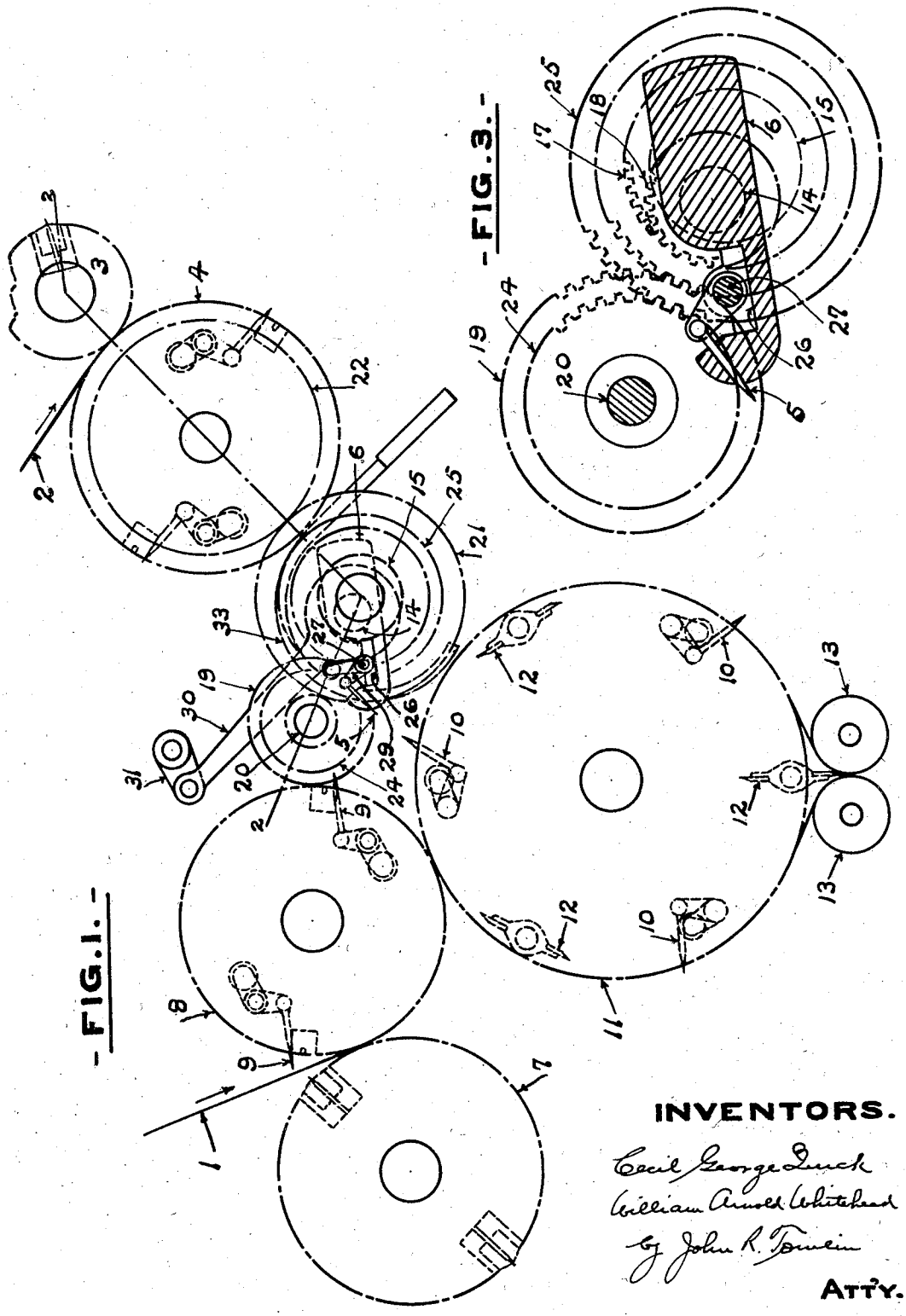
Dec. 3, 1935. C. G. QUICK ET AL 2,022,688

