

May 8, 1934.

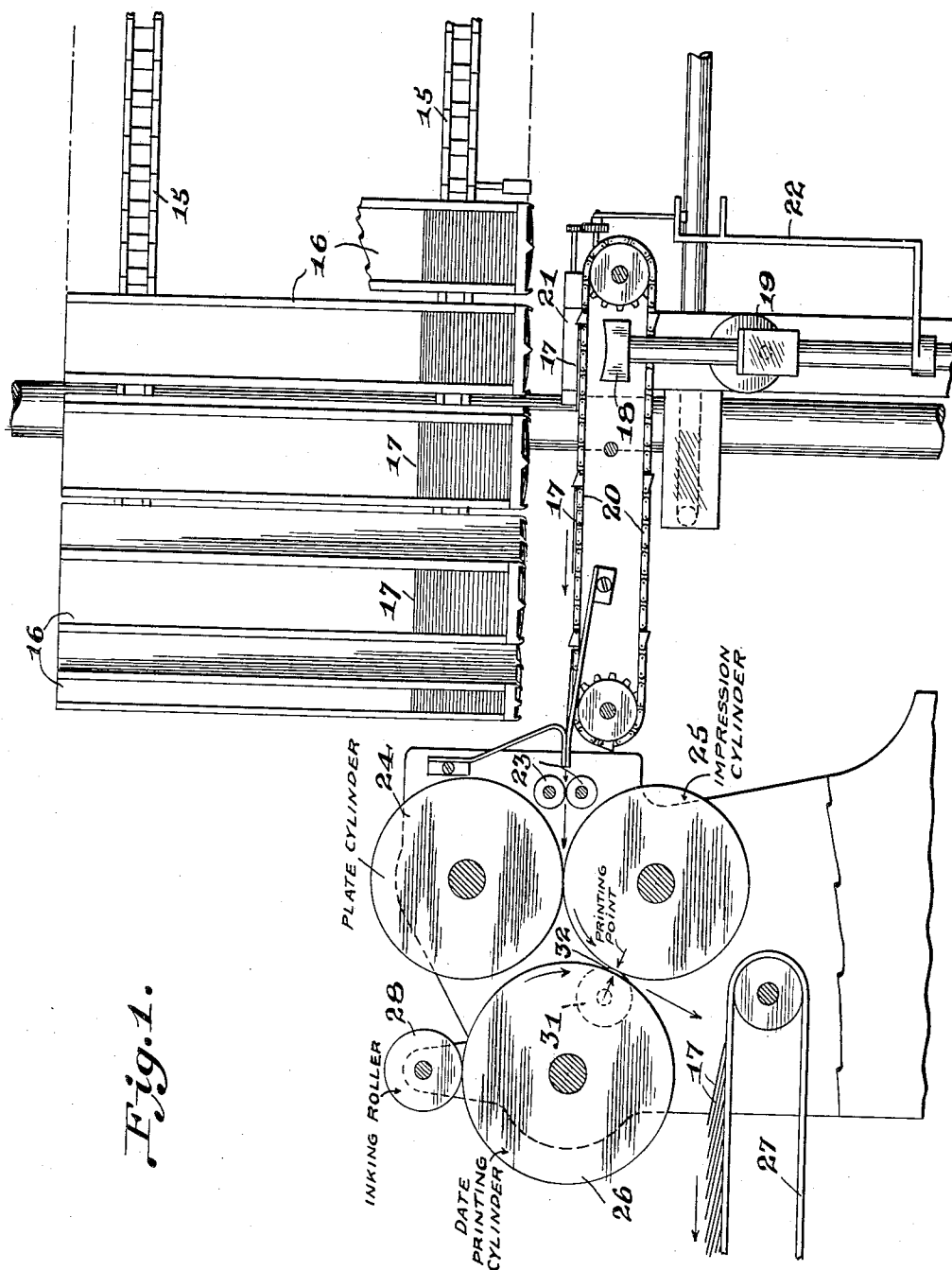
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1,958,175

