

No. 650,543.

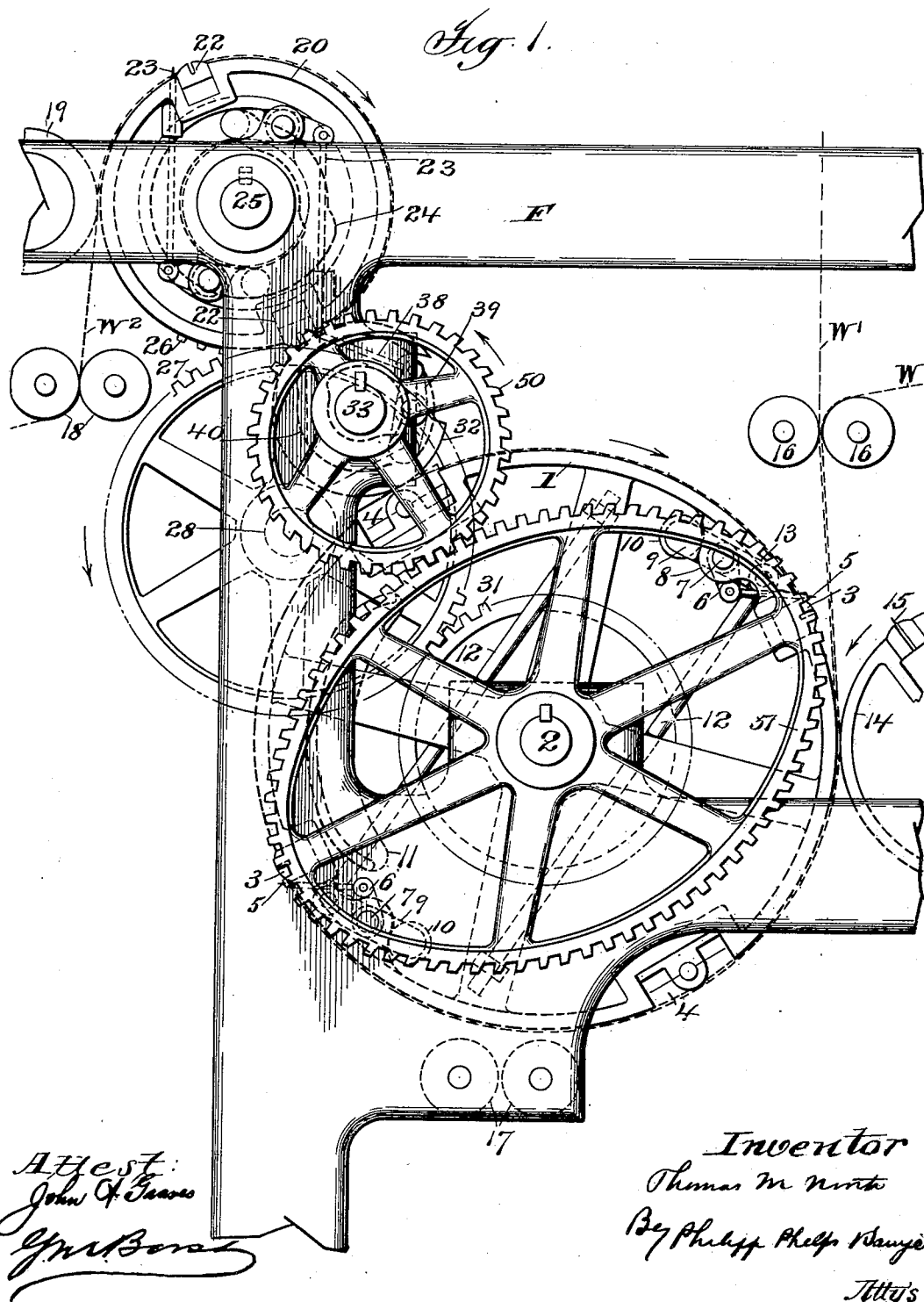
Patented May 29, 1900.

T. M. NORTH.
ASSOCIATING MECHANISM.

(Application filed Oct. 6, 1899.)

(No Model.)

