No. 792,557. PATENTED JUNE 13, 1905.

R. C. SEYMOUR.

MECHANISM FOR DOUBLING OR FOLDING AND CUTTING PAPER OR OTHER FABRICS.

APPLICATION FILED DEC. 21, 1904.

3 SHEETS—SHEET 1.

Fig. 1.

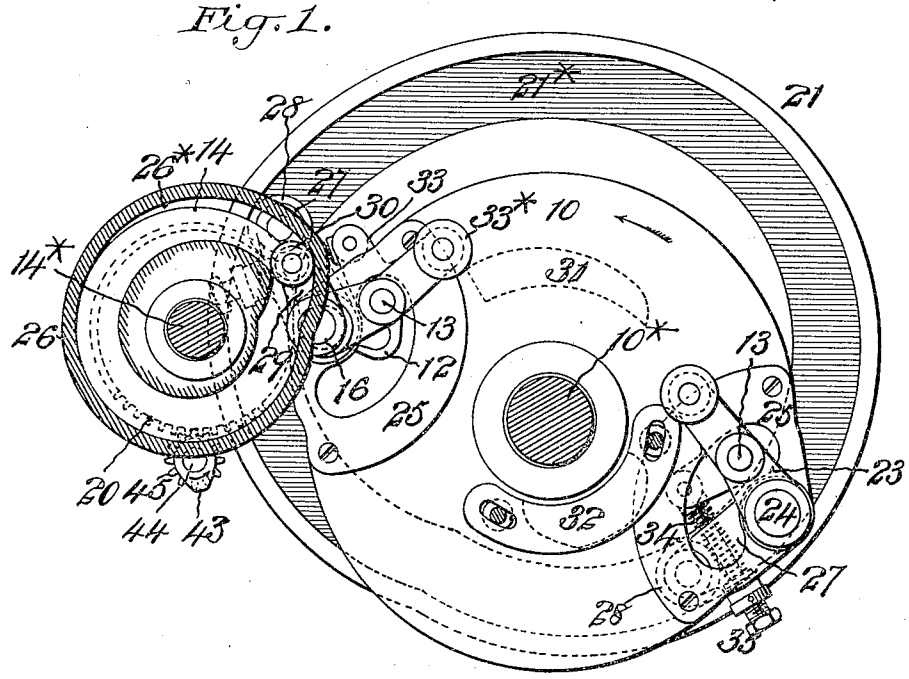
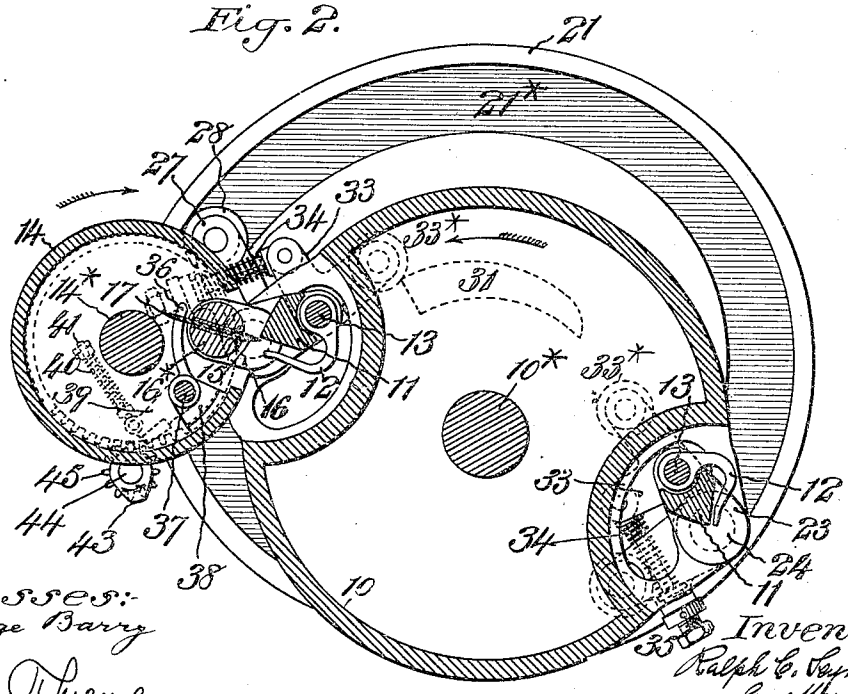


Fig. 2.