CYLINDER CONNECTION FOR PRINTING MACHINES

Filed July 13, 1932

4 Sheets-Sheet 1



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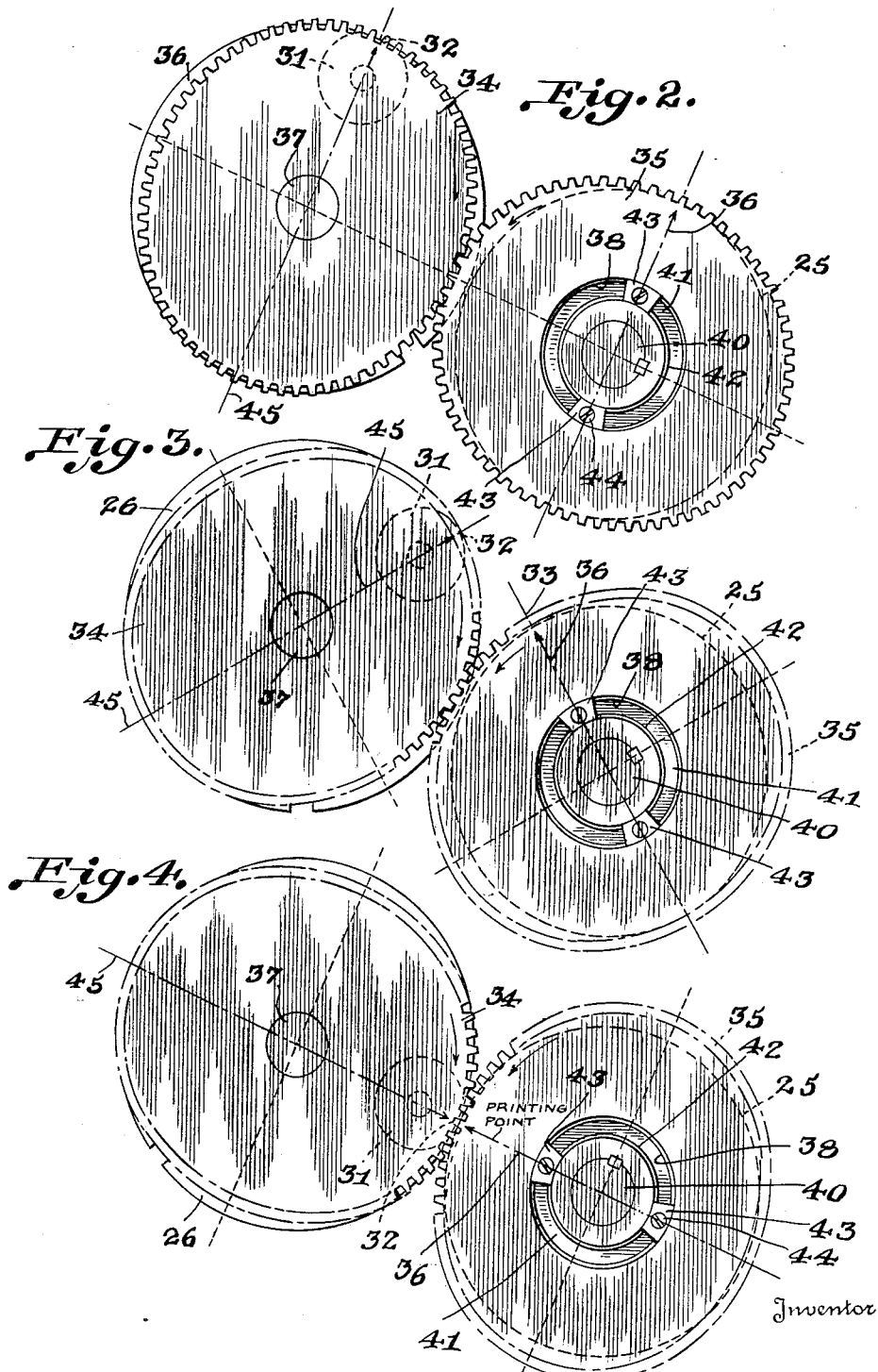
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CYLINDER CONNECTION FOR PRINTING MACHINES