CUTTING AND COLLECTING MECHANISM FOR PRINTING MACHINES

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-FIG. 1.-

-FIG. 3.-

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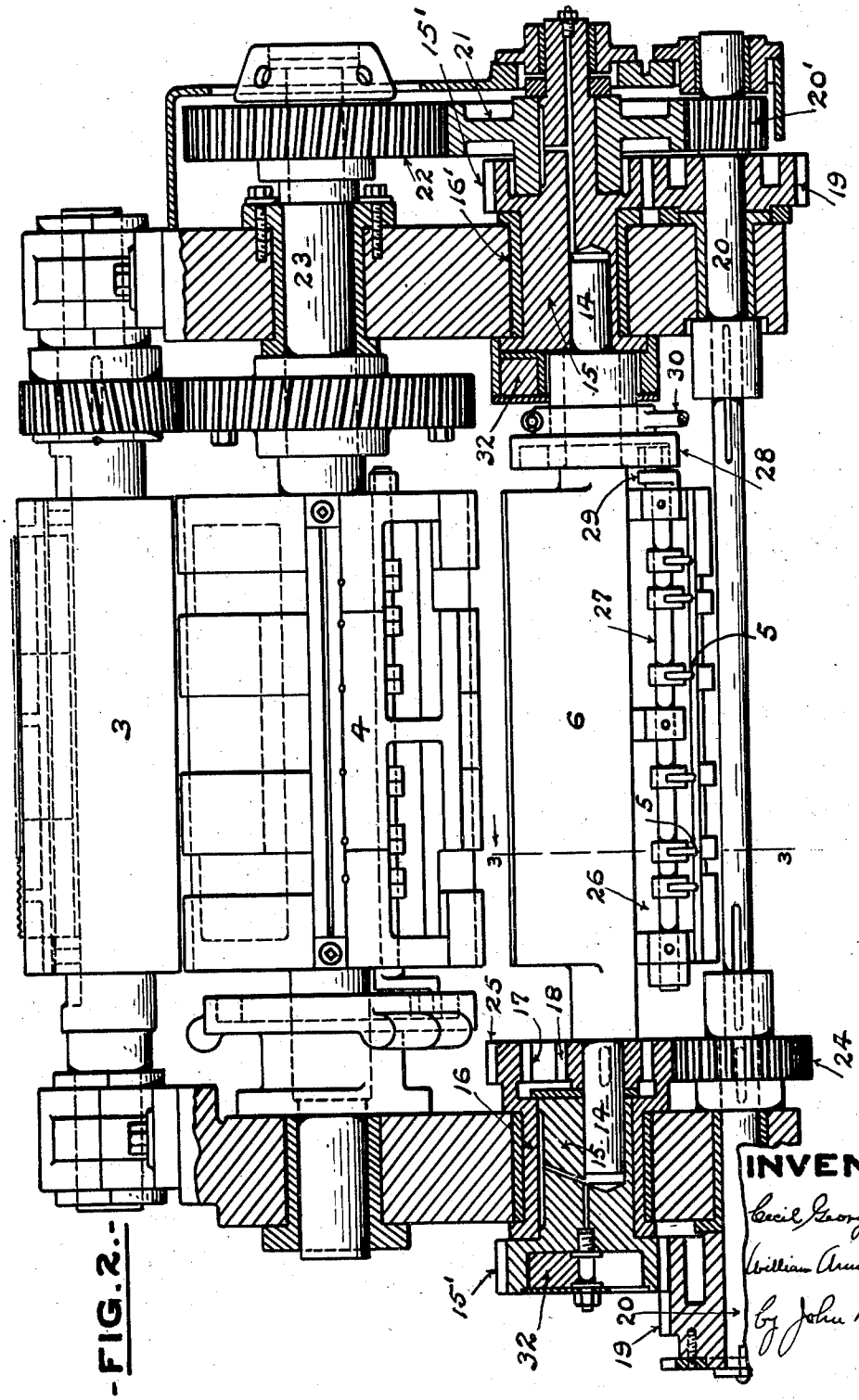


FIG. 2.

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UNITED STATES PATENT OFFICE

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CUTTING AND COLLECTING MECHANISM FOR PRINTING MACHINES

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In Great Britain October 8, 1931

15 Claims. (Cl. 270—48)

This invention relates to improvements in means for feeding supplementary products to the principal products of a printing machine: for example, in a magazine press, the supplement may consist of a cover and/or additional pages, and has for its general object the provision of improved means for insuring correct registration of supplementary products with principal products during the process of association.

In such an arrangement it is sometimes necessary to run the press for printing the supplementary product at a speed less than that of the main press, the relative speed depending upon the particular requirements of each particular class of collated product. The feeding means hitherto commonly employed consisted of an inclined chute or guide down which the supplementary product traveled at the speed of its press until it was taken by pins running at the speed of the main press. In order to insure exact register between the supplementary and the principal product, it is essential that the pins should pick up the supplementary product at an invariable position in the length of the supplementary product. If the position at which the supplementary product is taken by the pins should vary, it is obvious that departure from correct register will occur depending upon the extent of variation.