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Fig. 3.

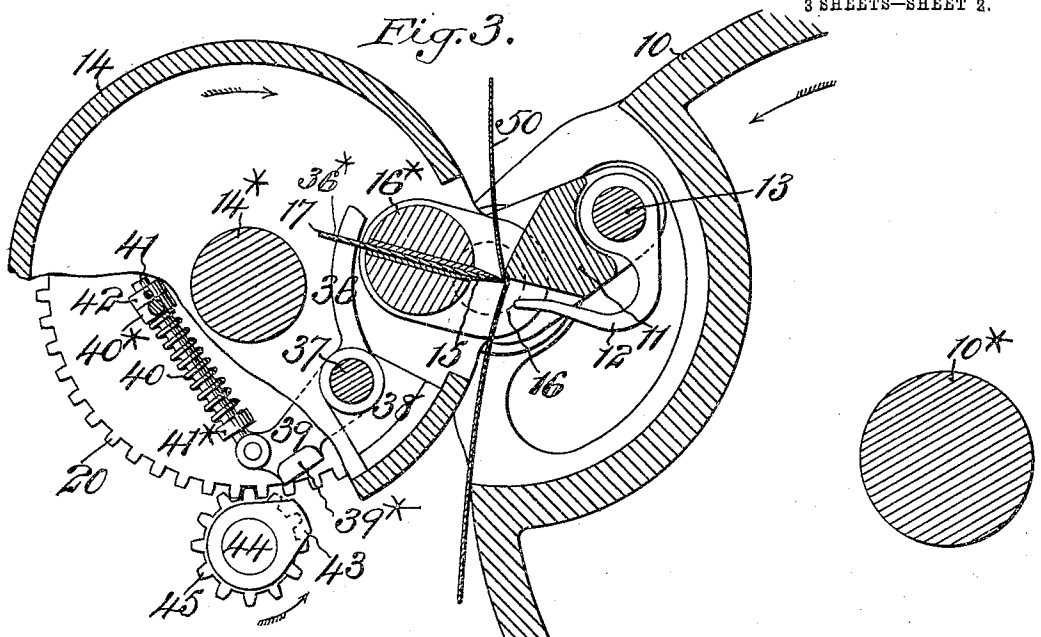
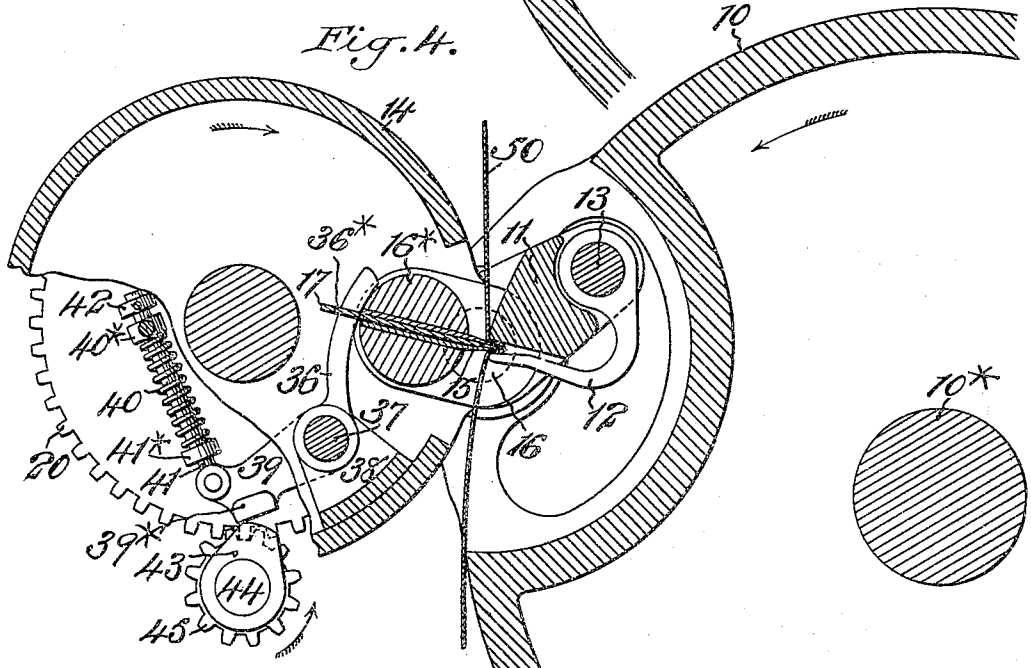