Filed July 13, 1932

4 Sheets-Sheet 2



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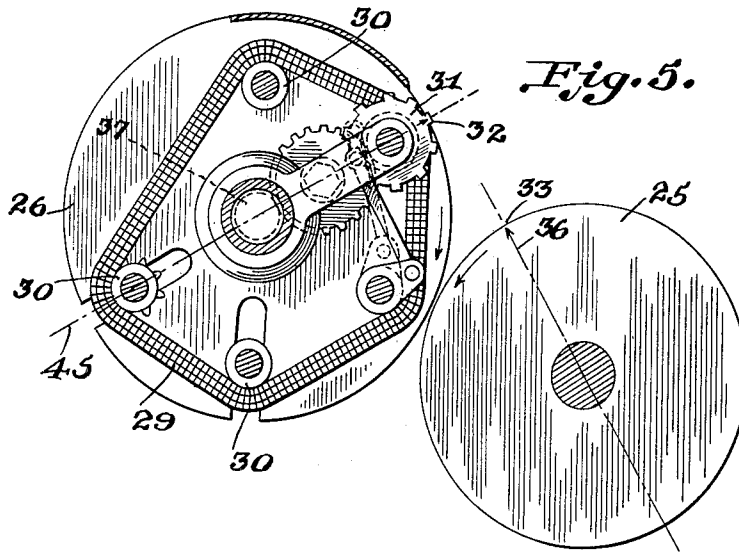
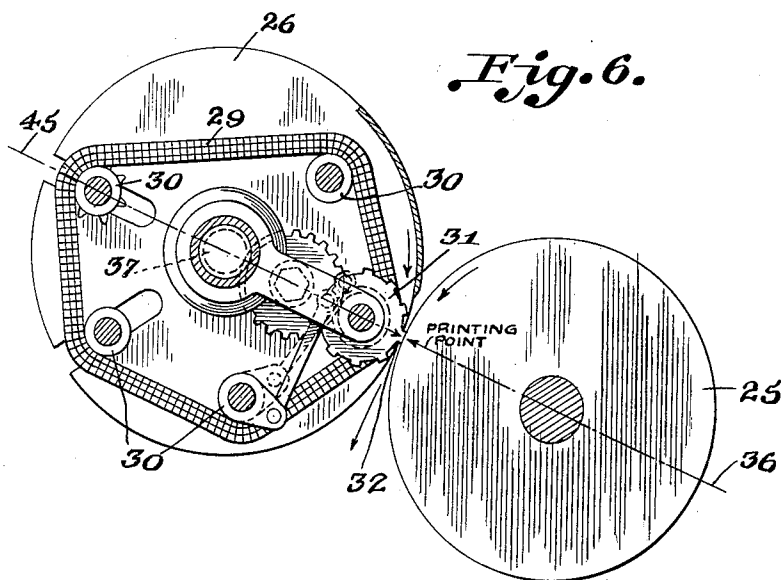
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4 Sheets-Sheet 3



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4 Sheets-Sheet 4

Fig. 7.

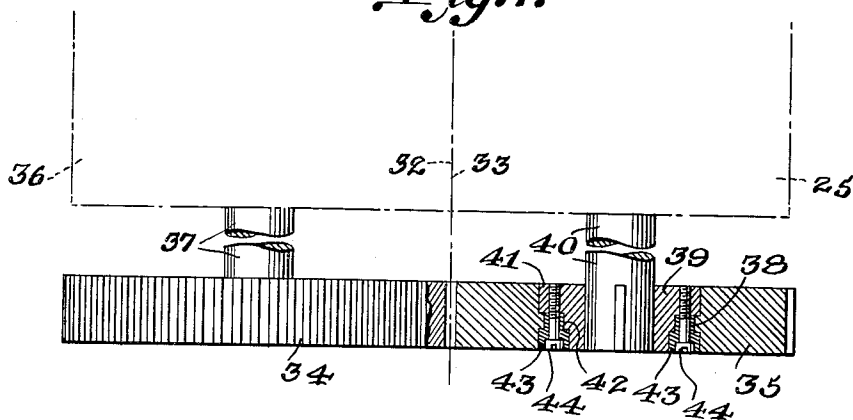


Fig. 8.

