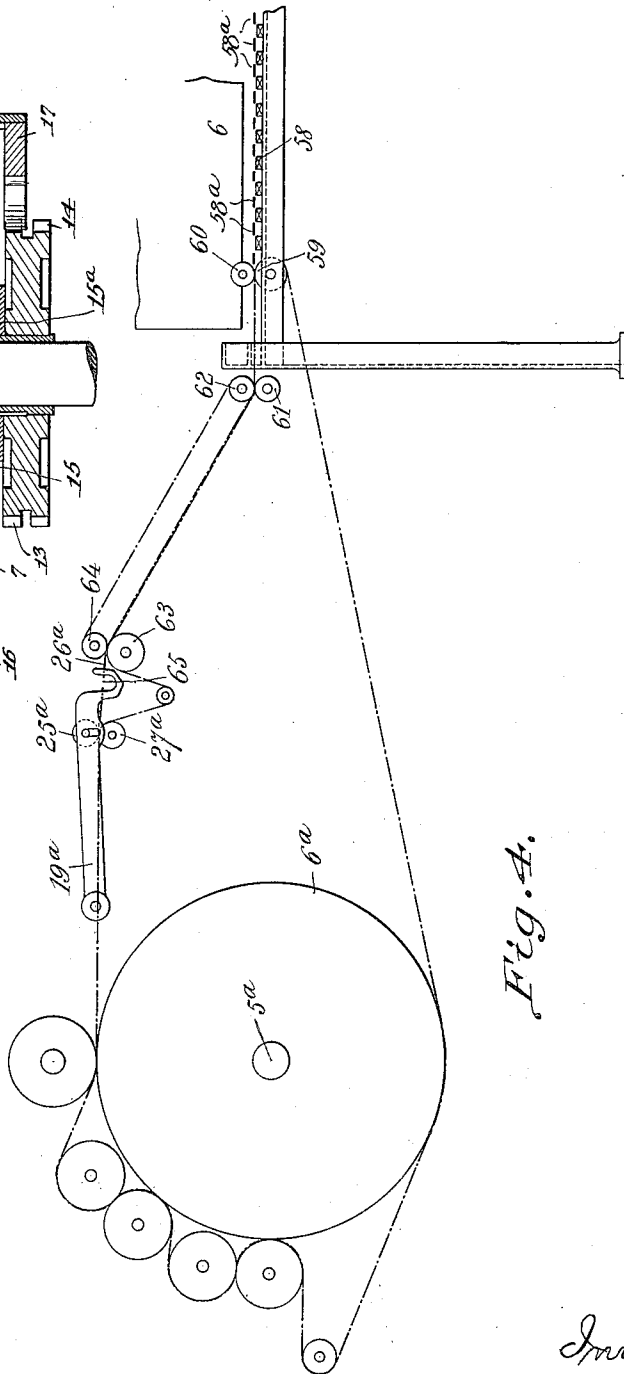


Fig. 4.

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B. Rommers
M. H. Darg.

Inventor
Eugene Louis Collon.
By *Henry Orth* atty.

UNITED STATES PATENT OFFICE.

EUGÈNE LOUIS COLLON, OF CANNES, FRANCE.

MACHINE FOR FOLDING LINEN, CLOTH, AND OTHER MATERIALS.

1,031,915.

Specification of Letters Patent.

Patented July 9, 1912.

Application filed November 21, 1910. Serial No. 593,473.

To all whom it may concern:

Be it known that I, EUGÈNE LOUIS COLLON, citizen of the Republic of France, and resident of 13 Rue de Cronstadt, Cannes, Alpes-Maritimes, in the said Republic, engineer, have invented certain new and useful Improvements in Machines for Folding Linen, Cloth, and other Materials; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to machines for folding linen, cloth and the like, wherein the movement of the folders is caused by rotative cams which become disconnected from their shaft and automatically displaced the one relatively to the other according to the dimensions of the articles to be folded. The invention concerns especially machines of the kind wherein the automatic adjustment of these cams, which is produced by a pawl gear that brings into play a train of planet wheels, is interrupted by the raising of what has been termed the engagement lever. This interruption is brought about by the wedging of a small metallic tube between a roller moved by the machine and the extremity of a double armed lifting lever. But this movement caused by the wedging action, which latter is obtained with more or less reliability, involves uncertainty and irregularity of action.