The variations which occur in practice with the known arrangement are we believe due to several causes; on account of the relative speed between the supplementary product and the pins, the pins in effect "snatch" the supplementary product,—the snatching effect increasing with increase in the relative speeds and becoming acute when the supplementary product is traveling at say only one-fourth the speed of the main product.

In mechanism heretofore known, pins which are carried by the collecting cylinder, when in their projected position to carry the main products, ride over the paper forming the supplementary product very slightly before they effect penetration thereof, and the extent of sliding movement depends upon the relative speed, on the quality of the paper, on the finish of the surface of the paper and on the sharpness of the pins. If the paper has a glossy surface, the sliding movement will be greater than with paper having an ordinary mat surface and will increase during a run as the pins become blunted so that the register progressively becomes worse. It will be seen that despite the necessity for obtaining proper register, the apparatus hitherto employed has rendered this difficult if not impossible.

The main object of the present invention is to provide an arrangement which will avoid "snatching" and thus will obviate the difficulty of obtaining proper register consequent thereon.

According to the present invention the supplementary product is transferred to the high speed products by a member (or members) which is caused to have a cyclic variation in its rate of movement, being decelerated to take charge of the supplementary product at (or approximately at) the speed thereof, and then being accelerated to speed up the supplementary product to associate it with the principal product at (or approximately at) the speed of the latter product. Thus, snatching of the supplementary product is avoided, and in consequence it is insured that the supplementary product is taken at an invariable position thereby providing constant proper register.

In one way of carrying the invention into effect, sheet taking transfer pins are carried by a member which rotates about an axis, which axis is in turn rotated about a fixed axis, the arrangement being such that during one phase of the cycle the rotations are subtractive and during another phase are additive, the effect being subtractive to present the pins to the slow speed supplementary product at (or approximately at) the speed of the product, and being additive to present the supplementary product taken by the pins to a collecting cylinder at (or approximately at) the speed of the collecting cylinder.

The invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a diagrammatic view of a layout embodying the invention;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1, certain parts being shown in elevation; and

Figure 3 is a detail sectional view taken on the line 3—3 of Figure 1.

In the drawings, 1 indicates a main web lead, and 2 a supplementary web lead. 3 is the knife cylinder which cooperates with a gutter cylinder 4 to sever the supplementary web into products which are carried by pins 5 on a pin carrier 6, the motion of which is caused to have a cyclic variation in the manner hereinafter described. The numeral 7 indicates a second knife cylinder which cooperates with a second gutter cylinder 8 to sever the main web or webs, the gutter cylinder 8 having pins 9 to take the products and to deliver them to pins 10 on a collecting cylinder 11, to which the pins 5 also deliver the supplementary products. The collecting cylinder is provided with folding blades 12 which deliver the collected or associated product to

folding-off rolls 13. In the arrangement shown, the collecting cylinder is what is commonly referred to as a "three part" cylinder (or in other words the peripheral length of the cylinder is equal to the length of three products) and the speed of the supplementary web is equal to one half that of the main web or webs. The object of the invention is therefore so to actuate the carrier 6 that the half speed web portions of the supplementary product are accelerated to the speed of the main web or webs and delivered to the pins 10 at every other third of a revolution of the cylinder 11.

To effect this movement of the carrier 6, it is formed with shaft extensions 14 which are rotatably supported in eccentric bores in cylindrical blocks 15, which blocks are rotatably mounted in a rotatable sleeve 16 and a bushing 16'. The sleeve 16 is formed with an internal gear 17 meshing with a pinion 18 fast with the shaft 14. The blocks 15 carry gears 15' which mesh with gears 19 secured to a shaft 20, to which shaft a pinion 20' is also secured. The pinion 20' is driven through an intermediate gear 21 from a gear 22 fast on the shaft 23 of the gutter cylinder 4. The gear is so proportioned that for one revolution of the cylinder 4, the blocks 15 make four revolutions. The shaft 20 is also provided with a gear 24 in mesh with a gear 25, formed on the sleeve 16, the ratio of the gears 24 and 25 being 2:3. The ratio of the internal gear 17 to the pinion 18 is 3:2. With the parts arranged as described, it will be found that the pins 5 on the carrier 6 will be decelerated to the speed of the supplementary product at the moment that the said pins 5 are presented to take a product from the cylinder 4 and then accelerated to deliver the product to the pins 10 on the cylinder 11 at the speed of the main web, the said pins 5 being presented to take a supplementary product at each half revolution of the cylinder 4 and being presented to deliver the supplementary products to the cylinder 11 at every other third revolution thereof.