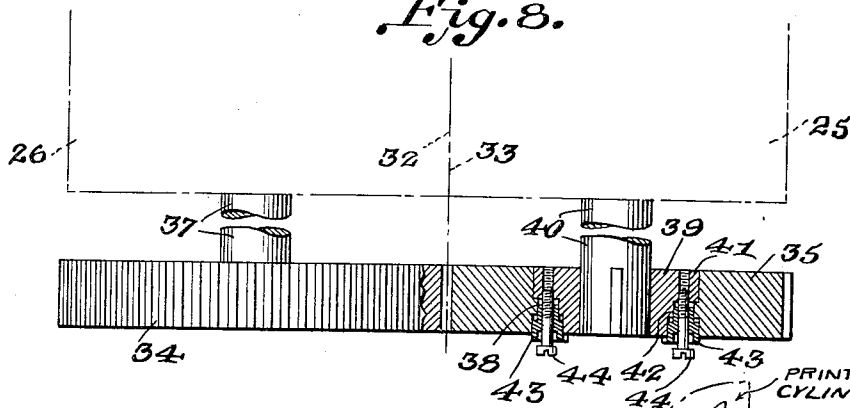


Fig. 9.

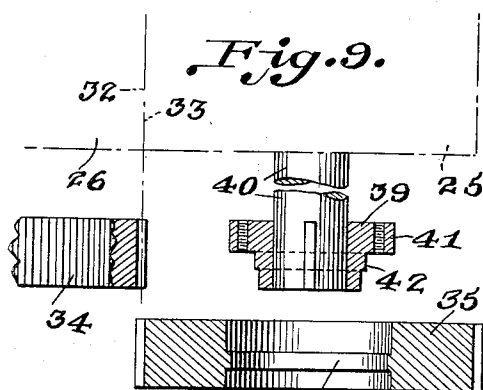


Fig. 10.

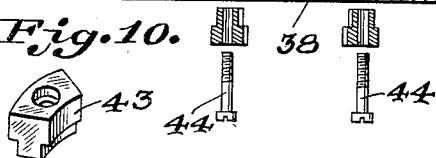
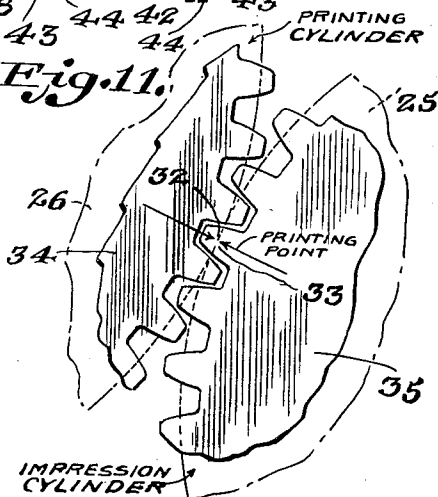


Fig. 11.



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UNITED STATES PATENT OFFICE

1,958,175

CYLINDER CONNECTION FOR PRINTING MACHINES

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Application July 13, 1932, Serial No. 622,344

8 Claims. (Cl. 101—216)

The present invention relates to printing machines of the rotary type, and which are particularly adapted for the consecutive printing and numbering of envelopes for periodic and serial use, such as for church collections, etc.

In printing machines of this type the envelopes, or other sheets or articles to be printed, are fed into a printing couple composed of cooperating plate and impression cylinders. These cylinders are of relatively small diameters, such for instance as six inches in one practical embodiment, to proportion the feeding of the envelopes and effect the necessary cooperation of adjacent parts of the feeding and printing mechanism. The dating cylinder used may be of any suitable construction, such as disclosed in my co-pending application, Serial No. 588,695, filed January 25, 1932. The dating cylinder cooperates directly with the impression cylinder, but it is impractical to make the dating cylinder of the small diameter of the other cylinders owing to the number of printing links in the printing chain of the dating cylinder. The diameter of the dating cylinder is seven inches in comparison to the six inch diameter of the cylinders of the printing couple, and the printing takes place at but one point on the periphery of the dating cylinder and at but one point on the periphery of the impression cylinder so that the dating cylinder must make one complete revolution to each single complete revolution of the impression cylinder, even though their diameters are different.

The object of the present invention, therefore, is to provide means for so driving these dating and impression cylinders, one through the other, as to effect the necessary registration of their respective printing points at each complete revolution of the cylinders.

Another object of the invention is to provide means of adjustment between the cylinders admitting changing the printing point of the impression cylinder relative to the normal printing point of the dating cylinder so that the cylinders may cooperate with this adjustment.