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

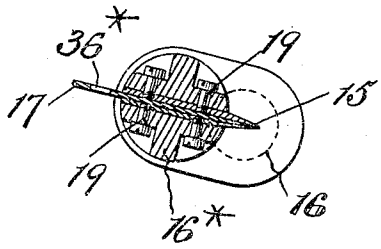


Fig. 5*.

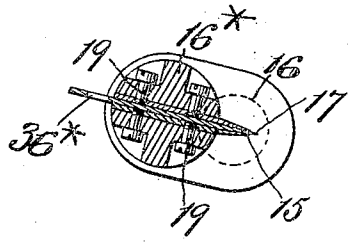
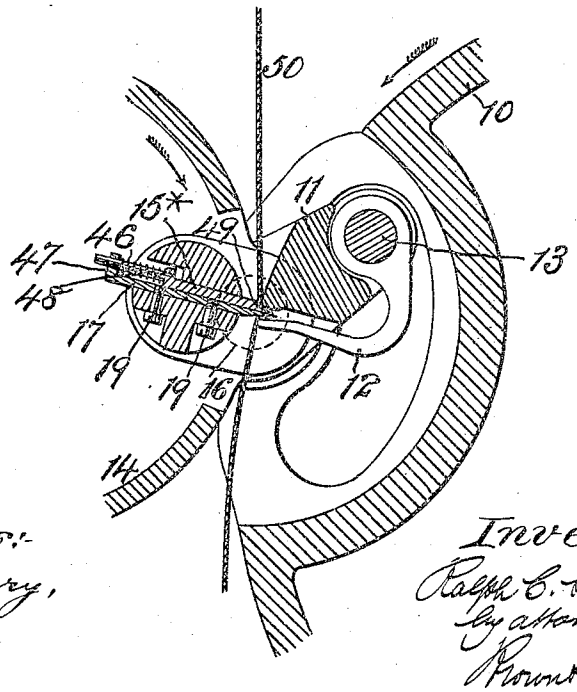


Fig. 6.



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PHOTO-LITHOGRAPHED BY SACKETT & WILHELMS LITHO. & PTG. CO. NEW YORK

No. 792,557. Patented June 13, 1905.

UNITED STATES PATENT OFFICE.

RALPH C. SEYMOUR, OF NEW YORK, N. Y., ASSIGNOR TO C. B. COTTRELL & SONS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

MECHANISM FOR DOUBLING OR FOLDING AND CUTTING PAPER OR OTHER FABRICS.

SPECIFICATION forming part of Letters Patent No. 792,557, dated June 13, 1905.

Application filed December 21, 1904. Serial No. 237,769.

To all whom it may concern:

Be it known that I, RALPH C. SEYMOUR, a citizen of the United States, and a resident of the borough of Manhattan, in the city and State of New York, have invented a new and useful Improvement in Mechanism for Doubling or Folding and Cutting Paper or other Fabrics, of which the following is a specification.