It may be considered that the pins 5 have two motions, one a motion due to their movement about the axis of the carrier 6 and the other a motion due to the movement of the carrier about the axis of the blocks 15, which rotate twice for every sheet that is transferred. The speed of the pins 5 is decelerated during 180° of the rotation of the pinion 18 and accelerated during the remainder of a revolution. The two motions referred to above are in opposite sense to each other during the deceleration period and in the same sense during the acceleration period.

The carrier is in the form of a trough shaped member in the trough 26 of which the shaft 27 for actuating the pins 5 is mounted. The shaft 27 is rocked to project and retract the pins by a cam 28 which is engaged by a roll on an arm 29 secured to the shaft 27. The cam 28 is freely mounted on the shaft 14 and prevented from turning by a link 30 which is pivotally connected to an arm 31 mounted to oscillate about a fixed axis, the arm 31 permitting the cam 28 to partake of the movement of the shaft 14 about the axis of the blocks 15. Counterweights 32 are secured to the blocks 15 in position to effect balancing of the carrier 6. A guide 33 is provided for guiding the trailing end of the product taken by the pins 5 on the carrier 6.

The rotation of the sleeve 16 is preferred inasmuch as it provides a locus for the pins 5 on the carrier 6 which is of a form well suited to the transference of the supplementary products. Satisfactory results can however be obtained by fixing the sleeve 16 against rotation. In this case, the cylindrical blocks 15 are driven from the cylinder 4 through gearing which steps up the revolutions of the cylindrical member to that of the collecting cylinder in the ratio of 6:1.

Obviously the parts may be arranged to effect any desired acceleration and deceleration depending upon the particular requirements of each product.

It will be seen that an arrangement according to the invention obviates the defects which occur in existing mechanism, permitting the usual inclined guide to be dispensed with (the sheet taking pins according to the invention taking the supplementary product direct from the gutter cylinder of the slow speed press) and as the pins on the member are merely transfer pins (as distinct from pins on which collection is made) they can be actuated by any known mechanism so as to be protruded to stab the supplimentary product as they are presented thereto.

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

What we claim is:

1. In a printing machine, means for feeding a slow speed sheet to a higher speed sheet, comprising a sheet taking device rotating at a substantially constant angular velocity about its axis, and means for driving the device with a cyclical deceleration and acceleration, the device being decelerated so that it moves at substantially the speed of the slow speed sheet when it is presented thereto and accelerated to speed up the sheet.

2. In a printing machine, a slow speed cylinder, a higher speed cylinder, a rotatable sheet taking device rotating at a substantially constant angular velocity about its axis and adapted to transfer a sheet from the slow speed cylinder to the higher speed cylinder, and means for rotating the device so that it is decelerated to be presented to the slow speed cylinder to take a sheet therefrom at substantially the speed of the said slow speed cylinder, and accelerated to speed up the sheet to deliver it to the higher speed cylinder at substantially the speed thereof.

3. In a printing machine, means for feeding a slow speed sheet to a higher speed sheet, a rotatable sheet taking device, means for imparting two components of movement thereto, the components being subtractive to decelerate the device to present it to the slow speed sheet at substantially the speed thereof and additive to accelerate the device to speed up the sheet to present it to the higher speed sheet at substantially the speed thereof.

4. In a printing machine, a slow speed cylinder, a collecting cylinder running at a higher speed, a rotatable member having a sheet taking device thereon to transfer a sheet from the slow speed cylinder to the collecting cylinder and means for imparting two components of rotation to the member, the components being subtractive to decelerate the member to present it to the slow speed sheet at substantially the speed thereof, and additive to accelerate the device to speed up the

sheet to present it to the higher speed sheet at substantially the speed thereof.

5. An arrangement as claimed in claim 3 in which the sheet taking device is carried by a member having a rotation imparted thereto about its own axis and also about a parallel axis.

