No. 650,542. Patented May 29, 1900.

T. M. NORTH.

ASSOCIATING MECHANISM.

(Application filed Oct. 6, 1899.)

(No Model.) 3 Sheets—Sheet 1.

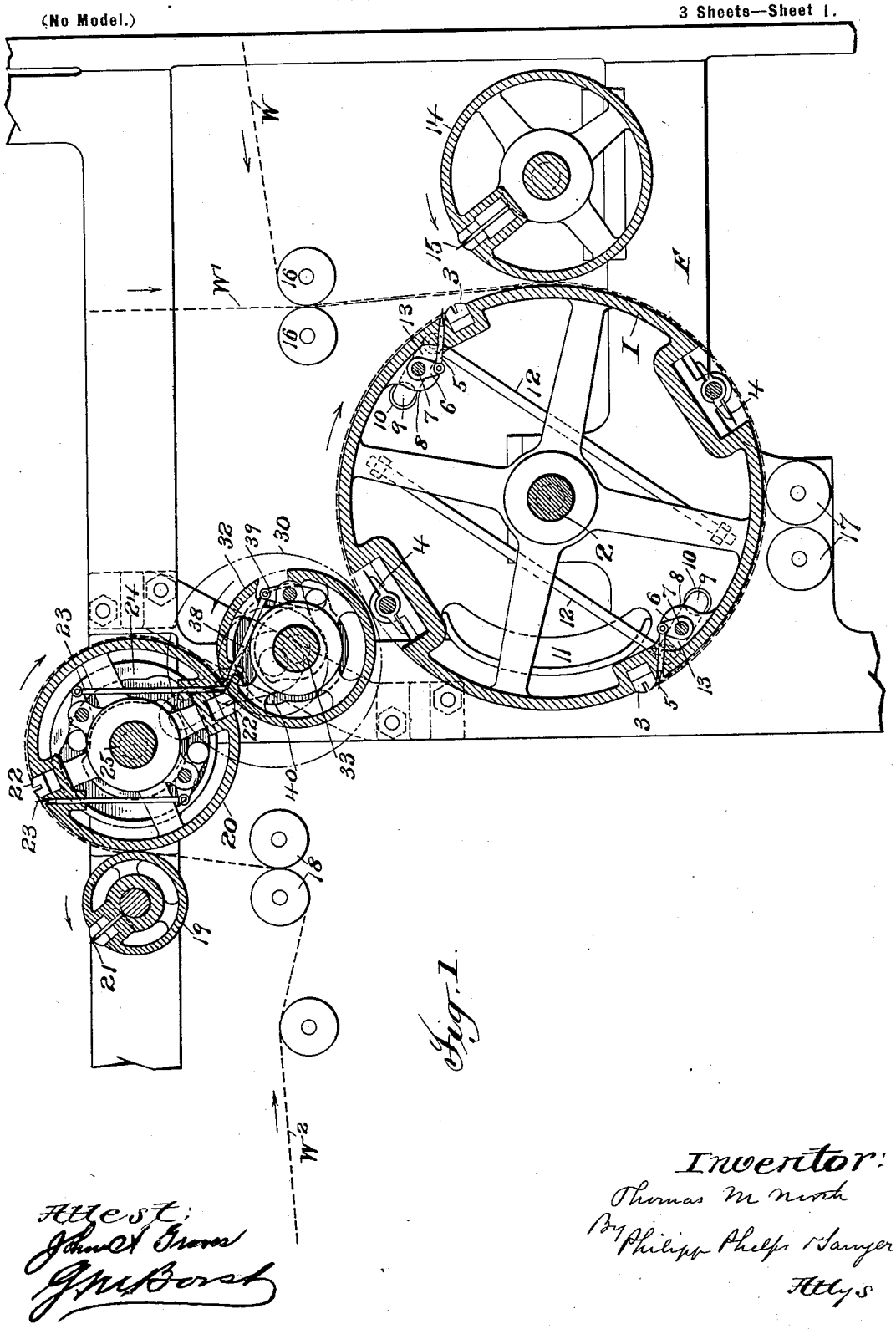


Fig. 1.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 3 Sheets—Sheet 2.

