

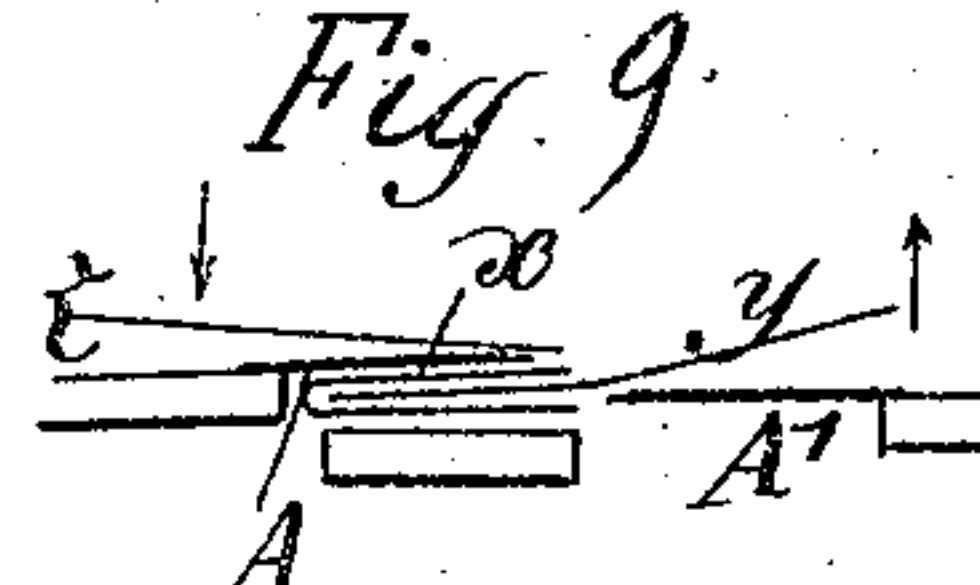
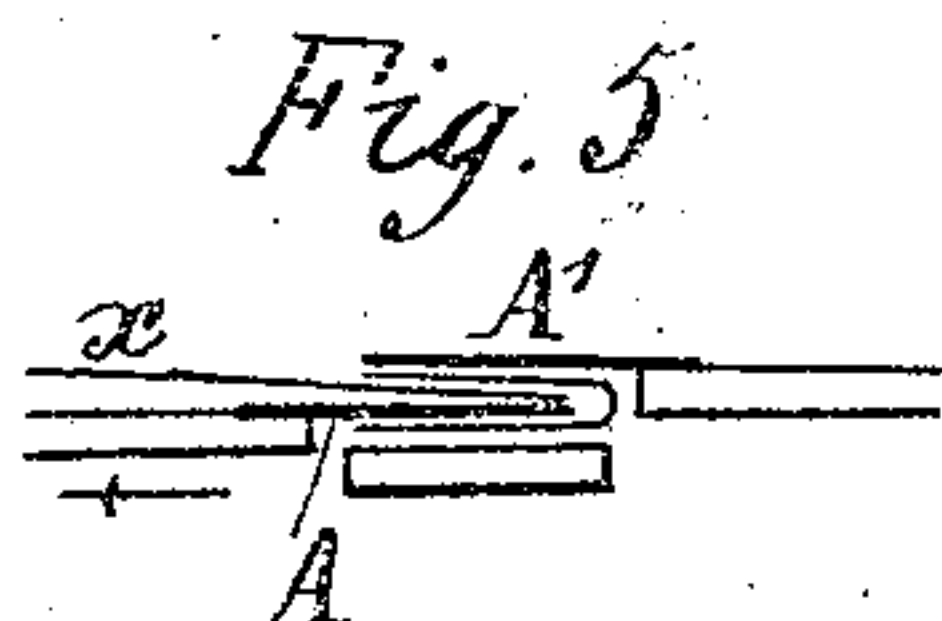
