

H. M. BARBER.
CUTTING AND FOLDING MACHINE.
APPLICATION FILED JAN. 19, 1910.

1,013,919.

Patented Jan. 9, 1912.

3 SHEETS-SHEET 1.

Fig. 2.

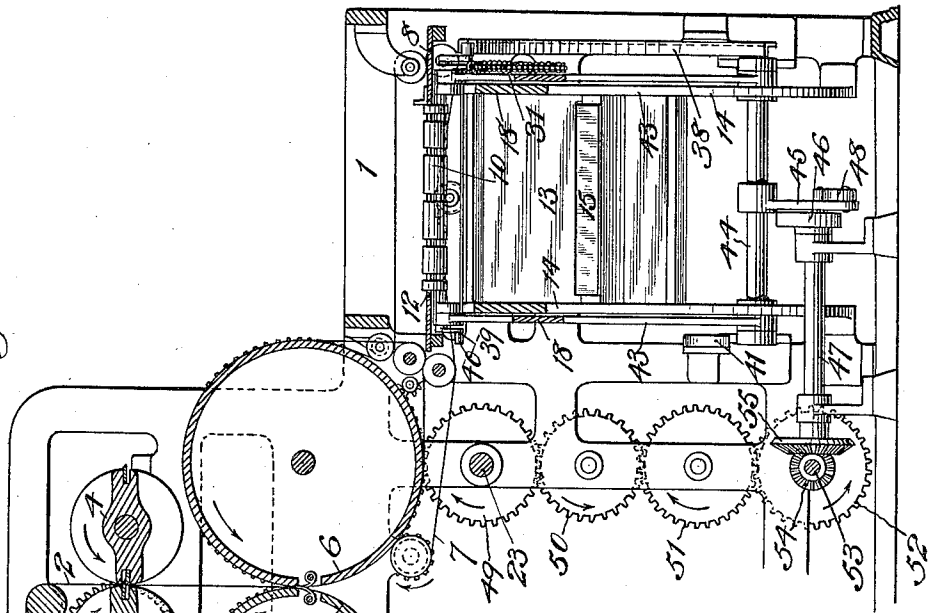
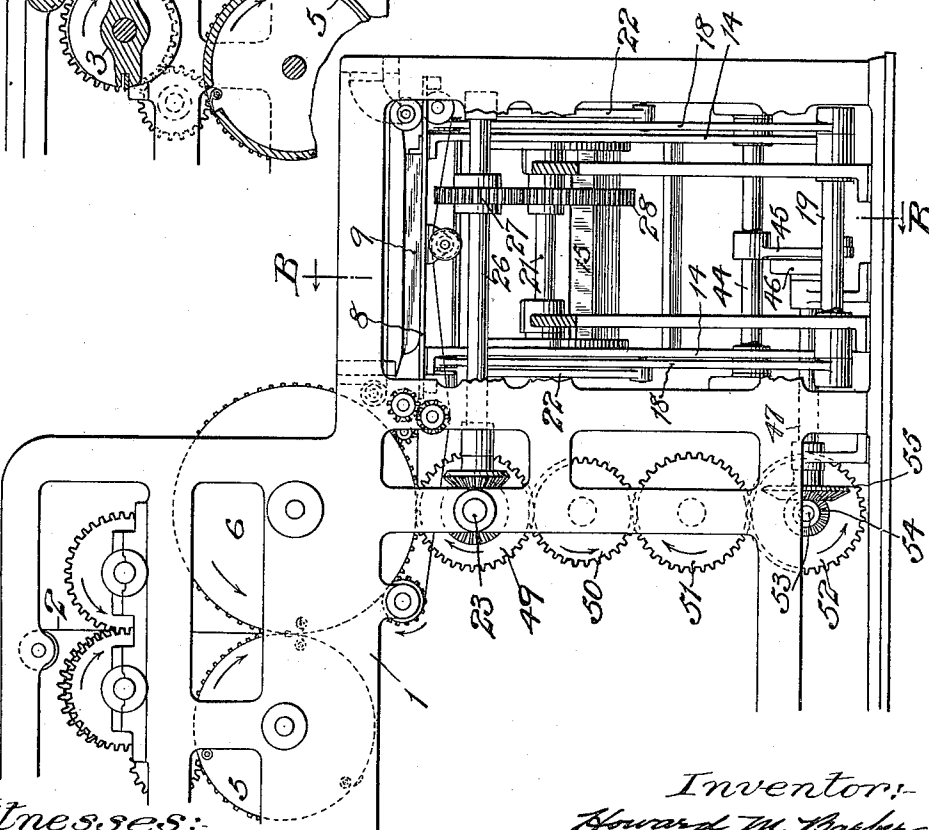


Fig. 1.