3 Sheets—Sheet 1.



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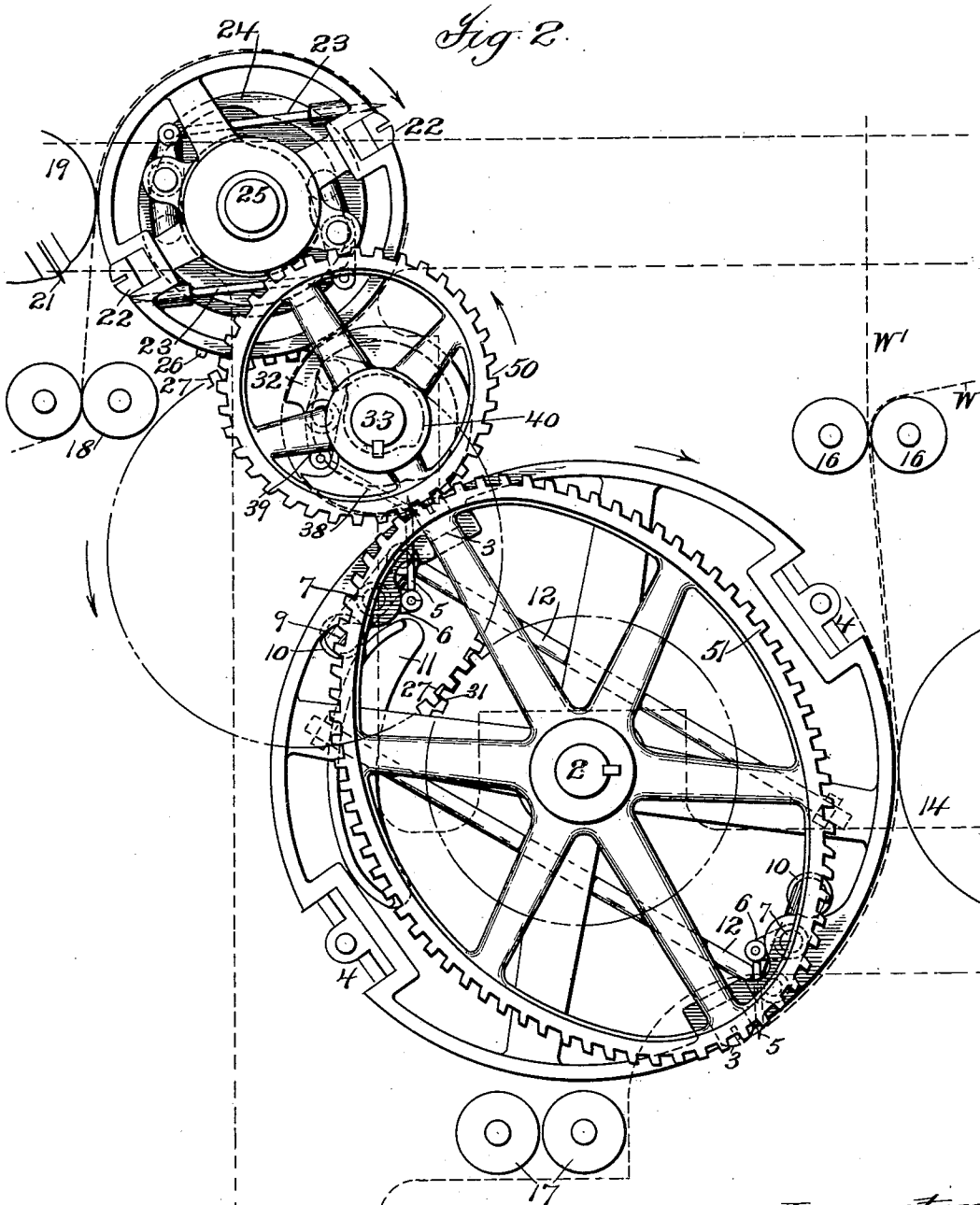
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(Application filed Oct. 6, 1899.)

(No Model.)