The invention also provides a novel combination of elliptic gears with the unequal diameter dating and impression cylinders to effect equal turning movements of the cylinders at the points of contact of the printing points and to effect the necessary relative movements of the cylinders between the points of contact.

A further object of the invention is to provide a pair of intermeshing elliptical gears of equal size for a pair of cylinders of different diameters; wherein the minor axis of the elliptical gear on

the smaller cylinder is equal to the diameter of the smaller cylinder to insure equal speeds of the cylinders; and wherein the elliptical gear on the smaller cylinder may be axially adjusted relatively thereto for insuring coincidence of the minor axis of the elliptical gear with the printing point of the smaller cylinder at all adjustments or locations of the printing point.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views.

Figure 1 is a side elevation of a printing and envelope feeding machine, showing diagrammatically the relative positions of the parts.

Figure 2 is a detail enlarged side elevation of the driving connection between the two cylinders of different diameters and having printing points for registration at each complete revolution of the cylinders, showing the driving points at quarter turn in advance of the point of registration.

Figure 3 is a similar view showing the printing points further advanced toward the point of registration or printing point.

Figure 4 is a like view showing the relative positions of the cylinders and the connection therebetween with the printing points in registration or contact.

Figure 5 is a detail fragmentary sectional view taken through the dating cylinder, showing its relation to the impression cylinder of the printing machine, showing the printing points of the respective cylinders prior to registration.

Figure 6 is a like view showing the parts in position with the printing points in register.

Figure 7 is an edge view, partly in section, of the intermeshing elliptical gears showing the slip ring connection of one of the gears with its adjacent cylinder shaft and with the slip ring locked in place.

Figure 8 is a like view showing the slip ring released and ready for adjustment axially with respect to its adjacent cylinder.

Figure 9 is a detail fragmentary sectional view taken through the slip ring gear and its parts in separated relative positions and showing a portion of the mating gear.

Figure 10 is a detail perspective view of one of the lock or clutch blocks used, and

Figure 11 is an enlarged fragmentary view of the adjacent portions of the intermeshing ellip-

tical gears, showing in dotted lines the respective cylinders at the point of registration or contact of the printing points of the cylinders.

Referring now to the drawings, and first to Figure 1, there is shown a pair of vertically spaced apart supporting chains 15 on which are mounted a plurality of magazines 16 which carry therein stacks of envelopes 17. The envelopes 17 are removable through the lower ends of one or more of the magazines by means of a sucker head 18 of any suitable construction and operated by an eccentric 19, or the like, for vertical reciprocation beneath the magazines. A feeding mechanism 20 is arranged horizontally beneath the row of magazines to receive the envelope 17 therefrom, the envelope 17 being held on the feeder 20 by means of retaining plates 21, or the like, operable through a bracket 22 by the sucker head to remove the envelopes from the sucker head as the latter descends through the feeder 20. The feeder 20 is of the endless construction and carries the envelope 17 forwardly into the printing machine, the envelopes being delivered between the pair or rolls 23 which are in register with the line of contact between a plate cylinder 24 and an impression cylinder 25. The cylinders 24 and 25 are disposed in vertical alignment and the envelopes passing therethrough are adapted to move outwardly and downwardly over the impression cylinder into contact with a date printing cylinder 26 which is preferably disposed outwardly of the cylinders 24 and 25, comprising a printing couple, so as to date the envelopes as they are carried downwardly from the printing couple.

The envelopes 17 are collected upon a suitable endless conveyor 27 which carries the printed and dated envelopes to any suitable point of discharge. The date printing cylinder 26 may be provided with an inking roller 28 disposed above the same for inking the printing point or device which is carried by the date printing cylinder.

The plate cylinder 24 and the impression cylinder 25 are only shown diagrammatically in the drawings as they may be of any adaptable construction, and these cylinders are preferably of relatively small diameter to proportion the same according to the size of the envelope 17 and so as to cooperate with the feeding mechanism. The dating cylinder 26 is provided with a dating chain 29 of any suitable construction built up of links each carrying a printing form of a different date, and owing to the length of the printing chain 29, it is practically impossible to make a dating cylinder 26 of the same small diameter as that of the plate cylinder 24 and the impression cylinder 25. Means must be provided therefore for bringing the printing points of the impression cylinder 25 and the dating cylinder 26 into proper register or contact upon each complete revolution of each cylinder.