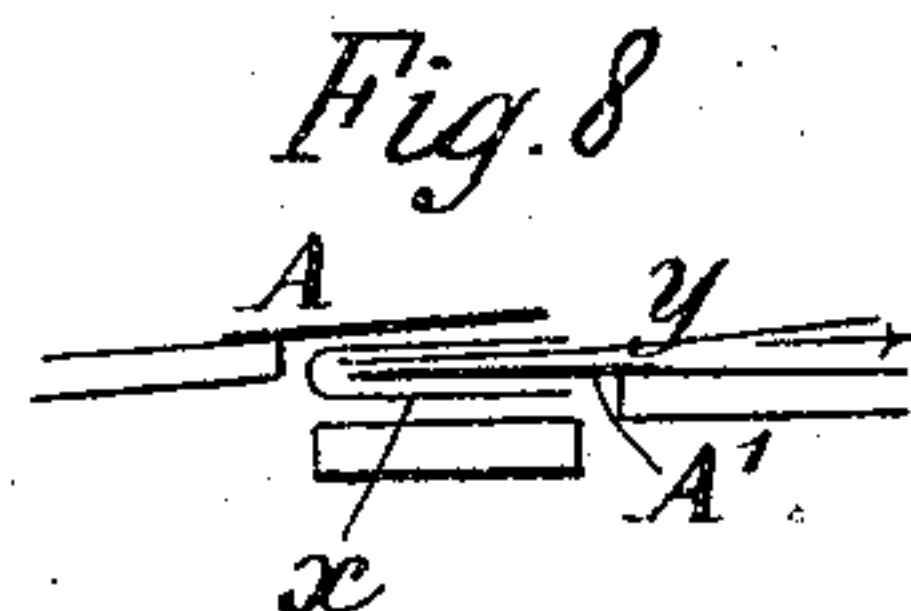
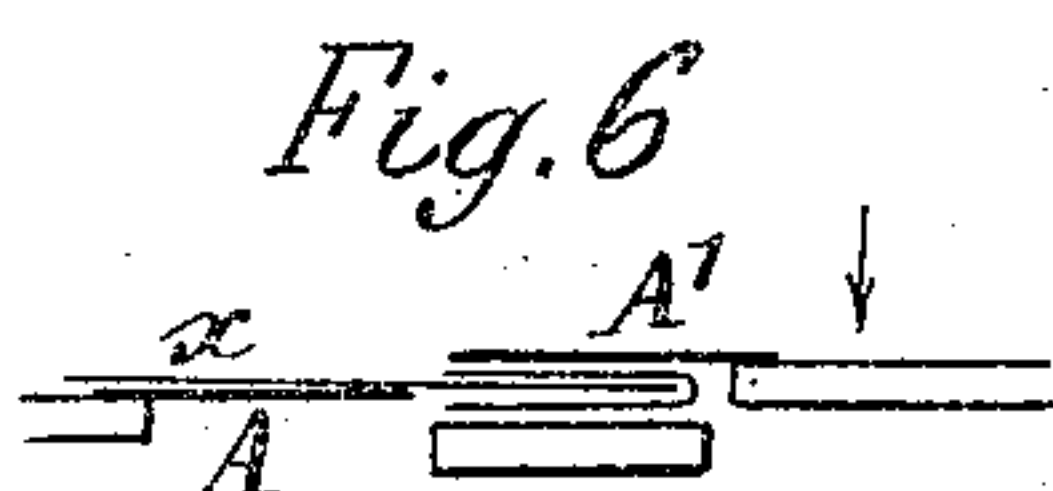