Witnesses:
F. George Barry,
Henry C. Thoms.

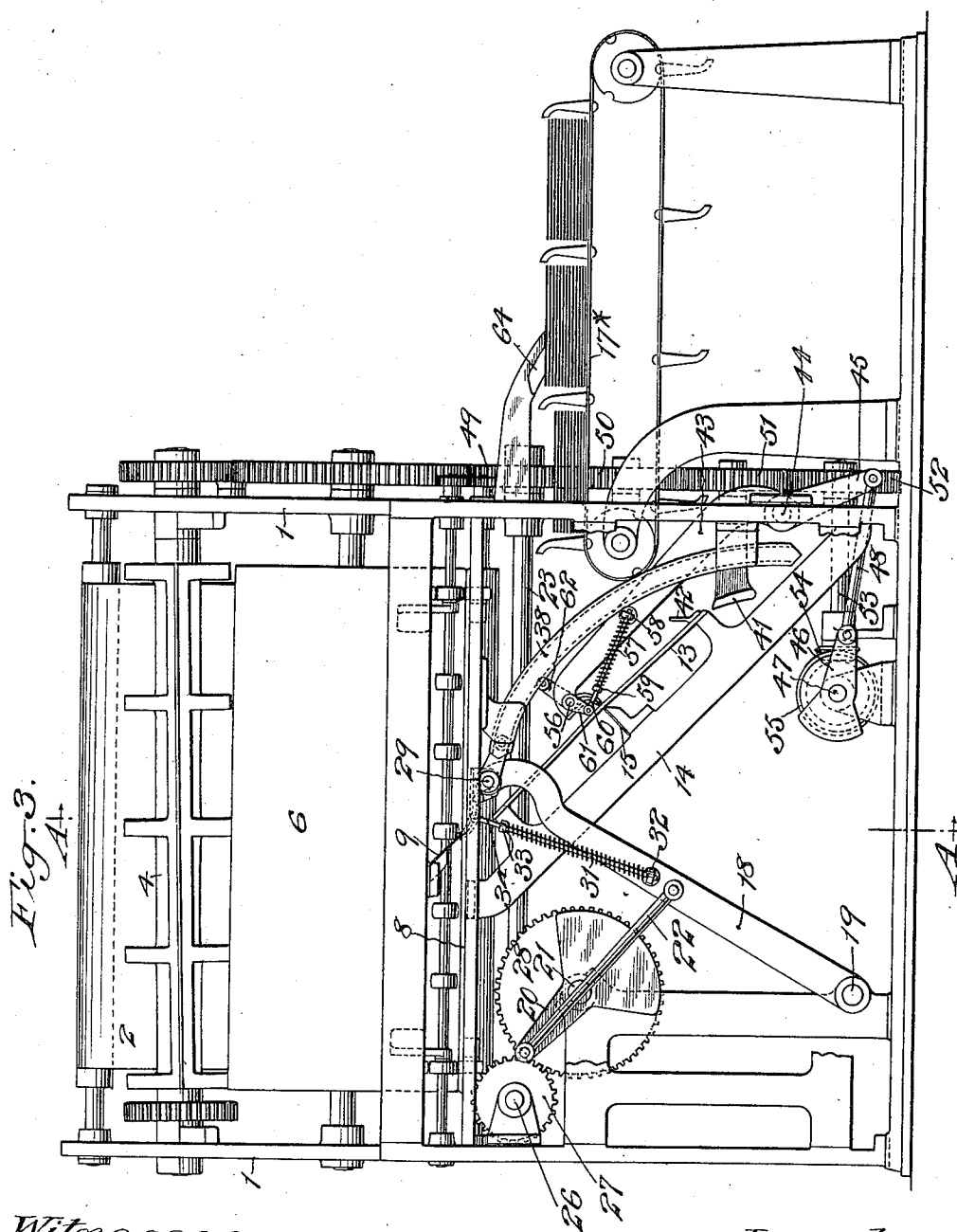
Inventor:
Howard M. Barber
by his attorneys
Thompson & Howard

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Henry B. Thorne.