This improvement relates to a device consisting in part of a blade, hereinafter referred to as the "creasing-blade," and in part of grippers which crease a sheet on said blade and fold or double it in the act of drawing it from the blade, the said grippers being carried by one and the said blade by another of two cooperating cylinders.

The object of said improvement is to sever the sheet in the crease so formed by an operation continuous to that of forming the crease; and to this end the invention consists in the mechanism hereinafter described and claimed, the principal elements of which are the coöperating cylinders, creasing-blade, and grippers above referred to and a cutting-knife.

In the accompanying drawings, Figure 1 represents an end view of the two coöperating cylinders and the mechanism applied in connection therewith for operating the grippers, the creasing-blade, and the knife, the cam for operating the creasing-blade being in section; Fig. 2, a transverse section of the two cylinders, the blade, the grippers, and the knife. Figs. 3 and 4 are diagrammatic views on a larger scale, illustrating different stages in the operation of the creasing-blade, the grippers, and the knife; Figs. 5 and 5*, transverse sectional views of the creasing-blade and knife and the bar or stock by which they are carried; Fig. 6, a transverse sectional view illustrating a modification of the creasing-blade and knife.

10 is the cylinder in which are the grippers 11 12, carried by the arms 23 of a rock-shaft 24, the journals on the ends of which are pivoted into plates 25, fastened to the ends of the cylinder. The members 11 of the grippers consist of bars which extend between the arms 23 and form parts of the rock-shaft 24. The members 12 are carried by shafts 13, which are pivoted into the rock-shaft arms 23. 14 is the cylinder in which is the creasing-blade 15, the said blade being carried in a bar or stock 16*, pivoted by journals 16 into the ends of the said cylinder. Except as to the particular construction of the blade 15 to adapt it for the reception of the knife 17, which constitutes the principal element of novelty in this invention, the said cylinders, grippers, and blade are represented as like those which are the subject of United States Patent No. 668,719, and therefore require here only such further description as to identify them; but before giving this description I will explain the construction of the said blade and of the knife. The said blade 15, instead of being single, as described in the aforesaid Letters Patent, is double—that is to say, it is formed of two corresponding blades or members which, with the cutting-knife between them, are arranged in the bar or stock 16* in the cylinder 14. These two members are secured face to face within a slot in the bar or stock 16* in such manner that their edges meet to form practically a single edge which though thin is not sharp enough to cut. Those parts of said members which are within the bar or stock are spaced apart at a sufficient distance to permit the knife to work freely between them; but the operative parts of said members, which project from the stock and which come together to form the single edge, have such elasticity that until forced apart by the passage of the knife between them, as shown in Fig. 5*, they remain close together, as shown in Fig. 5. The said blade members are represented in Figs. 5 and 5* as secured fixedly in the slot in the stock 16* by means of headed screws 19, which are inserted through opposite sides of the stock and screwed into tapped holes in the said members.

The cylinders 10 14 are represented like those in Patent No. 668,719, hereinbefore referred to, the gripper-cylinder 10 being of twice the circumference of the creasing-blade cylinder 14. The shafts 10* and 14* of said