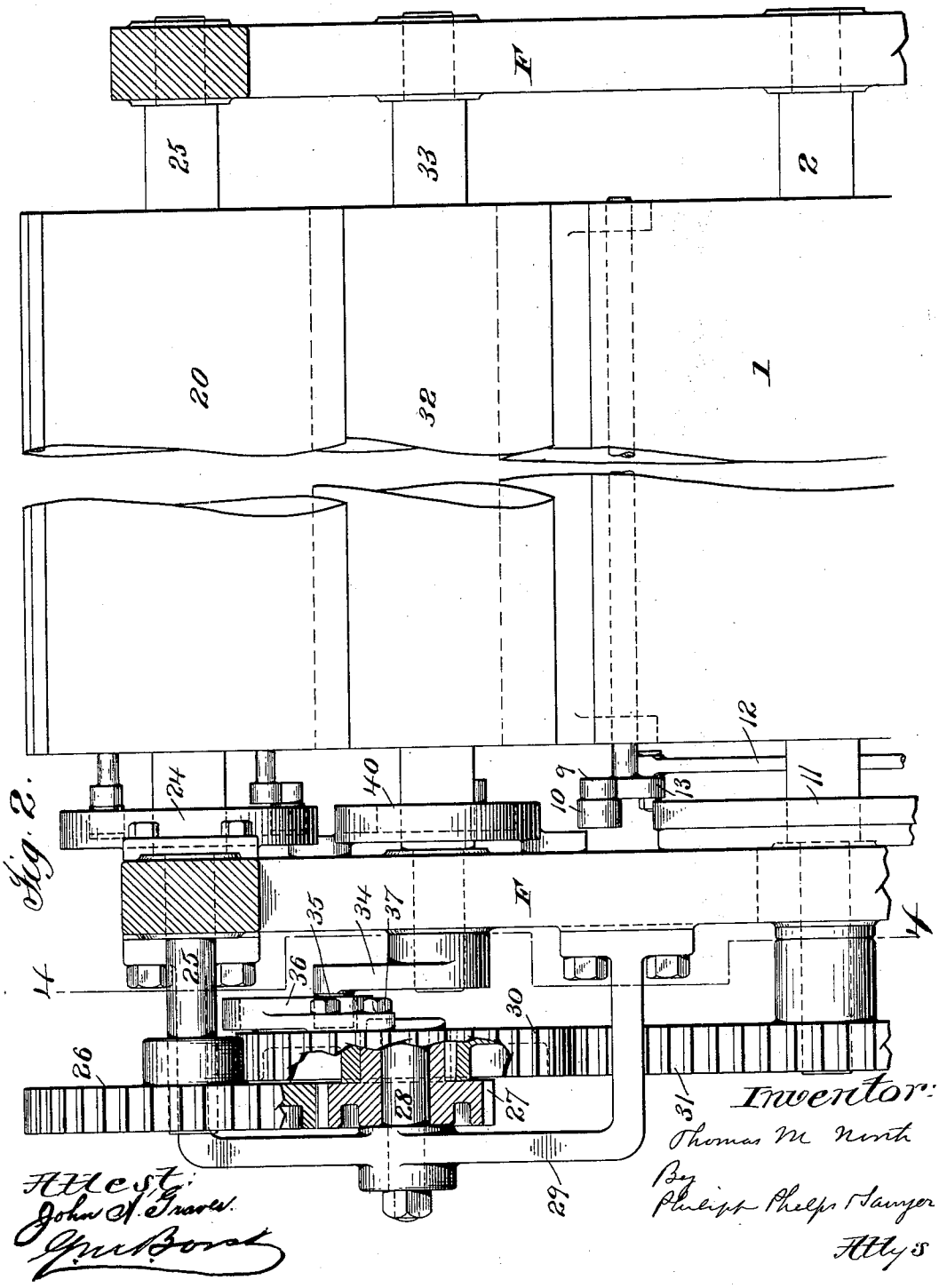


Fig. 2.