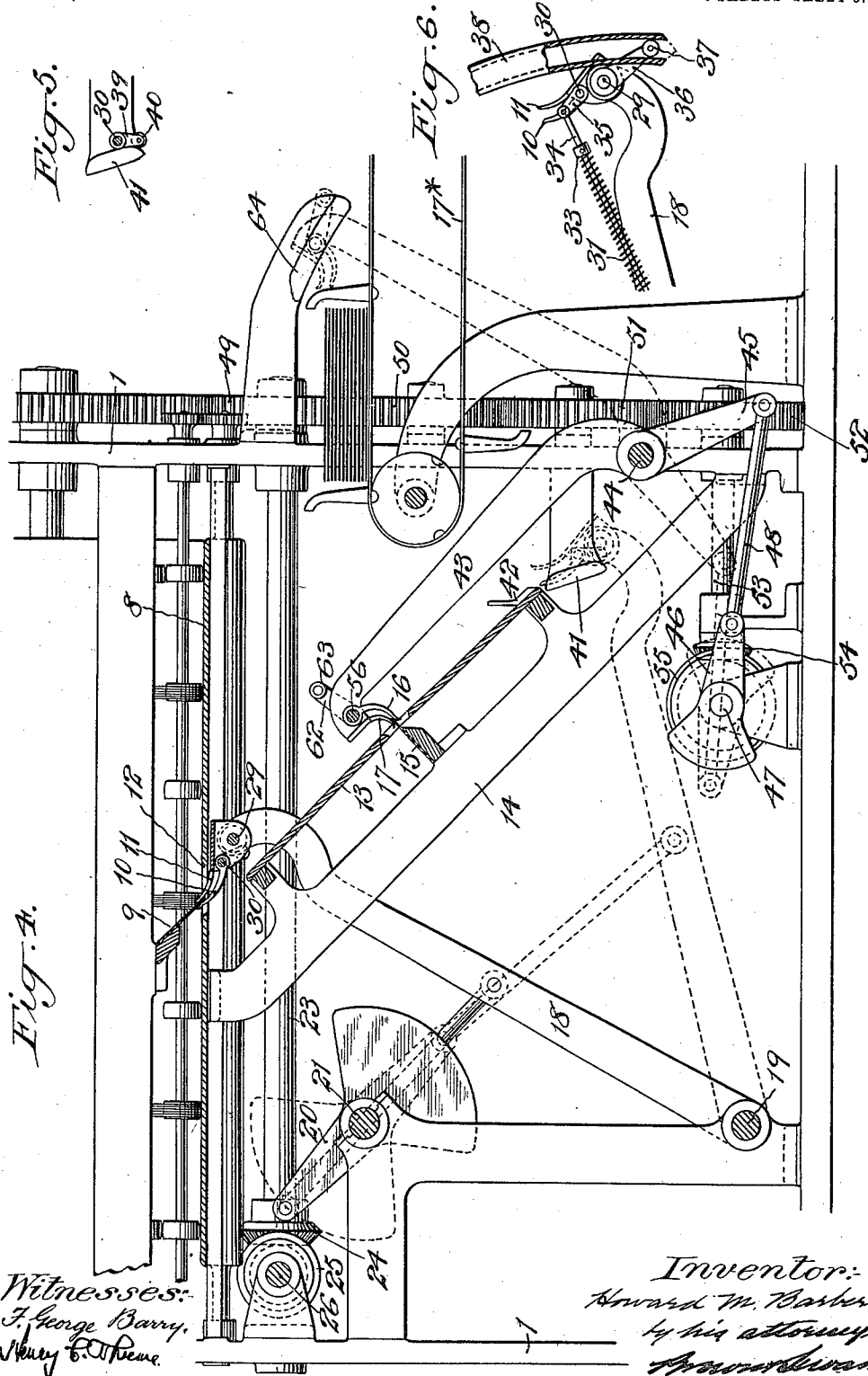
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3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

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

CUTTING AND FOLDING MACHINE.

1,013,919.