3 Sheets—Sheet 2.



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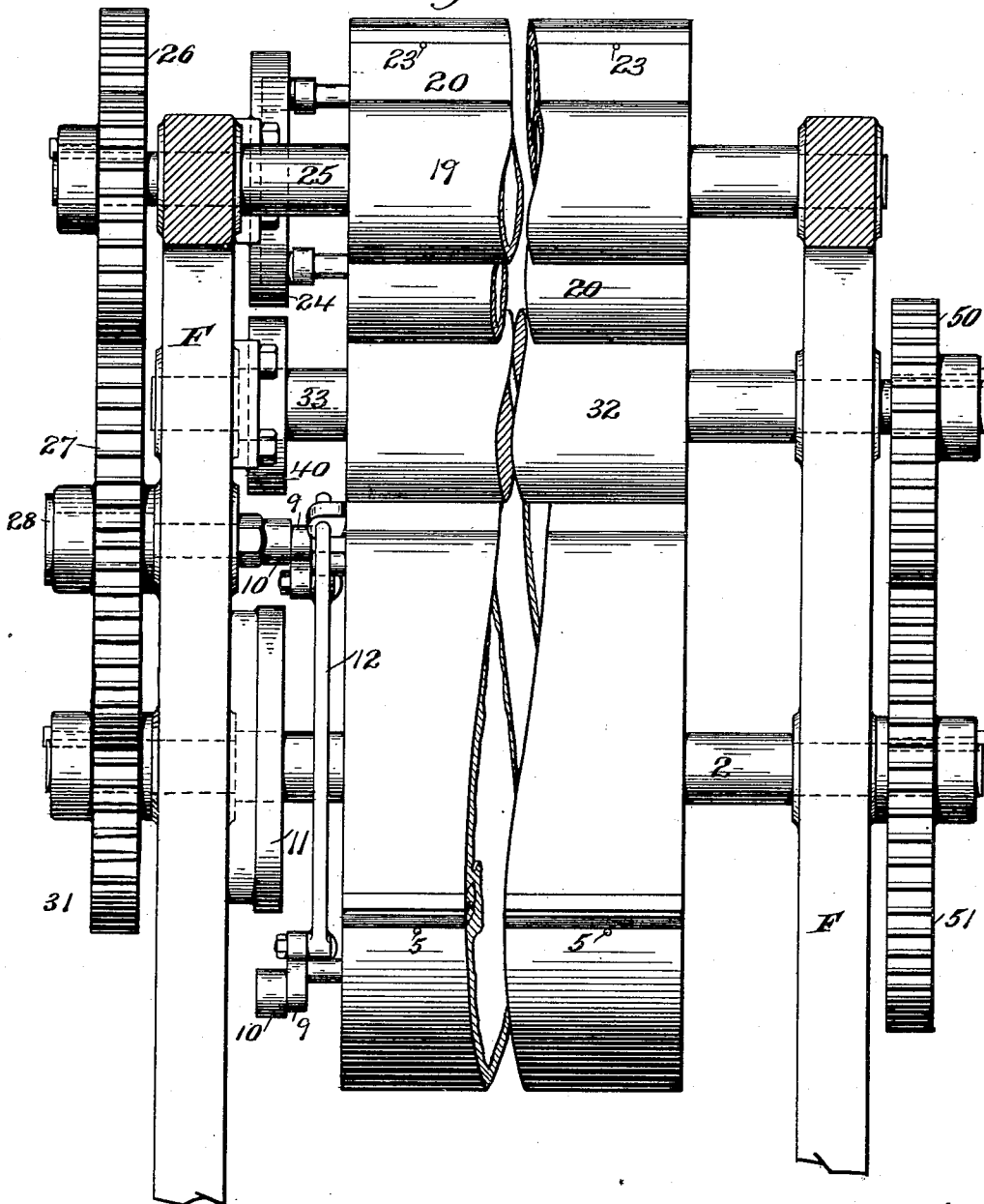
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ASSOCIATING MECHANISM.

(Application filed Oct. 6, 1899.)

(No Model.)

3 Sheets—Sheet 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS M. NORTH, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE,
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ASSOCIATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 650,543, dated May 29, 1900.

Application filed October 6, 1899. Serial No. 732,766. (No model.)