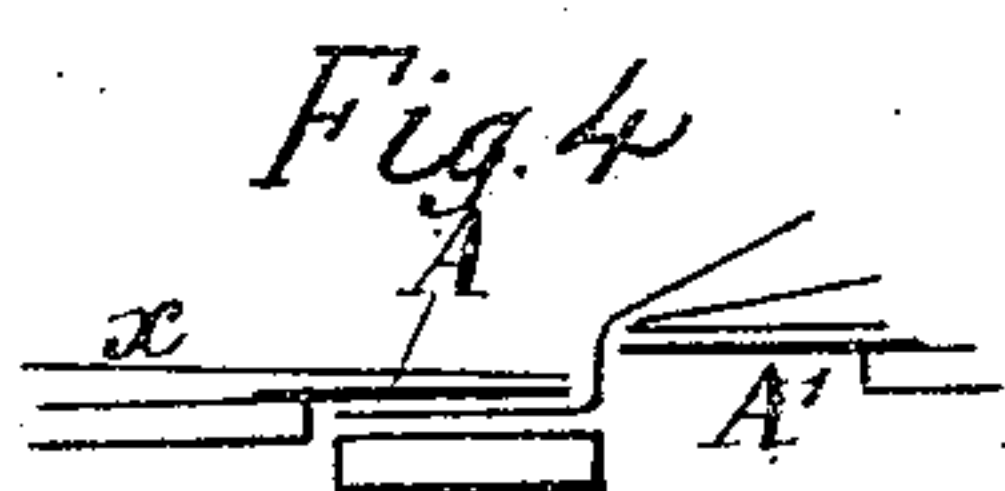
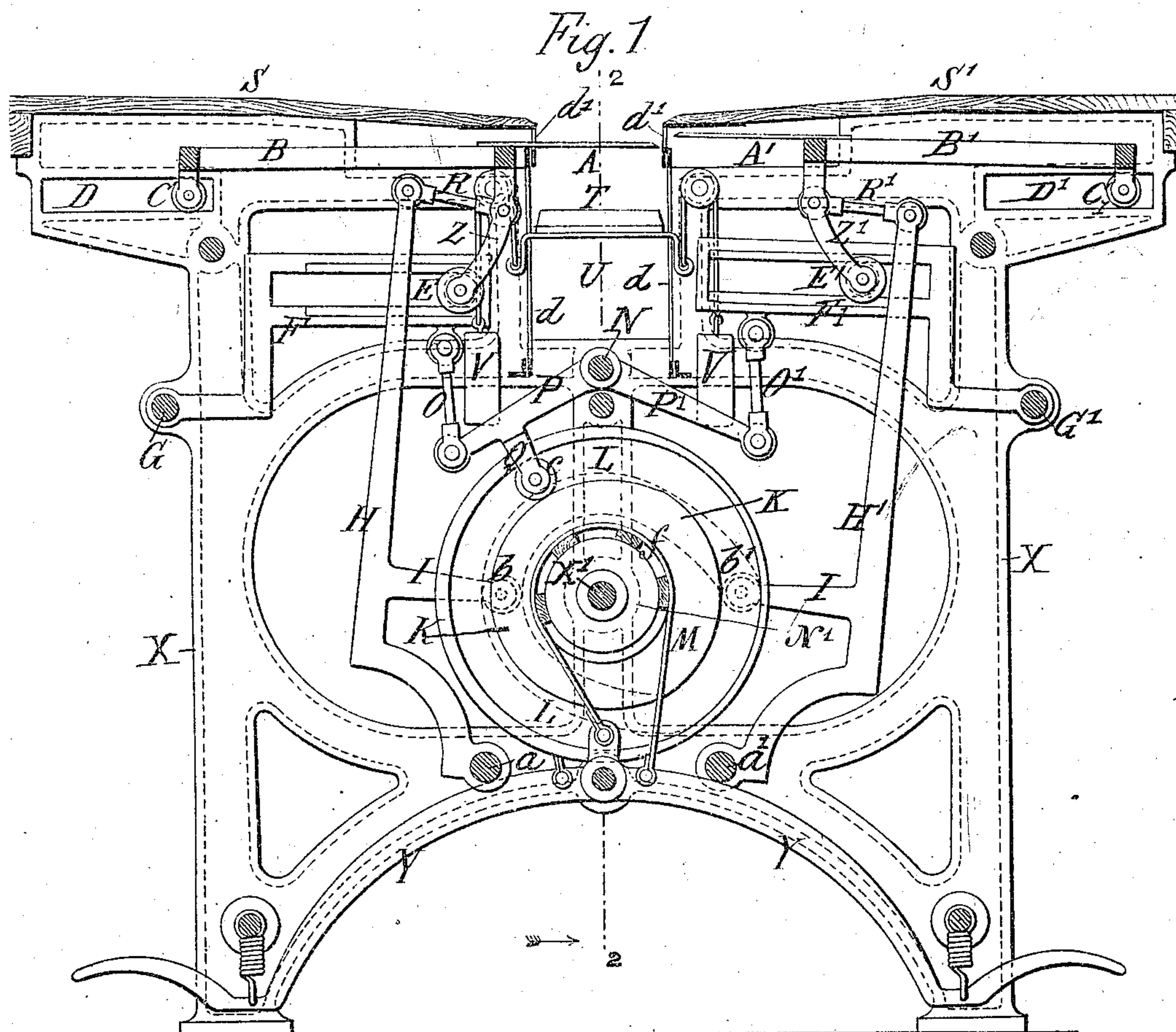
(No Model.)