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(Application filed Oct. 6, 1899.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 3.

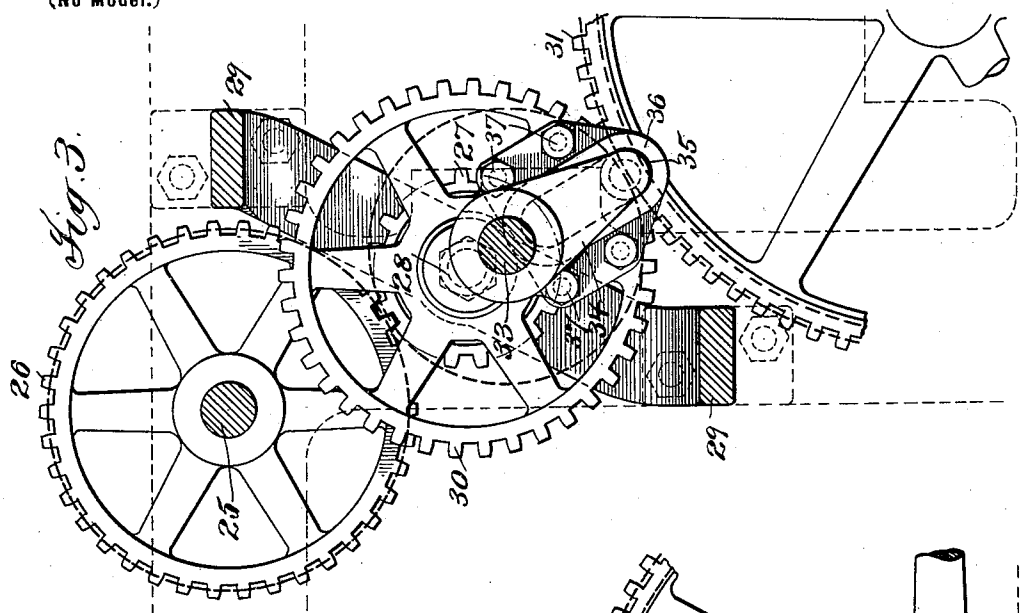
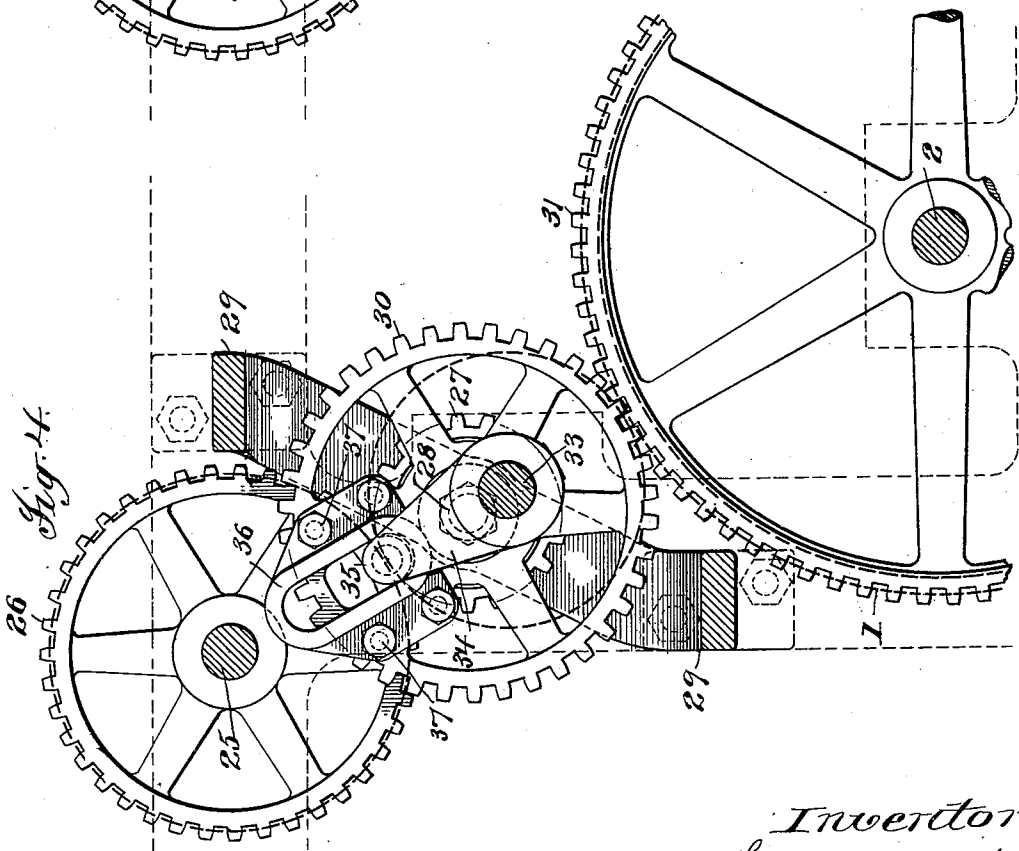