To all whom it may concern:

Be it known that I, THOMAS M. NORTH, a subject of the Queen of Great Britain and Ireland, residing at New York city, county of Kings, and State of New York, have invented certain new and useful Improvements in Associating Mechanism, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in devices for associating moving products whether in web or sheet form—such, for instance, as the products of printing-machines.

In another application, Serial No. 732,765, filed of even date herewith, I have described a mechanism for associating a sheet cut from a web or webs moving at a faster speed, the object of the particular mechanism set forth in said application being to produce a paper which consists of a number of pages other than four or a multiple of four. In the machine described in said application two forwarding mechanisms are employed, one of said mechanisms consisting of a pair of cutting-cylinders moving at a slow speed and the other of a pair of cutting and folding cylinders moving at a high speed. The sheet is taken from one of the pair of cutting-cylinders moving at a slow speed at the speed of that cylinder and is delivered to one of the pair of cutting and folding cylinders moving at a high speed, the transfer being accomplished by a mechanism which moves at a varying speed, said speed being at times the speed of the slowly-moving cylinder and at times the speed of the more rapidly moving cylinder. In the machine described in the said application the varying speed of the transfer mechanism is effected by means of a crank driving mechanism.

The object of the present invention is to effect the results set forth in that application by the use of a transferring mechanism driven by intermeshing gears, thus doing away with the crank-driving mechanism.

With this and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations, as will be hereinafter described and then fully set forth in the claims hereunto appended.

In the accompanying drawings, forming a part of this specification, and in which like characters of reference indicate the same parts, Figure 1 is a view of the cutting and folding cylinders of an ordinary web-printing machine with the improved form of transfer mechanism shown in connection therewith. Fig. 2 is a view similar to Fig. 1 with the parts in different positions. Fig. 3 is a sectional front elevation of the construction shown in the other figures.

Referring to the drawings, F indicates a frame in which the mechanism hereinafter described is mounted.

1 indicates a cutting and folding cylinder, said cylinder being mounted on a shaft 2, which finds its bearings in the frame F, before referred to. This folding-cylinder is provided with the usual cutting-blocks 3 and folding-blades 4, these devices being of any usual or preferred form. The cylinder is further provided with any suitable form of sheet taking and retaining devices. These devices preferably consist of retaining-pins 5, working through apertures in the cylinder, said pins being controlled by rock-arms 6, mounted on shaft 7. This shaft is journaled in suitable ears 8 and has projecting arms 9, the arms being preferably provided with friction-rolls 10. These friction-rolls are arranged to contact with a suitable stationary cam 11, mounted on the frame, the function of which is to draw the pins into the cylinder at suitable times. The pins are thrown forward by spring-controlled rods 12, which are connected to arms 13 on the shaft 7. This being an ordinary construction, the springs have been omitted from the drawings. Coöperating with the cylinder 1 is a knife-carrying cylinder 14, said cylinder carrying a knife 15, which coöperates with the cutting-blocks before referred to.

16 indicates guide-rollers by which a web or a series of associated webs are led to the cutting-cylinders 1 and 14. These rolls 16 may be the drawing-off rolls of a longitudinal folder or they may be simply guide-rollers, as shown.

At 17 are indicated a pair of folding rolls with which the blades coöperate to fold the product of the cylinder 1.

The present machine is designed to associate with a web or webs running at full speed

a sheet which is cut from a web which is running at half-speed, the purpose being in the machine shown to make a ten-page paper in which eight pages will be furnished by the two webs W and W' (shown as running through the guide-rollers 16) and the other two pages will be formed by a sheet cut from the half-speed web W² and associated with the two webs referred to by the mechanism to be hereinafter described.

The half-speed web W², which comes from any suitable form of printing mechanism, is shown as being forwarded by guide-rolls 18. From the guide-rolls 18 it is delivered to a pair of cutting-cylinders 19 and 20. The cutting-cylinder 19 is provided with the usual form of knife 21, said knife coöperating with blocks 22, carried by the cylinder 20. The cylinder 20 is provided with any suitable form of sheet taking and retaining devices—as, for instance, the usual sheet-taking pins 23, said pins being controlled in an obvious manner by means of a stationary cam 24.

