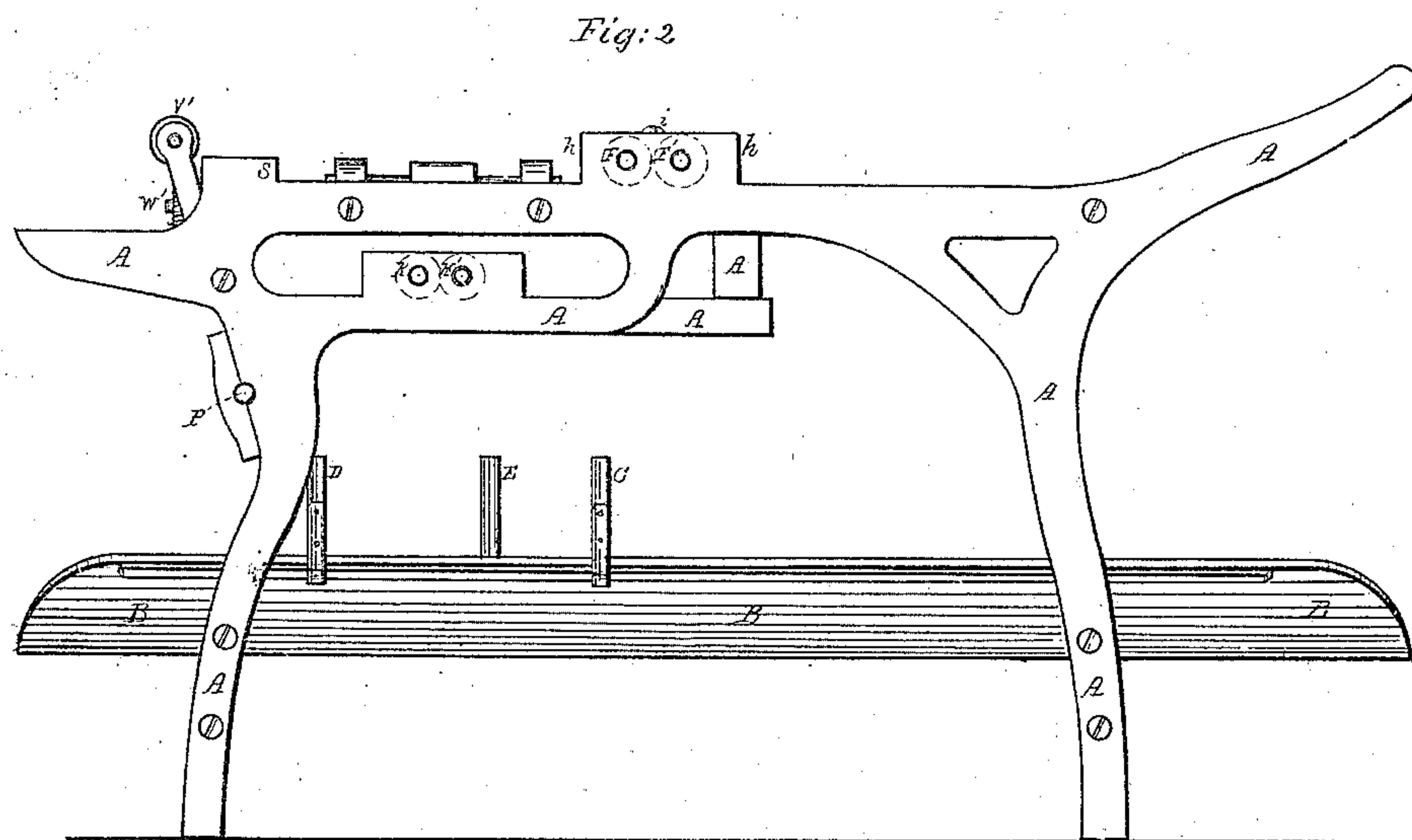
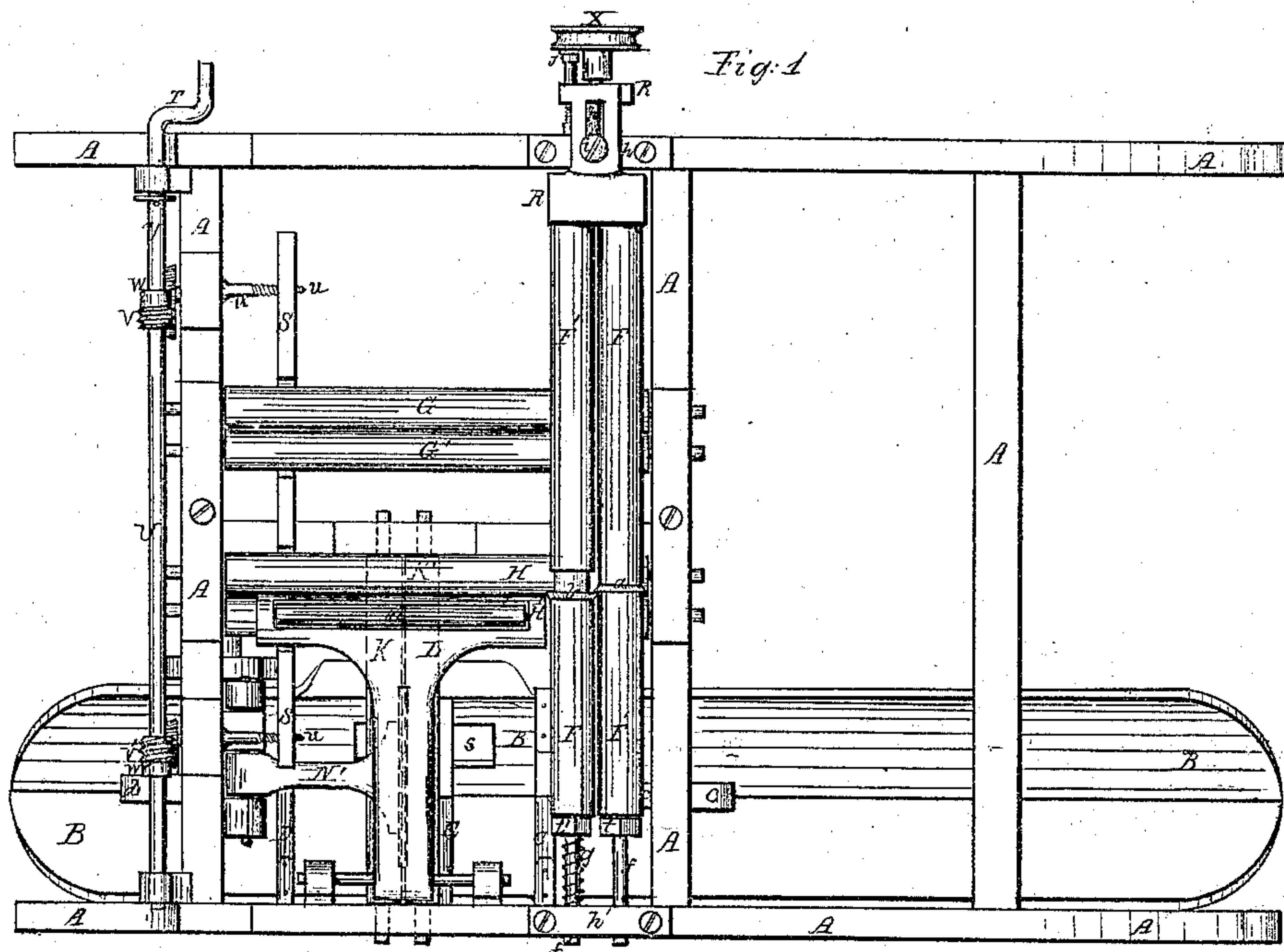