2 Sheets—Sheet 1.

M. A. COUDERT.  
SHEET FOLDING MACHINE.

No. 451,176.

Patented Apr. 28, 1891.



Witnesses:  
J. Schaefer  
E. Schaefer

Inventor:  
Michel Amable Boudet  
By Henry Boudet  
his Atty.

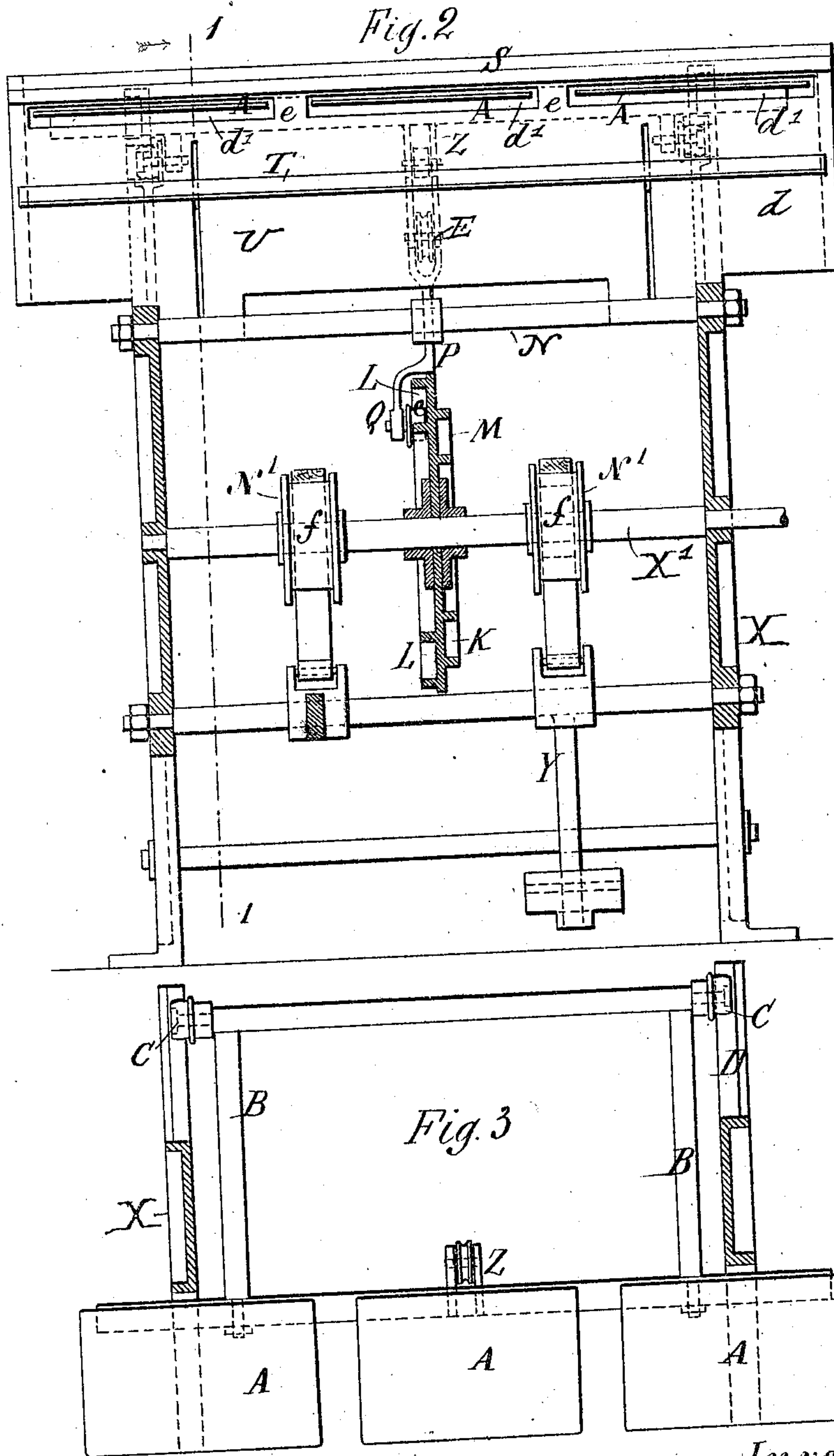
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2 Sheets—Sheet 2.