The cutting-cylinder 20 is mounted on a shaft 25 and may be driven in any desirable way. In the machine shown it is driven by a gear 26, which meshes with a gear 27, said gear being mounted on a stud 28, which is secured to the frame F. The gear 27 meshes with a gear 31, mounted on the shaft 2 of the folding-cylinder 1. The gearing just described is arranged in the machine shown so that the cylinder 20 may be driven at half the speed of the folding-cylinder 1, or, in other words, at the speed of the incoming web W². It will be further remarked that while the gearing described is a convenient and ready means for driving the said cylinder 20 any other suitable or desirable form of gearing may be used.

It being borne in mind that the cutting and folding cylinder 20 is running at half the surface speed of the folding-cylinder 1, it will readily be understood that the sheet which is taken therefrom and which is to be delivered to the folding-cylinder 1 must be brought up to the speed of that cylinder.

In the machine shown the transfer of the sheet from the cylinder 20 to the cylinder 1 is effected by a transfer-cylinder or sheet-carrier 32. This transfer cylinder or carrier is mounted on a shaft 33, which finds its bearings in the side frames of the folder.

While any form of direct gearing may be used which will give the cylinder 32 the variable speed required, this cylinder will preferably be operated by the construction hereinafter described.

The shaft 33 of the cylinder 32 is provided with a gear 50, the said gear being eccentrically mounted on the said shaft, as is clearly indicated in Fig. 1. The gear 50 meshes with an elliptical gear 51, which is mounted on the shaft 2 of the folding-cylinder 1. It is obvious that if the shaft 2 of the folding-cylinder 1 be driven at a regular rate of speed the elliptical gear 51 will drive the gear 50,

and consequently the cylinder 32, at varying rates of speed. The said gear 50 will be driven at its highest speed when it is engaged by the teeth of the gear 51 which are substantially in line with the major diameter of the elliptical gear 51 and will be driven at its lowest speed when it is engaged by the teeth which are substantially in line with the minor diameter of the elliptical gear 51. Between these two speeds the gear 50, and consequently the cylinder 32, will be driven at a varying speed, said speed constantly increasing and decreasing, according to the position of the elliptical gear 51. The gears 50 and 51 are so proportioned that when the gear 50 is running at its slowest speed the surface speed of the cylinder 32 will coincide with the surface speed of the cylinder 20, and when the gear 50 is being driven at its highest speed its surface speed will coincide with the surface speed of the cylinder 1.

The transfer-cylinder 32 is provided with any usual form of sheet-taking devices—such, for instance, as pins 38, these pins being mounted on a rock-arm 39 and controlled in an obvious manner by a stationary cam 40. It is obvious from what has been said that if the pins on the cylinders 20 and 32 are properly arranged the pins 38 on the cylinder 32 will register with the pins 23 on the cylinder 20 and will take a sheet therefrom when the cylinders are moving at the same rate of speed. The cylinder 32 after its pins take the sheet has its speed gradually and constantly increased by the gears 50 and 51 during the half-revolution after taking the sheet, so that by the time the pins 38, carrying the sheet, meet the pins on the cylinder 1 they will be moving at the same surface speed as the pins on the cylinder 1, and consequently the sheet can be transferred from the pins on the transfer-cylinder to the pins on the cylinder 1 without sudden strain or jerk.

After the pins on the cylinder 1 have taken the sheet they carry it forward and associate it with the webs W' W², these webs being cut off by the knife 15 on the cylinder 14 and being folded off by the blades 4 in the usual manner.

It is to be understood that the arrangement of gearing by which the invention is carried into effect may be considerably varied. While, furthermore, the invention is shown in connection with a machine in which the forwarding mechanisms for advancing the products are cylinders, it is of course capable of use with any other suitable form or forms of forwarding mechanism. The invention, therefore, is not to be limited to the specific mechanism which has been described and illustrated. While, also, the invention is particularly designed for use with printing-machines, it is to be understood that it is also capable of use in other relations.

What I claim is—

1. In an associating mechanism, the combination with a forwarding mechanism run-

ning at one speed, of a forwarding mechanism running at a different speed, a transferring mechanism arranged between the two, and intermeshing gearing arranged to drive the transferring mechanism at a varying speed, said speed at times coinciding with the speed of each of the forwarding mechanisms, substantially as described.