C. Chambers, Jr.,
Paper Folder.

No. 113256.

Patented. April 4. 1871.



Witnesses
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United States Patent Office.

CYRUS CHAMBERS, JR., OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 113,256, dated April 4, 1871.

IMPROVEMENT IN PAPER-CUTTING AND FOLDING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, CYRUS CHAMBERS, JR., of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Machines for Folding, Cutting, and Packing Paper; and I do hereby declare the following to be a full and correct description of the same, reference being had to the accompanying drawing, in which—

Figure 1 is a plan or top view of a machine embodying my improvements.

Figure 2 is a side elevation of the same.

Figure 3 is an end elevation of the same.

Figure 4 is a horizontal central section through the first pair of rollers.

The same letter indicates the same part in the several figures.

These improvements consist—

First, in securing the cutters that sever the inset from the main sheet permanently in the rollers, and adjusting those rollers endwise, for the purpose of regulating the position of the cutters.

Second, in giving two strokes to the third folding-blade to one revolution of the main shaft, for the purpose of folding the "inset" and "outset" separately, and at equal intervals of time from each other.

Third, in devices for folding and packing the inset and outset either separately, or with the inset placed within the outset, as may be desired.

In the accompanying drawing—

A marks the frame of the machine.

B, the packing-trough.

C, D, and E, the plungers that operate in trough B.

F F', the first pair of rollers to which the cutters *a b* are attached.

G G', the second pair of rollers.

H H', the reversing or third pair of rollers.

K K', the fourth pair of rollers.

L, the second knife.

M, the drop-roller.

N, the third knife with its arm N'.

P, the cam-shaft.

Q, cam.

R, cap.

S, stop.

T, winch.

U, worm-shaft.

V V', worms.

W W', worm-wheels.

X, adjusting-screw of cap R.

a, the cutter on roller F.

b, the cutter on roller F'.

c, the back brace of plunger C.

d, the back brace of plunger D.

e, lug on plunger E, which projects through a slot, *s*, in the inner side of trough B.

f, the shaft of roller F.

f', the shaft of F'.

g, a spiral spring around shaft *f'*.

h h', boxes of rollers F F'.

i, set-screw for adjusting cap R.

j, set-screw for adjusting roller F'.

p, slot in top of cap R.

q, yoke embracing neck of roller F.

t t', nuts on roller-shafts *f f'*.

u u, screws supporting stop S.