M. A. COUDERT.  
SHEET FOLDING MACHINE.

No. 451,176.

Patented Apr. 28, 1891.



Witnesses:  
*J. G. Springer*  
*E. R. Stuart*

Inventor:  
*Michel Amable Coudert*  
By *Henry Courmet*  
*his Atty.*



# UNITED STATES PATENT OFFICE.

MICHEL AMABLE COUDERT, OF VICHY, ASSIGNOR TO THE SOCIÉTÉ ANONYME FRANCAISE DES BASCULES AUTOMATIQUES, OF PARIS, FRANCE.

## SHEET-FOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 451,176, dated April 28, 1891.

Application filed October 27, 1890. Serial No. 369,453. (No model.) Patented in France August 28, 1889, No. 200,462; in England September 12, 1889, No. 18,068; in Belgium February 22, 1890, No. 89,602, and in Italy March 12, 1890.

### *To all whom it may concern:*

Be it known that I, MICHEL AMABLE COUDERT, a citizen of the French Republic, and a resident of Vichy-Allier, France, have invented certain Improvements in Sheet-Folding Machines, (for which patents have been granted in France, No. 200,462, dated August 28, 1889; in Great Britain, No. 18,068, dated September 12, 1889; in Belgium, No. 89,602, dated February 22, 1890, and in Italy, March 12, 1890,) of which the following is a specification.

My invention relates to that class of machines employed for folding sheets of paper automatically, and particularly to those included in the above class which are employed to fold circulars, prospectuses, pamphlets, and the like.

In the machine which will be fully hereinafter described the sheets of paper are placed on two oppositely-arranged inclined tables on the top of the machine-frame and fed alternately to the folding-blades. After being folded so that they lie one within the other the folded sheets are deposited in a case or box fixed in the frame of the machine. Motion is imparted to the folding-blades by two cams, which give to the said blades a to-and-fro edgewise movement and also a to-and-fro flatwise movement.

In the drawings which serve to illustrate my invention, Figure 1 is a vertical section taken at right angles to the main or cam shaft in the plane indicated by line 1 1 in Fig. 2, and Fig. 2 is a vertical mid-section in the plane indicated by the line 2 2 in Fig. 1. Fig. 3 is a sectional plan of one of the folders and its appurtenances. Figs. 4, 5, 6, 7, 8, and 9 are detached illustrative views showing the positions of the folding-blades at different stages of the folding operation.