Fig. 4.



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UNITED STATES PATENT OFFICE.

THOMAS M. NORTH, OF NEW YORK, N. Y., ASSIGNOR TO ROBERT HOE, THEODORE H. MEAD, AND CHARLES W. CARPENTER, OF SAME PLACE.

ASSOCIATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 650,542, dated May 29, 1900.

Application filed October 6, 1899. Serial No. 732,765. (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 in web or sheet form—such, for instance, as the products of printing-machines.

It is frequently necessary in the formation of products having an odd number of plies—as, for instance, in the production of newspapers, where it is desired to make a product having six, ten, or fourteen pages, or any other number of pages which is not a multiple of four—to assemble with a moving web or webs, which are to be cut and folded to form two plies or a multiple of two, a short section, which is to form a single ply of the folded product, the said single ply in a newspaper forming two pages of the paper. The web from which this sheet is cut necessarily moves through the machine at a slower rate of speed than the web or webs with which it is to be associated, and in newspaper-work usually at half the speed. Devices have heretofore been used for taking a sheet cut from the slow-speed web and bringing it up to the speed of the rapidly-running web, so that it may be properly registered and associated with said web. All these devices have, however, been operated so that the sheet which is moving at slow speed has had its speed instantly increased at some point in the operation of the transferring means from the slow speed to the high speed. The result of this has been that the sheet has been subjected to a great strain by the sudden change of speed, and, furthermore, the devices by which the product is handled are liable to act unevenly on the product, and the results are exceedingly unreliable. It is of course necessary, and especially in handling printed sheets, that all devices of this sort shall operate so that the associated sheet shall be always brought into exact register with the web or sheet with which it is to be associated. The devices which have been heretofore used for this purpose have been particularly unreliable in this respect.

It is the object of this invention to produce a mechanism by which a product running at a given speed may be associated with another product running at a different speed, and usually at a higher speed, said mechanism operating to take the product at its slow speed and bring it gradually up to the speed of the product with which it is to be associated.

With this and other objects in view the invention consists in certain constructions and in certain parts, improvements, and combinations to be hereinafter described, and fully pointed out in the claims hereunto appended.

In the accompanying drawings, which form a part of this specification, and in which like characters of reference indicate the same parts, Figure 1 is a sectional elevation of the cutting and folding cylinders of an ordinary web-press and the improved transferring mechanism by which a sheet running at a slow speed may be associated with a web running at a higher speed. Fig. 2 is an end elevation, partly in section, of the construction shown in Fig. 1. Figs. 3 and 4 are detail sectional elevations, on an enlarged scale, illustrating the devices employed for operating the transferring mechanism.