The cutters *a b* are secured in the rollers F F' by making the shorter ends of the rollers, sleeves, sliding over the shafts *f f'* of their longer ends, and pressing the cutters between them by the operation of the nuts *t t'* on the shafts. This construction is clearly shown in fig. 4. By it the roller-shafts are stiffened, and the cutters are firmly held between the sections of the roller without the use of holes, and screws through them, as heretofore employed.

The cutters *a b* are kept in contact, when desired, by the spiral spring *g* around the roller-shaft *f'*, and bearing against its box *h'*.

The roller-shafts *f f'* are made with long journals on them to slide through their boxes *h h'*, and the rollers F F' are held in position and adjusted by a yoke or finger, *q*, projecting downward from the under side of the cap or shield R into a groove in the roller F, to the shaft of which the spring *g* is not attached. This is clearly shown in fig. 4.

The cap R slides in a groove in box *h*, and is adjusted by the screw X, with a milled head, screwing into the side frame, and fixed by set-screw *i*.

The screw *j* in the sliding cap R, opposite to the center of the roller F', on whose shaft *f'* the spring *g* is placed, is so arranged as to strike against the end of the shaft on roller F', and, when run in, forces the cutters *a b* apart, and retains them so by compressing the spring *g* on shaft *f'*.

The screw *j* is of such length as to force the cutters *a b* just the distance apart they are required to be, when not intended to cut, and to retain them in that relative position without reference to the position of the shield, or that of the rollers relatively to other parts of the machine.

The stop S is sometimes supported on bars, as described in various patents for folding-machines granted to me, and is moved and retained on said bars by means of two screws. Sometimes, as in the present case, I support it wholly by the screws *u u*.

The shanks of these screws run in projections on the main frame, as shown in fig. 1. They have each a collar on the inside of said projections, and a worm-wheel, W or W', fig. 3, on the outside.

The wheels W W' are driven, respectively, by the worms V V' on the worm-shaft U, having the winch

T on its end, figs. 1 and 3, by which the shaft is rotated.

The rotation of this shaft imparts a slow, uniform, and parallel motion to the stop S, which can be adjusted with great exactness and convenience to any desired position, and will not be affected by the jar of the machine. Great accuracy and permanence of register are thus obtained.

The folding-rollers G G' and the reversing-rollers H H', with the drop-rollers, are arranged in the usual manner, and their tapes are so arranged as to carry the inset and the outset independently of each other.

The folding-knife N has two movements or throws for each revolution of the cam-shaft P, or for each whole sheet fed to the machine, said double throw being obtained from the double cam Q operating said knife by its arm N'.

By timing the drop-roller so as to start the inset in time to arrive at the second stop just half a revolution of shaft P before the outset, the inset only will be folded by the first descent of knife N; and the outset coming up just half a revolution behind the inset is folded by the succeeding stroke of knife N, made by the same revolution of the cam-shaft, whereby the inset and outset are folded separately and at equal intervals of time from each other.

The reciprocating plunger E in the packing-trough B has a motion back and forth, one throw each way for each revolution of the main shaft, said motion being obtained from an eccentric in the usual manner, and being alike in both directions.

The trough B, measuring from the intersection of rollers K K', projects toward the front end of the machine to about one-half the length that it projects toward the rear end of the machine, so that as many sheets of sixteen pages can be packed in the rear end of the trough as the front end will hold sheets of eight pages.

The motion of plunger E is so timed relatively to that of folding-knife N that the plunger is at the end

of its stroke toward the shorter end of the trough B when the third fold is made in the outset, or sixteen-paged signature, which allows that signature to drop into and be packed in the longer end of trough B, the plunger E pressing it against plunger C during its backward stroke.

When plunger E moves toward C the eight-paged signature or inset drops in between it and plunger D, and is packed against D by the return stroke of plunger E.

It is evident that if the movements of the drop-roller be so timed as to bring the inset to the last stop at the same instant with the outset, they would be folded together and packed together in the long end of the trough.

Having thus fully described my improvements,

What I claim, and desire to secure by Letters Patent, is—

1. The folding-rollers F F' having cutters *a b* attached, when made to slide endwise by means of screw X, yoke R, and spring *g*, for the purpose of adjusting the position of the cutters relatively to the sheet to be severed, as specified.

2. The folding-blade N, having two strokes imparted to it by the double cam at one revolution of the main shaft, and to a single stroke of the other folding-blades, as and for the purpose specified.

3. The reciprocating plunger, in combination with two sliding plungers, C D, working in the double packing-box B, as described, for the purpose of packing different signatures folded by the same mechanism, either separately or together, as preferred.

The above specification of my said invention signed and witnessed at Philadelphia this 20th day of May, A. D. 1870.

CYRUS CHAMBERS, JR.

Witnesses:

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