cylinders are to be so geared together that the latter makes two revolutions for one of the former, but only one of their gears—viz., that 20 on the cylinder 14—is represented. There are two sets of grippers 11 12 on the cylinder 10, but only one creasing-blade 15 on the cylinder 14. The mechanism for producing the operation of the grippers and creasing-blade and of the knife 17 is represented in Figs. 1 and 2. In these figures, 21 is the stationary cam for giving the rock-shaft 24 the movements necessary for turning either set of grippers 11 12 to form the crease in the sheet over the edge of the blade 15 and to withdraw the creased sheet from the blade and double it upon the cylinder 10. In Fig. 1, 26 is the stationary cam for producing the necessary turning movements of the creasing-blade to produce its coöperation with the grippers. For producing the turning movements above mentioned the rock-shaft 24 is furnished with an arm 27, on which is a roller 28, running in the groove 21* of the cam 21. For producing the turning movement of the creasing-blade there is on one of the journals 16 of its stock 16* an arm 29, Fig. 1, on which is a roller 30, running in the groove 26* in the stationary cam 26. The opening of the grippers for forming the crease in a sheet over the edge of the blade 15 is produced by a stationary cam 31, (shown in dotted outline in Figs. 1 and 2,) and their opening to release the sheet taken by the grippers is produced by a stationary cam 32, (shown in Fig. 2,) the gripper-shafts 13 being each furnished for the purpose with a bell-crank lever 33, on which is a roller 33*, running at the proper times over said cams. The closing of the grippers is produced by springs 34 applied between said bell-crank levers and adjustable abutment-screws 35 screwing into lugs on the plates 25.

For operating the knife 17 to sever the sheet in the crease formed between the blade and grippers it is carried, as shown in Figs. 2, 3, 4, by arms 36 on a rock-shaft 37, which is arranged parallel with the cylinder 14 in bearings 38, provided within said cylinder, the said arms entering into slots 36* in the back part of the knife, which projects through the stock 16*. The said rock-shaft 37 is furnished with an arm 39, to which there is applied a coil-spring 40 for the purpose of holding back the knife, with its edge sheathed within the creasing-blade 15, until the proper time for severing the creased sheet. The said spring is placed upon a rod 41, connected with said arm 39 and working through a guide 40*, fixed within the cylinder, and it abuts between the said guide and a collar 41* on said rod. Very little movement is required for the said blade, only sufficient to withdraw its edge sheathed in the blade, as shown in Fig. 5, and to project its edge a little way beyond the edge of the blade, as shown in Fig. 5*. The withdrawal or sheathing movement of the blade to the requisite extent is limited by an adjustable stop-nut 42, screwed onto the end of the rod 41 outside of the abutment-guide 40*. The movement of the knife to protrude its edge through and beyond the edge of the creasing-blade is produced very quickly by a cam 43, fitted to turn on a fixed stud 44 and operating on a projection 39* on the arm 39. The cam 43 is furnished with a pinion 45, through which it receives rotary motion from the gear 20 on the cylinder 14, the meshing of the said pinion with the said gear being such that the said cam produces the protrusion of the knife from the creasing-blade, as shown in Figs. 4 and 5*, immediately after the formation of the crease in a sheet between the said blade and the grippers. In order to produce a sufficiently-quick protrusion from and withdrawal of the knife into the blade, I have represented the pinion 45 as of only one-quarter the circumference of the gear 20, and although the cam 43 revolves four times to one revolution of the cylinder 14 it only protrudes the knife from the creasing-blade once in one revolution of the cylinder 14 and then at the proper time for severing the creased sheet when the arm 39 has revolved with the cylinder 14 into contact-position, as shown in Fig. 4.

The operation of the several parts having been separately described, I will briefly describe, with reference to Figs. 3 and 4, their combined operation to produce the creasing and cutting of the sheet and the doubling of the cut sections of the sheet on the cylinder 10.

I will first suppose the cylinders in their revolution in the opposite directions (indicated by arrows in Figs. 1, 2, 3, 4) to have arrived at the relative positions represented in Figs. 1, 2, and 3. One set of grippers and the creasing-blade are then in such positions that the blade has just passed the edge of the gripper-jaw 11 and is bending a sheet 50 over said edge, as shown in Fig. 3, to commence the formation of the crease, the grippers being then open, the knife being sheathed, as shown in Figs. 3 and 5 in the creasing-blade, and the gripper-roller 33* being, as shown in Figs. 1 and 2, just about to escape from the cam 31. A very little continued movement of the cylinders causes the creasing-blade to pass farther beyond the edge of the jaw 11, between the said jaw and the jaw 12. A very slight further continued movement of the cylinders carries the roller 33* beyond the cam and permits the closing movement of the gripper-jaw 12 by the spring 34, by which movement the grippers, being closed on the blade, complete the crease of the sheet, as shown in Fig. 4. By a very slight further continued movement of the cylinders the cam 43 and the projec-