Specification of Letters Patent.

Patented Jan. 9, 1912.

Application filed January 19, 1910. Serial No. 538,929.

To all whom it may concern:

Be it known that I, HOWARD M. BARBER, a citizen of the United States, and resident of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Cutting and Folding Machines, of which the following is a specification.

This invention relates to machines for cutting and folding paper or other fabrics and has for its object to provide certain improvements in the construction, form and arrangement of the several parts of the folding mechanisms whereby the delivery of the output may be facilitated.

One part of this invention consists in providing a folding table onto which the sheets are brought and coacting folding mechanism comprising a stationary folding blade located beneath the sheets and a set of folding jaws located above the sheets, said jaws being arranged to fold the sheets on the folding blade and then carry the so folded sheets into position to be deposited upon a sheet receiving device, such, for instance, as a sheet delivery carrier.

Another part of this invention consists in providing a table to which the sheets are fed, reciprocating means for forwarding the sheets from said table to a folding table, and devices, as above described, for folding and carrying the sheets to a delivery carrier or other sheet receiving means.

Another part of this invention consists in providing one folding table onto which the sheets are fed, a folding mechanism therefor in which the folding blade is located above the table and the folding jaws work from beneath the table, the said folding jaws being arranged to convey the sheets to a second folding table, and a folding mechanism coacting with the second folding table, said last-named folding mechanism comprising a folding blade located beneath the sheets and folding jaws operating from above the table for folding the sheets and carrying them to a sheet receiving means such, for instance, as a delivery carrier.

In the folding machine illustrated herein, the two folding mechanisms are arranged to impart a first parallel fold and a second parallel fold to the sheet or sheets fed thereto.

In the accompanying drawings, Figure 1 represents in side elevation that portion of a cutting and folding machine which includes my improved folding mechanism, Fig. 2 is a longitudinal vertical section taken in the plane of the line A—A of Fig. 3, looking in the direction of the arrows, Fig. 3, is an end view of the machine, Fig. 4 is an enlarged detail section taken in the plane of the line B—B of Fig. 1, looking in the direction of the arrows, certain of the parts being shown in one position in full lines and in another position in dotted lines, Fig. 5 is a fragmentary view showing the cam for opening the folding jaws of the first folding table to deliver the sheet onto the second folding table, and Fig. 6 is a fragmentary view showing the means for guiding the folding jaws of the first folding table in their movement back and forth across the second folding table.

The main frame of the cutting and folding machine is denoted by 1, in which frame are mounted the several parts of the machine. The main printed web 2, which comes from the printing press, passes between a pair of rotary cutters 3, 4, downwardly into engagement with a collecting cylinder 5 and transfer cylinder 6. Tape carriers 7, passing around suitable pulleys, are arranged to deliver the sheets onto the first folding table 8, which table is herein represented as being arranged in a horizontal position. The folding mechanism for this first table 8 comprises a folding blade 9 located above the table and a pair of folding jaws 10, 11, arranged to coact with the folding blade from beneath the table, the table being provided with a slot 12 through which the jaws 10, 11, extend for folding the sheets over the blade 9 and through which slot the so folded sheets are withdrawn from the table 8. This folding of the sheets is accomplished by causing the jaws 10, 11, to force the sheets over the edge of the folding blade 9.

A second folding table 13 is located below the first folding table 8, which second folding table is, in the present instance, located on an incline and supported by a part 14 of the main frame 1. The folding mechanism for this second folding table 13 comprises a folding blade 15 projecting upwardly from beneath the table and a pair of folding jaws

16, 17, arranged to fold the sheets onto the folding blade from above the table.

A sheet receiving device, such, for instance, as an endless pocketed delivery carrier 17*, is located in position to receive the sheets from the folding jaws of the second folding mechanism. The folding jaws of the first folding mechanism are arranged to deliver the folded sheets from the first folding table onto the second folding table, as follows:—A pair of side arms 18 are pivoted at 19 in the machine frame, one of which arms is connected to the crank arm 20 of a shaft 21 by a connecting rod 22. This shaft 21 is rotated from a cross shaft 23 through bevel gears 24, 25, shaft 26 and spur gears 27, 28. The arms 18 have a rock shaft 29 loosely mounted in their free ends, upon which rock shaft are fixed the series of jaws 11 of the folding device.