2. In an associating mechanism, the combination with a carrier running at one speed, of a second carrier running at a different speed, and a gear-operated transferring-carrier interposed between the two and running at a varying speed, said speed at times coinciding with the speed of each of the other carriers, whereby the transferring-carrier may operate to receive the product from one of the carriers when it is running at the speed of that carrier and deliver it to the other carrier when it is running at the speed of that carrier, substantially as described.

3. In an associating mechanism, the combination with a carrier provided with sheet taking and retaining devices running at a given speed, of a second carrier provided with sheet taking and retaining devices and running at a different speed, and a gear-operated transferring-carrier located between the two and running at a varying speed, said speed at times coinciding with the speed of each of the other carriers, substantially as described.

4. In an associating mechanism, the combination with a folding-cylinder provided with sheet-taking devices and folding-off mechanism, of means whereby said cylinder is run at a given speed, a second cylinder provided with sheet-taking devices, means whereby said second cylinder is run at a speed which differs from that of the first cylinder, a transferring-cylinder located between the two cylinders, and intermeshing gearing driving said transferring-cylinder at a varying speed, said speed coinciding at times with the speed of each of the other cylinders, substantially as described.

5. In an associating mechanism, the combination with a pair of cutting and folding cylinders running at a given speed, one of said cylinders being provided with sheet taking and retaining devices, of a pair of cutting-cylinders running at a different speed from the cutting and folding cylinders, one of said cutting-cylinders being provided with sheet taking and retaining devices, means for leading a web to each pair of cylinders, a transferring-cylinder provided with sheet taking and retaining devices, and intermeshing gearing operating to drive said transferring-cylinder at a varying speed, said speed at times coinciding with the speed of each pair of cylinders, substantially as described.

6. In an associating mechanism, the combination with a pair of cutting and folding cylinders running at a given speed, one of said cylinders having one or more sets of sheet-retaining pins, of a pair of cutting-cylinders, one of said cutting-cylinders having one or more sets of sheet-retaining pins, said cutting-cylinders running at a different speed from the cutting and folding cylinders, means for leading a web to each pair of cylinders, a transferring-cylinder having a set of sheet-retaining pins located between the two pairs of cylinders, and intermeshing gearing for driving the transferring-cylinder at a varying speed, said speed coinciding at times with the speed of each pair of cylinders, substantially as described.

7. In an associating mechanism, the combination with a pair of forwarding-cylinders running at a given speed, of a pair of forwarding-cylinders running at a different speed, a transferring-cylinder interposed between the two pairs of forwarding-cylinders, and a pair of variable-speed gears, one of which is mounted on the shaft of the transferring-cylinder and the other of which is mounted on the shaft of one of the forwarding-cylinders, said variable-speed gears being arranged to drive the transferring-cylinder at times at the speed of one of the pairs of forwarding-cylinders and at times at the speed of the other pair of forwarding-cylinders, substantially as described.

8. In an associating mechanism, the combination with a pair of forwarding-cylinders running at a given speed, of a pair of forwarding-cylinders running at half that speed, of a transferring-cylinder located between the two pairs of forwarding-cylinders, and varying-speed gearing between the transferring-cylinder and the full-speed forwarding-cylinders, said variable-speed gearing being arranged to drive the transferring-cylinder at times at a speed coinciding with the speed of the full-speed cylinders and at times at a speed coinciding with the half-speed cylinders, substantially as described.

9. In an associating mechanism, the combination with a pair of cutting and folding cylinders, one of said cylinders having sheet receiving and retaining devices, of a pair of cutting-cylinders, one of said cylinders having sheet receiving and retaining devices, a transferring-cylinder interposed between the two and having sheet receiving and retaining devices, an elliptical gear on the shaft of one of the cutting and folding cylinders, an eccentric gear on the shaft of the transferring-cylinder, said elliptical and eccentric gears being arranged to drive the transferring-cylinder at times at the speed of the cutting and folding cylinders and at times at the speed of the cutting-cylinders, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

THOMAS M. NORTH.

Witnesses:

F. W. H. CRANE,
L. ROEHM.