The present invention provides an improved essentially mechanical arrangement intended to produce with absolute certainty the cessation of the adjustment of the cams, that is to say of the pawl gear which controls the adjustment of the cams to an extent proportional to the dimension of the article to be folded. For this purpose the small tube in falling, as soon as it ceases to be supported by the linen or other article, causes engagement of a pawl to take place, which, by means of planet wheels, rotates a cam controlling the adjustment as required. The cessation of the cam adjustment is thus produced by the movement of the machine itself and is therefore effected with all possible certainty. The improved arrangement moreover has the advantage of requir-

ing only a small tube which is not supported upon the whole width of the serviette but only upon one of its edges, thus obviating disadvantages due to the length of this tube and to the gap or slot which had to be provided in the feed table.

The present improvements apply also to an improved connection of the two parts of the machine in order to facilitate folding in the transverse direction. This arrangement permits of making the second part of the machine absolutely identical with the first, and of securing simplicity of regulation and accuracy in folding.

Figure 1 of the annexed drawings is a side view of the upper part of a folding machine with automatic cam regulation wherein the cessation of the adjustment of the cams is effected by the improved arrangement. Fig. 2 is a view to a larger scale of that part of the machine seen to the right hand side of Fig. 1. Fig. 3 is partly a transverse section of the machine and partly an end elevation of the arrangement of the mechanism seen in Fig. 2. Fig. 4 is a diagram illustrating the mode of connecting the two parts of the machine. Fig. 5 is a transverse section through the main shaft and axis of the planet trains that effect the variations of the angular position of the cams for controlling the various elements.

The cams 1 and 2 which actuate the folders 3 and 4 are in known manner mounted loosely on the principal shaft 5 of the machine which carries the continuously revolving roller 6. Each cam carries a concentric toothed wheel which meshes with a planet wheel fixed on a spindle 7 that passes freely through the engagement lever cam 8 fixed on the spindle 5. The cam 1 carries a wheel 9 that gears with the wheel 10 on the spindle 7 and the cam 2 carries a wheel 11 that gears with the wheel 12 on the spindle 7. On the spindle 5 are also rotatably mounted two connected ratchet wheels 13 and 14 which partake of the general movement of the machine. To the ratchet wheel 13 is fixed a wheel 15 which gears with a wheel 16 keyed on the spindle 7 of the planet wheel gearing. A pawl 17 which engages the ratchet wheel 13 is fixed on the spindle 18 on which are also fixed on the one hand the engagement lever 19 and on the other hand a lever 20 carrying at its end a roller which contacts with the cam 8. The ratchet wheel 14 is engaged by a pawl 21

pivoted upon the cam 8 and carrying at its end a roller 22 which can engage with a fixed stop 23 on the framing. A coil or torsion spring 15^a (Fig. 5) is arranged between the shaft 5 and pinion 15, and acts on the cams 1 and 2 through the medium of the train of planet gears 10 and 16 and tends to return the parts forwardly or in the direction of rotation, that is to say into the position corresponding to the size of the smallest article which can be passed through the machine, the parts so returned being on the shaft 5, and comprising the cams 1 and 2 for the folders and the double ratchet wheel 13, 14. The engagement lever 19 which at one end is formed as a hook 24 carries the movable engagement or feeding roller 25 which in conjunction with the driven feed roller 27 serves to feed forward the linen article, which is placed on the table 26. The whole of this arrangement for working the cams of the folding devices is already known but is referred to in order to enable the present invention to be fully understood.

The steel tube 28, which is either raised, or rests in the hook 24 of the engagement lever, only bears upon a very small length say 15 or 20 millimeters of the linen article during its passage over the table 26. The dotted line 29, Fig. 3, indicates the left hand side edge of the serviette. Upon the lever 19 is pivoted at 32 a lever 31 which at its end is provided with a sleeve 33 for lifting the tube 28 when the engagement lever is lifted into its raised position 30 (see Fig. 1). A stop 34 is fixed on the machine framing and can be contacted by the lever 31 so that the latter is forced to take an inclined position in order to facilitate the introduction of the article to be folded. The lever 31 is counterbalanced by a weight 66 so that only the weight of the small tube is effective. The end of the lever 31 carries also a pawl 35 which gears with a ratchet wheel 36 mounted loosely on an auxiliary spindle 37 which is suitably driven. This wheel 36 is fixedly connected with a toothed wheel 38 also loose on the spindle 37. Upon the latter is keyed a crank arm 39 which at one end carries a loose spindle 40 upon which are fixed on the one hand a toothed wheel 41 gearing with the wheel 38 and on the other hand a toothed wheel 42. This latter gears with a toothed wheel 43 loose on the spindle 37; this wheel is fixed to a ratchet wheel 44 with which engages a pawl 45 carried by a cam 46 also mounted loosely on the spindle 37; a spring 47 fixed on the cam 46 holds the pawl 45 in constant engagement with the teeth of the ratchet wheel 44. The roller at the end of a lever 48 which is fixed on an auxiliary spindle 49 comes in contact with the cam 46; on the auxiliary spindle 49 is also fixed a lever 50 which at its end

carries a roller intended to act on the hook 24 of the clutch lever 19 for lifting the latter. The cam 46 moreover on its other face is provided with a projection 51 which comes in contact with a stop 52 fixed on the machine framing and so arranged as to render impossible the movement of the cam 46 in the direction of the arrow 53 when the raised portion 54 of this cam has passed the roller at the end of the lever 48; this raised portion would then be ready to act upon the lever 48, as soon as the cam tends to turn in the direction opposite to that of the arrow 53.