The series of jaws 10 of the folding devices are fixed to a rock shaft 30 passing through and loosely mounted in the jaws 11 so that the jaws 10 may swing with the jaws 11 as well as have an independent swinging movement with respect to the said jaws. The jaws 10 are held yieldingly pressed against the jaws 11 by a spring 31 interposed between a lug 32 on one of the rock arms 18, and a shoulder 33 fixed to a slide bar 34, one end of which bar slides freely through the lug 32 and the other end of which bar is attached to an arm 35 fixed to the shaft 30, to which shaft the jaws 10 are also fixed. The shaft 29, on which the jaws 11 are fixed, is provided with an arm 36 provided with a stud or roller 37 arranged to travel in the groove of a curved cam 38, the shape of which cam is such that, as the arms 18 are rocked back and forth, the free ends of the folding jaws 10, 11, are caused to travel in substantially a right line, back and forth along the top of the second folding table 13. The shaft 30 is further provided with an arm 39 having a stud or roller 40 arranged to be engaged by a fixed cam 41 for opening the jaws 10, 11, as the arms 18 approach the limit of their movement away from the first folding table 8, across the second folding table 13, for permitting the folded sheets to be deposited onto the second folding table. A stop 42 is provided on the second folding table 13 for supporting the first folded sheets in position thereon.

The folding mechanism for the second folding table is constructed, arranged and operated as follows:—A pair of arms 43 are fixed to a rock shaft 44 loosely mounted in the machine frame 1. These arms 43 are rocked with the shaft by providing the shaft with an arm 45, the free end of which is connected to the crank 46 of a shaft 47 by a connecting rod 48. This shaft 47 is driven from the shaft 23 through spur gears

49, 50, 51, 52, shaft 53, and bevel gears 54, 55. The series of jaws 17 of the folding mechanism extend across between the ends of the pair of rock arms 43 and are fixed with respect thereto. The series of jaws 16 are fixed to a rock shaft 56 loosely mounted in the free ends of the rock arms 43. These jaws 16 are yieldingly held closed against the jaws 17 by a spring 57 interposed between a lug 58 on one of the arms 43 and a shoulder 59 on a bar 60, one end of which bar is fitted to slide freely through the lug 58 and the other end of which bar is secured to an arm 61 fixed to the shaft 56. This shaft 56 is further provided with an arm 62 provided with a stud or roller 63 arranged to be engaged by a fixed cam 64 for opening the jaws as the arms 43 approach the limit of their movement away from the table 13 for depositing the twice folded sheets onto the delivery carrier 17*.

From the above description it will be seen that to the sheets are imparted first and second parallel folds, the first folding operation being from beneath the first folding table and the second folding operation from above the second folding table. This arrangement permits the very rapid folding and delivery of the product and also permits such an arrangement of the parts as to materially reduce the space in which the operations are accomplished.

The timing of the parts is such as to permit the deposit of the first folded sheets on the second folding table as the twice folded sheets are being deposited onto the delivery carrier.

By the use of the inclined folding table 13 I am enabled to so arrange the sheet receiving device *i. e.* the delivery carrier 17*, as to permit the folding jaws to transfer the sheets from the folding table 13 to the sheet receiving device without lifting the sheets to any material degree. This results in a material saving in power and also obviates the necessity of requiring the jaws to grip the folded product with great pressure sufficient to lift the same and obviates any tendency on the part of the product to drop by gravity, because of its weight, from the grasp of the folding jaws.

It is evident that various changes might be resorted to in the form and arrangement of the several parts without departing from the spirit and scope of my invention; hence I do not wish to limit myself strictly to the structure herein set forth, but

What I claim is:—

1. In a folding machine, an inclined folding table, a fixed folding blade, a set of reciprocating folding jaws arranged to coact with the folding blade from above the table and means for bringing the sheets into position on the folding table over the folding blade.

2. In a folding machine, an inclined folding table, a folding blade, a set of reciprocating folding jaws arranged to coact with the folding blade from above the table and means reciprocating in substantially right lines for bringing the sheets into position on the folding table.

3. In a folding machine, a delivery carrier, an inclined folding table, a fixed folding blade means for bringing the sheets into position on the folding table over the folding blade and a set of reciprocating folding jaws arranged to coact with the folding blade from above the table for folding the sheets and transferring them to the delivery carrier.