Referring to the drawings, which illustrate one embodiment of the invention, 1 indicates the folding-cylinder of an ordinary web-printing machine, said cylinder being mounted on a shaft 2, located in suitable bearings in the frame F of the machine. 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 sets of retaining-pins 5, said pins working through apertures in the cylinder and being controlled by rock-arms 6, mounted on shafts 7. The shafts are journaled in suitable ears 8 and have projecting arms 9, preferably provided with friction-rollers 10, said rollers being arranged to contact with a suitable cam 11, mounted on the frame, the function of which is to with-

draw the pins into the cylinder at suitable times. The pins are thrown forward by means of 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 3, before referred to. The cylinders 1 and 14 constitute the form of web-forwarding mechanism which it is preferred to use, though other forms of forwarding mechanism might be employed. 16 indicates guide-rollers by which a web or a series of associated webs are led to the cutting-cylinders 1 and 14. These guide-rollers 16 may be the drawing-off rolls of a longitudinal folder or they may be simply guide-rolls, as shown. At 17 are indicated a pair of folding-rolls, with which the blades 4 coöperate to fold the product off 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 printed by a machine 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 W^2 and associated with the two webs referred to by the mechanism to be hereinafter described.

The half-speed web W^2, which comes from any suitable form of printing mechanism, is shown as being forwarded by guide-rollers 18. From the guide-rollers 18 it is delivered to a pair of cutting-cylinders 19 and 20. The cylinder 19 is provided with the usual form of knife 21, said knife coöperating with the 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 the shaft 25 and may be driven in any desired way. In the machine shown it is driven by a gear 26. (See Figs. 3 and 4.) The gear 26 meshes with a gear 27, which is mounted on a stud 28, said stud being supported in a bracket or frame 29, suitably bolted or otherwise secured to the frame F of the folder. The gear 27 has connected to it, preferably by being keyed to its hub, a gear 30, which gear 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 will be driven at half the speed of the folding-cylinder 1, or, in other words, at the speed of the incoming half-speed web W^2. It may be further remarked that while the gearing described is a convenient and ready means for driving the said cylinder 20 any other suitable or desired 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 be readily 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 said cylinder. While any form of device which will take the sheet at the speed of the cylinder 20 and bring it up by a gradually and constantly increasing movement to the speed of the cylinder 2 may be used, the mechanism preferably employed is as follows: Interposed between the cylinder 20 and the cylinder 1 is a transfer-cylinder or sheet-carrier 32. This transfer-cylinder or carrier is mounted on a shaft 33, which finds its bearings in the frame F of the folder. The shaft 33 is provided with a crank-arm 34, said arm being secured thereto in any suitable manner and preferably carrying an anti-friction-roll 35. The shaft 33 is set eccentric to the stud 28, on which are mounted the gears 27 30 and which therefore forms the axis of revolution of these gears. The gear 30 carries on its side a slotted operating-block 36, said block being secured to the gear in any suitable manner, as by bolts 37. The slot in the block 36 is engaged by the roll 35 on the arm 34, and inasmuch as the stud on which the gear 30 rotates and the shaft 33, to which the arm 34 is secured, are out of line with each other the gear will operate to transmit to the shaft 33 a constantly-varying motion. In the machine shown the parts are so arranged that the greatest speed of the transfer-cylinder carried by the shaft 33 will be twice its slowest speed and the slowest speed will be equal to the speed of the cutting-cylinder 20. 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 from a fixed 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 take the sheet from the pins 23 on the cylinder 20 when the cylinders are moving at the same rate of speed. The cylinder 33 after its pins take the sheet has its speed gradually and constantly increased during the next half-revolution by the crank mechanism which operates it, 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 transfer-cylinder to the cylinder 1 without any sudden strain or jerk. After the sheet has been taken by the pins 5 on the cylinder 1 it will be carried onward and associated with the webs W' W^2 in the usual manner, the said webs being cut by the knife 15 on the cylinder 14 and folded

off by the blades 4, which coöperate with the rolls 17.