As shown particularly in Figures 5 and 6, the dating cylinder 26 carries a plurality of rollers 30 suitably disposed for supporting the dating chain 29 within the circumference of the cylinder 26 and with a high feed roller and sprocket 31 disposed to support the outer face of the chain in projecting position at the periphery of the cylinder 26 so that such point of projection of the chain constitutes a printing point 32. The type of dating cylinder 26 shown diagrammatically and generally in the present drawings is shown and described in detail in my co-pending application, Serial No. 588,695, filed January 25,

1932. Of course, the dating cylinder may be of any other suitable construction providing a single printing point 32. As shown in the drawings, the impression cylinder 25 is provided with a printing point 33 at which the date is adapted to be imprinted upon the envelope 17, or other article being printed. It is therefore necessary that the printing points 32 and 33 be brought into register and contact upon each complete revolution of the cylinders 25 and 26.

To accomplish this purpose applicant provides a pair of intermeshing elliptical gears 34 and 35. The gears are intermeshed in 90° offset relation and are so proportioned as to size that the minor axis 36 of the gear on the smaller cylinder 25 is not less than the diameter of the cylinder 35.

The plane of contact between the intermeshing elliptical gears 34 and 35 therefore moves toward and from the periphery at the cylinder 25 so as to speed up the larger cylinder 24 as the plane of contact of the gears recedes from the periphery and to bring the larger cylinder 26 down to the speed of the cylinder 25 as such plane of contact approaches the periphery of the cylinder 25.

In the use of the printing machine, it may be desirable or necessary to change the printing point 33 of the impression cylinder 25, and in order to maintain the registration of the printing points of the impression and dating cylinders 25 and 26, an adjustment is required of the elliptical gear 35 with respect to the axis of the cylinder 25. In Figures 7 to 10, there is shown one form of construction admitting of this adjustment. The elliptical gear 35 is provided with an outer ring part which meshes with the elliptical gear 34. The gear 34 is fixed upon the dating cylinder shaft 37 which projects axially from the dating cylinder 26. As shown to advantage in Figure 9, the ring portion of the elliptical gear 35 has a relatively large central or axial opening extending entirely through the gear. An annular raised flange 38 is provided within the opening in the ring portion of the gear 35 and provides oppositely facing shoulders. A hub 39 is keyed or otherwise suitably secured to the shaft 40 of the impression cylinder 25 and has an outwardly extending annular flange 41 adapted to fit into the opening of the ring part and against the flange 38.

The hub 39 is provided at its outer side with a step formation providing a shoulder 42 of the depth of the flange 38 and of less diameter than that of the flange 38 so as to provide an annular recess about the outer portion of the hub. A suitable number of friction blocks 43 are fitted in the annular recess between the ring part and the hub and carry machine screws 44, or the like, which extend inwardly through the annular recess and into the flange 41 of the hub. These friction blocks or keys 43 are flanged or shouldered at their intermediate portions and adapted to respectively bind against the flange 38 and the shoulder 42 of the ring and the hub respectively. These friction blocks 43 thus securely bind the outer or ring part of the gear 35 upon the hub 39 after the desired adjustment is obtained.

In operation, the elliptical gears 34 and 35 are intermeshed in any suitable manner, such as suggested in Figure 9 by first securing the gear 34 to the dating cylinder shaft 37 and subsequently fitting the outer ring of the gear 35 on its hub 39 and bringing the teeth of the gears 34 and 35 into intermeshing engagement. From Figures 2, 3 150

and 4, particularly, it will be noted that the proper relation between the elliptical gears 34 and 35 is that wherein the longitudinal axes of the gears are at right angles to one another, or wherein one gear is disposed angularly at 90° with respect to the opposite gear.

The gear 35, as shown in Figures 2, 3 and 4, has its minor axis 36 equal to the diameter of the impression cylinder 25 so that at no time does the plane of intermeshing of the gears advance inwardly beyond the periphery of the cylinder 25. The printing point 33 on the impression cylinder 25 must coincide with the minor axis 36 of the gear 35 and the major axis 45 must coincide with the printing point 32 on the date printing cylinder 26.