4. In a folding machine, two folding tables and their folding mechanisms each folding mechanism including a fixed folding blade and a set of folding jaws arranged to co-act therewith, the folding jaws of the first folding mechanism operating to fold the sheets from the first folding table and transfer them onto the second folding table over its folding blade.

5. In a folding machine, a horizontal folding table, an inclined folding table and their folding mechanisms each folding mechanism including a fixed folding blade and a set of folding jaws arranged to co-act therewith, the folding jaws of the folding mechanism for the horizontal table operating to fold the sheets from the horizontal table and transfer them onto the inclined folding table over its folding blade.

6. In a folding machine, two folding tables and their folding mechanisms each folding mechanism including a fixed folding blade and a set of folding jaws arranged to co-act therewith, the folding jaws of the first folding mechanism operating to fold the sheets off the first folding table and transfer them onto the second folding table over its folding blade and the folding jaws of the second folding mechanism operating to fold the sheets off from the second folding table.

7. In a folding machine, a horizontal folding table, an inclined folding table and their folding mechanisms each folding mechanism including a fixed folding blade and a set of folding jaws arranged to co-act therewith, the folding jaws of the folding mechanism for the horizontal table operating to fold the sheets off the horizontal table and transfer them onto the inclined table over its folding blade and the folding jaws of the folding mechanism for the inclined table operating to fold the sheets off from the inclined folding table.

8. In a folding machine, two folding tables and their folding mechanisms each folding mechanism including a fixed folding blade and a set of folding jaws arranged to co-act therewith, the folding jaws of the

first folding mechanism operating from below the first folding table to fold the sheets and transfer them onto the second folding table over its folding blade.

9. In a folding machine, two folding tables and their folding mechanisms each folding mechanism including a fixed folding blade and a set of folding jaws arranged to co-act therewith, the folding jaws of the first folding mechanism operating from below the first folding table to fold the sheets and transfer them onto the second folding table over its folding blade and the folding jaws of the second folding mechanism operating from above the second folding table to fold the sheets off therefrom.

10. In a folding machine, a delivery carrier, two folding tables and their folding mechanisms, each folding mechanism including a fixed folding blade and a set of folding jaws arranged to co-act therewith, the folding jaws of the first folding mechanism operating to fold the sheets from one table and transfer them onto the other table over its folding blade and the folding jaws of the second folding mechanism operating to fold the sheets from the second folding table and transfer them to the delivery carrier.

11. In a folding machine, a delivery carrier, two folding tables and their folding mechanisms, each folding mechanism including a fixed folding blade and a set of folding jaws arranged to co-act therewith, the folding jaws of the first folding mechanism operating from below the first folding table to fold the sheets and transfer them to the second folding table over its folding blade and the folding jaws of the second folding mechanism operating from above the second folding table to fold the sheets off therefrom and transfer them to the delivery carrier.

12. In a folding machine, two folding tables and their folding mechanisms including folding jaws, a rocking support for reciprocating the folding jaws of the folding mechanism for the first folding table across the face of the second folding table and means for causing the free ends of the said jaws to travel in a substantially right line.

13. In a folding machine, two folding tables and their folding mechanisms including folding jaws, rocking supports for the folding jaws of both folding mechanisms whereby the folding jaws of one folding mechanism are operated to transfer the folded sheets from one folding table onto the other folding table and the folding jaws of the other folding mechanism are arranged to transfer the sheets from the last-named folding table to a sheet receiving device.

14. In a folding machine, two folding tables and their folding mechanisms including

folding jaws, rocking supports for the folding jaws of both folding mechanisms whereby the folding jaws of one folding mechanism are operated to transfer the folded
5 sheets from one folding table onto the other folding table, and the folding jaws of the other folding mechanism are arranged to transfer the sheets from the last-named folding table to a sheet receiving device, the
10 first-named folding jaws operating from beneath the first-named folding table and the

second-named folding jaws operating from above the last-named folding table.

In testimony, that I claim the foregoing as my invention, I have signed my name in 15 presence of two witnesses, this fourteenth day of January, 1910.

HOWARD M. BARBER.

Witnesses:

A. R. STILLMAN,
G. BURDICK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