It is to be understood, of course, that the mechanism by which the invention is carried into effect may be widely varied. Thus while the invention is shown in connection with a machine in which the forwarding mechanisms for advancing the products are cylinders it is of course understood that the invention is capable of use with any other suitable form or forms of forwarding mechanism. The invention is not therefore to be limited to the specific mechanism which has been described and illustrated, but it is to be understood as embracing all forms of mechanism in which a transferring device is used that takes a product from a forwarding mechanism running at one speed and delivers it to a forwarding mechanism running at another speed, the transferring device being arranged to run at varying speeds, its speed at the time it takes the product being equal to the speed of the forwarding device which then has control of it and its speed at the time it delivers the product being equal to the speed of the forwarding device to which it delivers it. While also the invention is particularly designed for use with printing-machines, it might be used in other relations.

What I claim is—

1. The combination with a forwarding mechanism running at one speed, of a forwarding mechanism running at a different speed, and a transferring mechanism arranged between the two and arranged to run at a varying speed, said speed at times coinciding with the speed of each of the forwarding mechanisms, substantially as described.

2. The combination with a forwarding mechanism running at one speed, of a forwarding mechanism running at a different speed, and a transferring mechanism provided with means for positively seizing the sheet arranged between the two and arranged to run at a varying speed, said speed at times coinciding with the speed of each of the forwarding mechanisms, substantially as described.

3. In a mechanism for associating products running at different speeds, the combination with means for forwarding a product at one speed, of means for forwarding a product at a different speed, and a transferring mechanism, running at a varying speed, interposed between the two forwarding means, said tranferring mechanism at times having the speed of each of the forwarding means and operating to take a product from one forwarding means when it is running at the speed of that means and deliver it to the other forwarding means when it is running at the speed of that means, substantially as described.

4. In an associating mechanism, the combination with a carrier running at one speed, of a second carrier running at a different speed, a 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 of 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.

5. In an associating mechanism, the combination with a carrier provided with sheet taking and retaining devices and running at a given speed, of a second carrier provided with sheet receiving and retaining devices and running at a different speed, and a 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.

6. 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 means for 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.

7. 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 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 means whereby said cylinder is caused to take a sheet from a cylinder of one pair at its speed and deliver it to a cylinder of the other pair at its speed, substantially as described.

8. 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 cylinders having a set 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 and located between the two pairs of cylinders, and means for causing the transferring-cylinder to run at a varying speed, said speed coinciding at times with the speed of each pair of cylinders, substantially as described.

9. In an associating mechanism, the combination with means for forwarding a sheet or web, said means running at a given speed, of

means for forwarding another sheet or web, said means running at a different speed, and a crank-driven transferring mechanism interposed between the two forwarding means, the crank being arranged to drive the transferring mechanism at times at the speed of each of the forwarding means, substantially as described.

10. In an associating mechanism, the combination with a forwarding-cylinder running at a given speed, of a second forwarding-cylinder running at a different speed, and a crank-driven transferring-cylinder located between the two, the crank being arranged to drive the transferring-cylinder at times at the speed of one forwarding-cylinder and at times at the speed of the other forwarding-cylinder, substantially as described.

11. In an associating mechanism, the combination with a forwarding-cylinder running at a given speed, of a second forwarding-cylinder running at a different speed, each of said cylinders having taking and retaining devices, a crank-driven transferring-cylinder located between the two and having taking and retaining devices which operate in connection with the taking and retaining devices of the other cylinders, and a crank driving mechanism for the transferring-cylinder, said driving mechanism being arranged to drive the transferring-cylinder at times at the speed of one of the forwarding-cylinders and at times at the speed of the other forwarding-cylinder, substantially as described.

12. In an associating mechanism, the combination with a pair of cutting and folding cylinders, one of said cylinders having retaining devices, of a pair of cutting-cylinders one of said cutting-cylinders having retaining devices, gearing for driving the two pairs of cylinders at different speeds, a transferring-cylinder located between the two pairs of cylinders, a gear from which said transferring-cylinder is driven, and a crank driving mechanism interposed between the gear and the transferring-cylinder, said mechanism operating to drive the transferring-cylinder at times at the speed of one of the pairs of cylinders and at times at the speed of the other pair of cylinders, substantially as described.