The apparatus operates in the following manner: The article to be folded, for example a table napkin, having entered between the rolls 25 and 27, the engagement lever 19, which previously has been lifted by the action of the cam 8, now descends from its raised position 30 to its intermediate position 55, and the steel tube 28 is supported by the linen article, which prevents it from falling into the slot in the feed table 26. When a length has passed between the rolls 25 and 27 equal to the smallest dimension of the piece which the machine is adapted to fold, the lever 19 is permitted by the cam 8 to drop from the position 55 to the position shown, and the pawl 17 takes into the teeth of and stops the ratchet wheel 13. This stoppage of the ratchet 13 stops the pinion 15 and forces the wheel 16, secured to shaft 7, to take a movement of rotation about its axis (in the direction of the arrow Fig. 1,) which is combined with its movement of translation with the cam 8 traversing shaft 7. This differential rotation of the cams unequally retards the movement of rotation, (by reason of the differences in diameter of the two operating wheels of the train of engaging planet gears,) and consequently causes a variation of their reciprocal angular position with respect to shaft 5, which tightens the torsion spring 15^a of the pinion 15. As soon as the linen article ceases to support the tube 28 the latter drops to the bottom of the hook 24 of the lever 19. The pawl 35 carried by the lever 31 of the little tube then engages with the ratchet wheel 36 which normally revolved in the direction of rotation of the spindle 37, indicated by the arrow 56. This ratchet wheel 36 is thus arrested as also is the toothed wheel 38 to which it is fixed. On the other hand, the crank arm 39 continues to turn with the spindle 37 upon which it is fixed, the wheel 41 rolls upon the wheel 38, the motion of which is then stopped, and communicates to the spindle 40 rotation in the direction of the arrow 57; in consequence the wheel 42 turns in the same direction and compels the wheel 43 and its ratchet wheel 44 to turn in a direction opposite to that of the

arrow 53. Having regard to the direction of the teeth of the wheel 44 and the position of its pawl 45, it is seen that the cam 46 is turned in the opposite direction to the arrow 53, and hence the raised portion 54 on this cam pushes against the roller on the lever 48 and causes a slight rotation of the spindle 49 upon which this lever is fixed. The lever 50 oscillates and its roller comes in contact with the hook 24 of the lever 19 which it raises to its intermediate position, 55. The pawl 17 is thus disengaged from the teeth of the ratchet wheel 13. The ratchet 13 again takes up at this moment its rotation and the movement of the cams 1 and 2 ceases to be retarded and their adjustment which has now been obtained as desired, is maintained against the effort of the spring by the pawl 21 engaging the ratchet wheel 14, until the second fold is marked when the roller 22 on the pawl 21 engages the fixed stop 23. The spring, immediately on this contact taking place, returns the cams into their initial position. While the folds are thus formed, the cam 8 has again raised the lever 19 from its intermediate position 55 to its raised position 30, and the lever 19 has thus lifted the tube 28 in such manner that the pawl 35 has gone out of engagement with the teeth on the ratchet wheel 36 which again becomes loose on its spindle 37 and resumes its motion in the direction of the arrow 53, as also does the wheel 38. The cam 46 is then liberated again and tends to turn in the same direction as the spindle 37; the cam projection 54 comes in the rear of the roller on the lever 48 and at the same moment the finger 51 strikes the stop 52 and arrests the cam. As the crank arm 39 continues to turn with the spindle 37, the wheel 42 always tends to turn the wheel 43 in the same direction, this movement being rendered possible by reason of the direction of the teeth of the ratchet wheel 44 which continues to turn under the pawl 45. As soon as a fresh serviette is ready to be introduced the whole system has returned to its initial position, then, when the lever 19 drops again into the position 55, Fig. 1, and deposits the small tube 28 upon the serviette, the pawl, which then commences a new adjustment of the cams, finds the parts in their initial position. The linen article having been folded in the direction of its width, it is carried by conveyer bands 58^a (Fig. 4) over a grid 58 and deposited thereon by lowering the bands. At one end of the grid is a driven roller 59 upon which a roller 60 is lowered to coöperate with the latter to feed the article in its longitudinal direction to receive its third and fourth folds. The roller 59 is driven by the bands of the second machine, which gives the serviette the third and fourth longitudinal fold.