X is the frame of the machine, of symmetrical form, and X' is the main cam-shaft from which motion is derived. This shaft is arranged in the center or median axis of the machine.

Above the shaft X', and also on the median line 2 2 in Fig. 1, is a rock-shaft N.

V is the box or receptacle which receives the folded sheets. This box is also arranged

on the median line 2 2 over the rock-shaft N. This line 2 2 marks the dividing-line between the two like operating or folding parts of the machine, and as these parts are alike in construction I have designated like elements of the two mechanisms by the same reference-letters, merely adding the numeral 1 to the letters designating the elements to the right of the line 2 2 in Fig. 1; and to avoid ambiguity I will describe minutely only one of these like parts.

S is an inclined platform or table on the machine-frame. On this table the pile of sheets is placed.

A is a folding-blade secured to a carriage B, which has two rollers C at its rear end that roll in guideways D in the frame. The carriage B pivots on rollers C, and carries at its front end a forked arm Z, in which is mounted a roller E, which rolls in a guideway in a vibrating track-frame F, which is pivoted to the frame X at G. The carriage B is coupled by a link R to a lever H, fulcrumed or pivoted to the main frame at a and provided with a branch I, which carries a roller b, which engages and rolls in a cam-groove K in one face of the main cam M, fixed on the main cam-shaft X'. This cam-groove K, by imparting a vibrating movement to the lever H, transmits said vibrating movement, somewhat amplified, to the frame B and folding-blade A. While this blade and its frame are moved to and fro horizontally by the cam K, an up-and-down movement is imparted to the front end of the frame and the blade affixed thereto by an arm P, fixed to the rock-shaft N and coupled at its outer end to the free or movable end of the frame F by a link O. On the arm P is a branch Q, which carries a roller c, which engages a cam-groove L in the face of the cam M. Thus it will be seen that the mechanism which actuates the folding-blade A imparts to it a rising-and-falling as well as a reciprocating movement.

At the other side of the machine like mechanism to that described is employed to impart motion to the corresponding folding-blade A'; but the like motions of the respective blades are not made at the same time. Their re-



spective movements will be hereinafter explained. Only one roller *c* is employed, as the arm *P'* is fixed to the same rock-shaft *N* with arm *P*; but it projects in the opposite direction.

I will explain the operation of the machine so far as described, premising that two attendants are employed to feed the sheets from the respective tables *S* and *S'*. The machine being in motion, one of the attendants (the one at the table *S*, for example) places a sheet of paper *x* on the advanced and depressed folding-blade *A*, taking care that it does not project beyond the edge of the blade. (See detached view, Fig. 4, for this position.) During the first sixth of a revolution of the cam-shaft the cam-grooves *K* and *L* impart no motion to the folding-blade *A*; but the cam-groove *K* acts on the roller *b'*, draws lever *II'* toward the center, and through link *R'* advances the elevated folding-blade *A'* over the sheet *x*. (See detached view, Fig. 5, for this position.) During the second sixth of a revolution the cam *L* still remains inactive and the track-frames *F F'* at rest. The cam *K* also allows the folding-blade *A'* to remain at rest; but it acts on the blade *A* to withdraw it. (See detached view, Fig. 6, for this position.) During the third sixth of a revolution of the cam-shaft the cam *L* raises the blade *A* and correspondingly depresses blade *A'*; thus pressing the sheet *x* down upon the movable bottom *T* of the box *U*. This bottom is drawn upward constantly by weights *V*, as seen in Fig. 1. The rising of the blade *A* raises that portion of the sheet *x* not under the blade *A'*, as seen in the detached view, Fig. 7, and the attendant at table *S'* places a sheet *y* on the said blade *A'* in the same manner that sheet *x* was first placed, Fig. 4, on blade *A*. During the fourth part or sixth of a revolution of the cam-shaft the track-frames *F F'* are not actuated by the cam-groove *L*, and the blade *A'* is not actuated by the cam-groove *K*, said blade remaining in its advanced position; but the said cam-groove advances the elevated blade *A*, and said blade folds the tail of the sheet *x* over the part of sheet *y* on blade *A'*. This position of the parts is illustrated in Fig. 8. During the next sixth of a revolution of the cam the blade *A* stands still while the blade *A'* withdraws, the former blade holding down the sheet *y* on the bottom *T*, so that it cannot be displaced by the withdrawal of the blade *A'*. The attendant at table *S* now places another sheet *z*, as seen in the detail view, Fig. 9. Finally, during the last sixth of the revolution of the cam the blades *A* and *A'* have no horizontal movement imparted to them; but the blade *A* is depressed and the blade *A'* elevated by the cam-groove *L*, whereby the blade *A'* raises the tail or outer portion of the sheet *y* preparatory to folding it over on the sheet *z*. The blades will now have resumed the positions seen in Figs. 1 and 4, and during the next