6. In a printing machine, a slow speed cylinder, a collecting cylinder running at a higher speed, a rotatable member having a sheet taking device thereon to transfer a sheet from the slow speed cylinder to the collecting cylinder and means for imparting two components of rotation to the member, the components being subtractive to decelerate the member to present it to the slow speed cylinder at substantially the speed thereof, and additive to accelerate the member to speed up the sheet to present it to the collecting cylinder at substantially the speed thereof; said rotatable member carrying said sheet taking device having a rotation imparted thereto about its own axis and about a parallel axis by being rotatably and eccentrically mounted in a turnable member, said rotatable member being driven to rotate about its own axis and the turnable member being driven to rotate the rotatable member bodily about the axis of the said turntable member.

7. An arrangement as claimed in claim 6 in which the rotatable member is provided with a gear wheel in mesh with an internal gear wheel.

8. In a printing machine, a slow speed cylinder, a collecting cylinder running at a higher speed, a rotatable member having a sheet taking device thereon to transfer a sheet from the slow speed cylinder to the collecting cylinder and means for imparting two components of rotation to the member, the components being subtractive to decelerate the member to present it to the slow speed cylinder at substantially the speed thereof, and additive to accelerate the member to speed up the sheet to present it to the collecting cylinder at substantially the speed thereof; said rotatable member carrying said sheet taking device having a rotation imparted thereto about its own axis and about a parallel axis, by being rotatably and eccentrically mounted in a turnable member, said rotatable member being driven to rotate about its own axis and the turnable member being driven to rotate the rotatable member bodily about the axis of the said turnable member, the rotatable and eccentrically mounted member being provided with a gear wheel meshing with an internal gear wheel, said internal gear wheel being rotatably mounted.

9. An arrangement as claimed in claim 4 in which the rotatable member carrying the sheet taking device has a rotational and a radial movement imparted thereto.

10. An arrangement as claimed in claim 3 in which the sheet taking device is carried by a member which is mounted to have relative angular movement with respect to a member in which it is mounted and which is rotated at a constant speed, means being provided for effecting alternating angular movement of the first member relatively to the second member.

11. In a printing machine, a slow speed cylinder, a collecting cylinder running at a higher speed, a rotatable member provided with a gear wheel coactingly engaged with an internal gear wheel forming a part of the rotatable member, said rotatable member having a sheet taking device thereon to transfer a sheet from the slow speed cylinder to the collecting cylinder and means for imparting two components of rotation to the rotatable member, the components being subtractive to decelerate the member to present it to the slow speed cylinder at substantially the speed thereof, and additive to accelerate the device to speed up the sheet to present it to the collecting cylinder at substantially the speed thereof; said rotatable member carrying said sheet taking device having a rotation imparted thereto about its own axis and about a parallel axis by being rotatably and eccentrically mounted in a turnable member, said rotatable member being driven to rotate about its own axis and the turnable member being driven to rotate the rotatable member bodily about the axis of the said turnable member.

12. In a printing machine, a slow speed cylinder, a collecting cylinder running at a higher speed, a rotatable member having a sheet taking device thereon, said sheet taking device having a rotational and radial movement imparted thereto and being adapted to transfer a sheet from the slow speed cylinder to the collecting cylinder, and means for imparting two components of rotation to the member, the components being subtractive to decelerate the device to present it to the slow speed sheet at substantially the speed thereof, and additive to accelerate the device to speed up the sheet to present it to the higher speed at substantially the speed thereof.

13. In a printing machine, means for feeding a slow speed sheet to a higher speed sheet, comprising a sheet taking device, and means for driving the device with a cyclical deceleration and acceleration, the device being decelerated so that it moves at substantially the speed of the slow speed sheet when it is presented thereto and accelerated to speed up the sheet, said device rotating about an axis member, said axis member rotating about an axis.

14. In a printing machine, a slow speed cylinder, a higher speed cylinder, a rotatable sheet taking device to transfer a sheet from the slow speed cylinder to the higher speed cylinder, and means for rotating the device so that it is decelerated to be presented to the slow speed cylinder to take a sheet therefrom at substantially the speed of the said slow speed cylinder, and accelerated to speed up the sheet to deliver it to the higher speed cylinder at substantially the speed thereof, said device including pins secured to a support rotatable about an axial member, said axial member being rotatable about an axis.

15. In a sheet transferring mechanism, a first rotating member having a sheet taking device adapted to take sheets at one speed and deliver them at a different speed, said member being driven at a constant rotative speed with relation to its axis, and a second rotating member arranged to so move said first member that its axis is revolved in an orbital path.

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