When the serviette has been seized between the two rollers 59 and 60, it travels upon the bands and passes between the rollers 61 and 62 and is then carried upward by the bands to a roller 63. In order to prevent the serviette from being unfolded by reason of the incline, a second set of bands is provided which passes over the roller 62 and over a roller 64 and keeps the serviette folded. The serviette having arrived at the roller 63 is pushed onto a small receiving table 26^a and finally brought to the feed rollers 25^a and 27^a of the second machine for folding lengthwise.

In Fig. 4 there are also seen the shaft 5^a and the principal roller 6^a of the second machine.

This arrangement for combining the two parts of the machine may of course just as well be applied to a folding machine connected with a drying machine or an ironing machine, or in general to any machine of a similar nature.

I claim:

1. In a folding machine with automatic regulation, mechanism for arresting the adjusting movement of the cams which actuate the folders, comprising a feed table provided with a transverse slot or gap; a small metallic tube movable through said slot; a cam; means controlled by the movement of the tube, for turning the said cam at a desired moment; a pawl mechanism and a system of levers actuated by the said cam, for disengaging the pawl mechanism and thereby arresting the adjustment of the cams which actuate the folders.

2. In a folding machine with automatic regulation, mechanism for arresting the adjustment of the cams which actuate the folders, comprising a feed table provided with a slot; a metallic tube supported by the article to be folded above this slot; a pawl mechanism connected with the tube; a train of planet wheels in connection with said mechanism; a cam; a connection between this cam and the train of planet wheels; and a system of levers actuated by the said cam.

3. In a folding machine with automatic regulation, mechanism comprising: a table provided with a slot or gap; a small metallic tube movable through said slot; a pivoted lever supporting one end of the said tube; a pawl carried by the said lever; a rotary shaft; two tooth-wheels loose on said shaft; two ratchet wheels fixed to respective toothed wheels; two toothed planet wheels in gear with the said loose toothed wheels; a cam mounted loosely on the said rotary shaft; a connection between this cam and one of the ratchet wheels; and a system of levers actuated by the said cam.

4. In a folding machine with automatic regulation, mechanism comprising: a table provided with a slot; a small movable me-

tallic tube; a train of planet wheels; a cam; a pawl mechanism connecting this cam with the train of wheels; a system of stops for limiting the return stroke of this cam; and
5 a system of levers actuated by the said cam.

5. In a folding machine with automatic regulation, mechanism comprising: a feed table, over which passes the article to be folded and provided with a slot or gap
10 formed transversely in the side edge of this table; a metallic tube of small length adapted to bear only on an edge of the article to be folded; a balanced lever for supporting the exterior end of this tube; a stop for the
15 free end of the said lever; a cam; means for rotating this cam when the tube drops; and a system of levers actuated by the said cam.

6. In a folding machine in which the
20 cams operating the folders are automatically adjusted in accordance with the dimensions of an article introduced into the machine, the combination with the feed table of an adjustment controller comprising
25 a weight adapted to rest upon one edge of the article passing over the feed table and to fall through a slot in said table when said article has passed said slot; means for receiving said weight and adapted
30 to be moved by said weight, and gearing adapted to transmit the movement of said means to a lever adapted to arrest the automatic adjustment.

35 7. In a folding machine in which the cams operating the folders are automatically adjusted in accordance with the dimensions

of an article introduced into the machine, the combination with a feed table having a transverse slot formed in one edge thereof of an adjustment controller comprising a
40 weight adapted to pass through said slot, means adapted to periodically raise and lower said weight, a normally operative gear adapted to be stopped by the falling
45 of said weight to its lowest position, and automatic means rendered operative by the stoppage of said gear and adapted to arrest the automatic adjustment of the cams operating the folders.

8. In a folding machine in which the
50 cams operating the folders are automatically adjusted in accordance with the dimensions of an article introduced into the machine, the combination with a feed table having a transverse slot formed in one edge
55 thereof of an adjustment controller comprising a weight, adapted to pass through said slot, means adapted to periodically raise and lower said weight, a normally operative gear adapted to be stopped by the
60 falling of said weight to its lowest position and self-resetting automatic means rendered operative by the stoppage of said gear and adapted to arrest the automatic adjustment
65 of the cams operating the folders.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

EUGÈNE LOUIS COLLON.

Witnesses:

S. DONNOUTANT,
ROUN EMILE.