13. In an associating mechanism, the combination with a pair of cutting and folding cylinders, one of said cylinders having taking and retaining devices, of a pair of cutting-cylinders, one of said cutting-cylinders having taking and retaining devices, a train of gearing connecting the cylinders, said gearing being arranged to drive one of said pairs of cylinders at a speed which differs from that of the other pair of cylinders, a transferring-cylinder interposed between the two pairs of cylinders, a gear for driving said transferring-cylinder connected to the train of gearing, and a crank mechanism between said gear and the transferring-cylinder, said crank mechanism operating to drive the transferring-cylinder at times at the speed of one of the pairs of cylinders and at times at the speed of the other pair of cylinders, substantially as described.

14. In an associating mechanism, the combination with a pair of cutting and folding cylinders, one of said cylinders having sheet-retaining pins and folding-off devices, of a pair of cutting-cylinders, one of said cutting-cylinders having sheet-retaining pins, gearing between the cutting and folding cylinders and the cutting-cylinders operating to drive the cutting-cylinders at half the speed of the cutting and folding cylinders, a transferring-cylinder having sheet-retaining pins interposed between the two pairs of cylinders, a crank on the shaft of said transferring-cylinder, a gear driven from the driving-train, a slotted operating-block for the crank carried by said gear, the gear and crank being so arranged that the transferring-cylinder will be driven at times at the speed of the cutting and folding cylinders and at times at the speed of the cutting-cylinders, substantially as described.

15. In an associating mechanism, the combination with a forwarding-cylinder having taking and retaining devices, of a second forwarding-cylinder having taking and retaining devices, a gear-train between the two cylinders and operating to drive one of the cylinders at a speed which is different from that of the other cylinder, a transferring-cylinder located between the two cylinders and having taking and retaining devices, a crank-arm on the shaft of said cylinder, and means operated from the gear-train for driving said crank-arm, said means and crank being arranged to drive the transferring-cylinder at times at the speed of one of the forwarding-cylinders and at times at the speed of the other forwarding-cylinder, substantially as described.

16. In an associating mechanism, the combination with a pair of cutting and folding cylinders, one of said cylinders having sheet taking and retaining devices, a pair of cutting-cylinders, one of said cutting-cylinders having sheet taking and retaining devices, means for driving the cutting-cylinders at half the speed of the cutting and folding cylinders, means for leading a web to each pair of cylinders, a transferring-cylinder located between the two pairs of cylinders and having sheet taking and retaining devices, and means for driving the transferring-cylinder at a varying speed, said speed at times coinciding with the speed of the cutting and folding cylinders and at times with the speed of the cutting-cylinders, substantially as described.

17. In an associating mechanism, the combination with a pair of cutting and folding cylinders, one of said cylinders having sheet taking and retaining devices, a pair of cutting-cylinders, one of said cutting-cylinders having sheet taking and retaining devices, means for driving the cutting-cylinders at half the speed of the cutting and folding cyl-

inders, means for leading a web to each pair of cylinders, a transferring-cylinder located between the two pairs of cylinders and having sheet taking and retaining devices, and a crank mechanism for driving the transferring-cylinder, said crank mechanism 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.

18. In an associating mechanism, the combination with a pair of cutting and folding cylinders, one of said cylinders having sheet taking and retaining devices, a pair of cutting-cylinders, one of said cutting-cylinders having sheet taking and retaining devices, means for driving the cutting-cylinders at half the speed of the cutting and folding cylinders, means for leading a web to each pair of cylinders, a transferring-cylinder located between the two pairs of cylinders and having sheet taking and retaining devices, a crank on the shaft of the transferring-cylinder, a suitable driving-gear, the axis of said gear being out of line with the axis of the shaft of the transferring-cylinder, and means for driving said gear, the gear and crank being arranged to drive the transferring-cylinder at a varying speed, said speed at times coinciding with the speed of the cutting and folding cylinders and at times with 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.