The important feature in the construction of the irregular gears 34 and 35 is that the printing points 32 and 33 on the respective cylinders 26 and 25, must register upon each complete revolution of the cylinders and must at the time of registration move simultaneously and equally through the plane of contact of the cylinders. The relative movements of the cylinders 25 and 26 throughout the remaining portion of the turning of the cylinders, must be such as to bring the said printing points 32 and 33 into proper registration and contact after the next complete turn of the cylinders. Thus, the offsetting and construction of the elliptical gears 34 and 35 corresponds to the relative diameters of the cylinders 25 and 26.

When the printing point 33 is shifted or changed upon the impression cylinder 25, the clutch blocks 53 are released by loosening the screws 44 and the outer ring part of the gear 35 permits the hub 39 with the cylinder 25 to be turned in either direction to bring the printing point 33 again into radial alignment with the minor axis 36 of the gear 35. Thus, all desired adjustments of the printing point may be had in connection with the impression cylinder 25, and by a corresponding adjustment of the gear 35 the same relation between the cylinders 25 and 26 of different diameters may be maintained.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims:

What is claimed is:

1. In a printing machine, the combination with a printing couple comprising a plate cylinder and an impression cylinder and a date printing cylinder cooperating with the impression cylinder and being of greater diameter than the latter, means connected to the date printing and impression cylinders for effecting relative turning thereof to register at an equal speed the printing points of the respective cylinders during operation of the machine.

2. In a printing machine, an impression cylinder having a printing point, a date printing cylinder having a printing point and being of a diameter different from that of the impression cylinder, and a pair of intermeshing irregular gears on the respective cylinders and having registering portions on radii equal to those of and registering with the printing points on the respective cylinders.

3. In a printing machine, an impression cylinder having a printing point, a date printing cyl-

inder having a printing point and being of greater diameter than that of the impression cylinder, and a pair of intermeshing elliptical gears mounted on the respective cylinders with the minor axis of the gear on the impression cylinder equal to the diameter thereof and coincident with the printing point of the same.

4. In a printing machine, an impression cylinder having a printing point, a date printing cylinder having a printing point and being of a different diameter from that of the impression cylinder, a pair of intermeshing irregular gears on the respective cylinders and having registering portions disposed on radii equal to those of and registering with the printing points on the respective cylinders, and means for axially adjusting one of said cylinders with respect to its gear to admit of adjustment of the printing point on the cylinder.

5. In a printing machine, an impression cylinder having a printing point, a date printing cylinder having a printing point, said date printing cylinder being of greater diameter than that of the impression cylinder, and a pair of intermeshing elliptical gears mounted on the respective cylinders with their major axes offset 90° from each other and with the minor axis of the gear on the impression cylinder coincident with the printing point thereof.

6. In a printing machine, an impression cylinder having a printing point, a date printing cylinder having a printing point, said date printing cylinder being of greater diameter than that of the impression cylinder, a pair of intermeshing elliptical gears mounted on the respective cylinders with their major axes offset 90° from each other and with the minor axis of the gear on the impression cylinder coincident with the printing point thereof, and a slip joint connection between the impression cylinder and its elliptical gear for admitting adjustment of the impression cylinder in accordance with the positioning of the printing point thereon.

7. In a printing machine, an impression cylinder having a printing point, a date printing cylinder having a printing point, a pair of elliptical gears carried respectively by the cylinders and intermeshing for relatively turning the cylinders with respect to said printing points, the gear on the impression cylinder having a freely slidable hub admitting axial adjustment between the impression cylinder and its gear, and clamping means for said freely slidable hub to hold the same in adjusted position.

8. In a printing machine, an impression cylinder having a printing point, a date printing point, a date printing cylinder having a printing point and being of greater diameter than that of the impression cylinder, a pair of intermeshing elliptical gears mounted respectively on the cylinders and disposed at 90° in axially offset relation, the gear carried by the impression cylinder having an outer ring part with an opening therein and an annular flange in the opening, a hub secured to the impression cylinder to turn therewith and having a flange fitting in the opening of the ring and having a stepped shoulder of less diameter than said flange and extending therethrough, and a plurality of clutch blocks fitting between said ring and the hub and having clamping screws engaging the hub for binding the blocks against said flange and shoulder to secure the ring in adjusted position about the hub.

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