revolution of the cam the same cycle of movements will be repeated.

The movable bottom *T* of the casing or box *U* is shown in Fig. 1 as somewhat depressed; but this is only to avoid obscuring the folders. This bottom will only yield and descend as the folded sheets are pressed down upon it by those that follow.

The sides *d* of the box or receptacle *U* extend up to the front or depressed edges of the respective tables *S* and *S'*, and in these sides are formed slots or apertures *d'*, through which play the folding-blades *A* and *A'* from opposite sides, as seen in Fig. 1.

On the shaft *X'*, with the cam *M*, is a brake-pulley *N'*, over which passes a brake-strap *f*, one end of which is secured to the frame and the other to a rocking treadle *Y*. The functions of this brake will be readily understood without further explanation. There may be a brake device on each side of cam *M*, as seen in Fig. 2.

I prefer to make the folding-blades each in several parts, as seen in Fig. 3, where the blade *A* is represented in three parts or sections. The advantage of this construction is that there may be an opening *d* for each section of the blade, the plate being uncut at the spaces *e* between said openings. This will prevent the blade when withdrawn from carrying back with it the folded sheet, as the latter will be stopped by the parts of the plate between the openings *d*.

Having thus described my invention, I claim—

1. In a paper-folding machine, the combination of the reciprocating carriage *B*, pivotally mounted on rollers at its rear end, the folding-blade *A*, mounted on the front end of said carriage, means, substantially as described, for imparting a reciprocating motion to said carriage and blade, the pivoted track-frame *F*, the roller *E*, carried by said carriage and rolling in said track-frame, and means, substantially as described, for imparting a vibrating motion to said track-frame, whereby two motions are imparted to the folding-blade.

2. In a paper-folding machine, the combination of the two reciprocating carriages *B* and *B'*, pivotally mounted at their rear ends and supported at their front ends on the respective track-frames *F* and *F'*, the said track-frames also pivotally mounted, the vibrating levers *II* and *II'*, coupled at their upper ends, respectively, to the carriages *B* and *B'*, the cam which vibrates said levers and thus imparts a reciprocating motion to said carriages, the rock-shaft *N*, the arms *P* and *P'*, fixed to said shaft and coupled, respectively, to the track-frames *F* and *F'*, the cam which rocks said shaft *N*, and the folding-blades *A* and *A'*, mounted, respectively, on the carriages *B* and *B'*, all arranged to operate substantially as set forth.

3. In a paper-folding machine, the combi-



nation of the respective tables S and S',  
the receptacle U, arranged between their de-  
pressed ends and provided with a counter-  
weighted bottom T, and the reciprocating  
5 folding-blades arranged to play through slots  
in the respective sides of said receptacle, said  
folding-blades being each made in two or  
more sections, as described, whereby the un-  
cut portion between the slots in the sides of  
10 the receptacle prevents the folder from with-

drawing the folded sheet, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

MICHEL AMABLE COUDERT.

Witnesses:

ROBT. M. HOOPER,  
AUGUSTE MATHIEU.