tion 39* on the arm 39 of the knife-operating shaft 37 are brought together, and the knife is thereby pushed forward in the creasing-blade, the elastic edges of the members of which it pushes apart until its own edge is sufficiently protruded from and beyond the blade to produce the severing of the sheet within the crease. As the blade and grippers continue to be carried round by and with the two cylinders each is withdrawn from the other, the knife being also withdrawn with the blade, and the severed sheet is doubled upon and around the cylinder in the same way that the creased sheet is doubled upon said cylinder, according to Patent No. 668,719, before referred to, and carried round thereby until liberated by the opening of the grippers by their roller 33* passing over the cam 32.

In the modification illustrated in Fig. 6 the creasing-blade 15* is single, the cutting-knife 17 is fixedly secured in the stock by screws 19, and the single creasing-blade is fitted to slide within the stock upon the knife under the control of a strong spring 46, which acts between a flange 47 on the knife and a flange or shoulder 48 on the head of the creasing-blade to force the edge of said blade beyond the edge of the knife, as shown in the figure. The creasing-blade has also a shoulder 49 on its outer face near its edge. In the operation of this modification the forming of the crease in the sheet is commenced by the edge of the folding-blade passing over the edge of the gripper-jaw 11, as described with reference to Fig. 3, and on the continued revolution of the cylinders the crease is formed by the closing of the grippers and the entrance of the blade between them as far as permitted by its shoulder 49, when by the further revolution of the cylinders the edge of the gripper-jaw 11 is caused to force the blade back upon the knife, so that the edge of the latter projects beyond that of the blade, and the continued revolution of the cylinders causes the knife to sever the sheet in the crease.

If the cutting-knife should be omitted from either of the examples of my invention herein described, the creasing-blade constructed as described would operate as a folding-blade, as in Patent No. 668,719, hereinbefore referred to.

In the foregoing description the operations of creasing, severing, and doubling have been described as performed on a sheet; but it is obvious that they may be performed in the same way on two or more sheets placed together one upon another.

What I claim as my invention is—

1. Mechanism for cutting and doubling sheets, comprising two cylinders, grippers carried by one of said cylinders and consisting of two members movable together and separately from each other in said cylinder, a creasing-blade carried by the other cylinder and a knife carried by said other cylinder for severing the sheet in the crease formed between said blade and grippers.

2. Mechanism for cutting and doubling sheets, comprising two cylinders, grippers carried by one of said cylinders, a creasing-blade composed of two members carried by the other, a knife arranged between the two members of said blade, and means for giving said knife a movement independently of said blade for projecting its own edge beyond the edge of the blade.

3. In mechanism for cutting and doubling sheets, a rotary cylinder, a stock pivoted in said cylinder and containing a creasing-blade and a cutter, a rock-shaft and bearings therefor in said cylinder, a cam outside of said cylinder, one arm on said rock-shaft connected with said cutter and another arm on said rock-shaft upon which said cam operates to move the cutter independently of the creasing-blade.

4. In mechanism for cutting and doubling sheets, the combination of two rotary cylinders, grippers carried by one of said cylinders and consisting of two members movable together and separately in said cylinder, a creasing-blade carried by the other cylinder, a knife carried by said other cylinder for severing the sheet in the crease formed between said blade and grippers, cams for opening said grippers, a cam for turning the two members of the grippers together in their cylinder, a cam for turning the creasing-blade in its cylinder in coöperation with the two gripper members, and a cam for producing the movement of the knife relatively to the creasing-blade.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 17th day of December, 1904.

RALPH C. SEYMOUR.

Witnesses:
FREDK. HAYNES,
F. GEORGE BARRY.