

May 10, 1938.

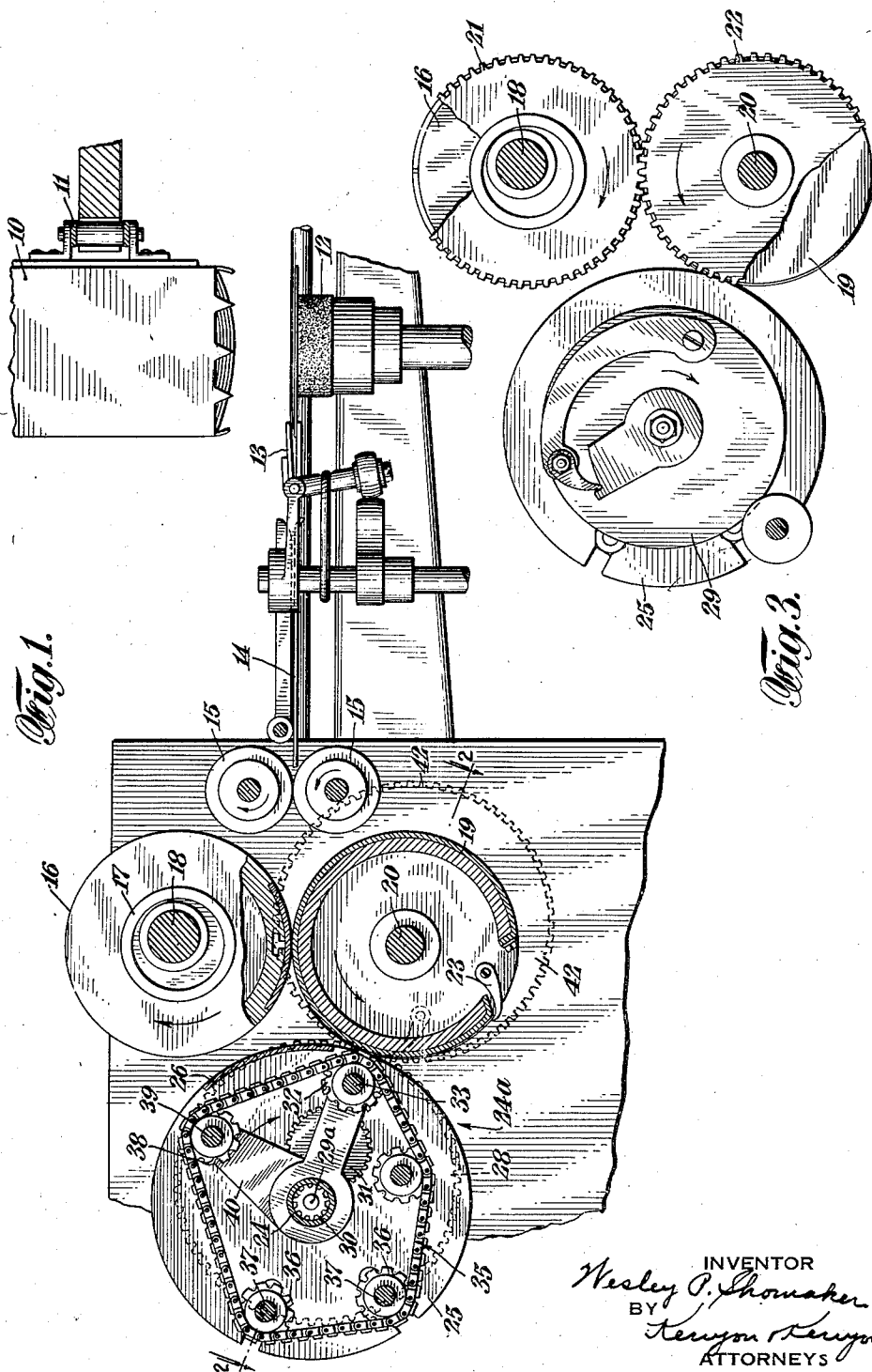
W. P. SHOMAKER

2,116,609

PRINTING PRESS

Original Filed March 2, 1933

2 Sheets-Sheet 1



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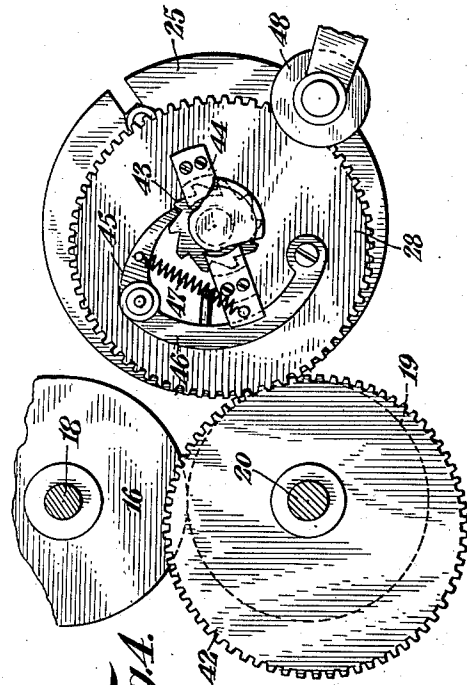
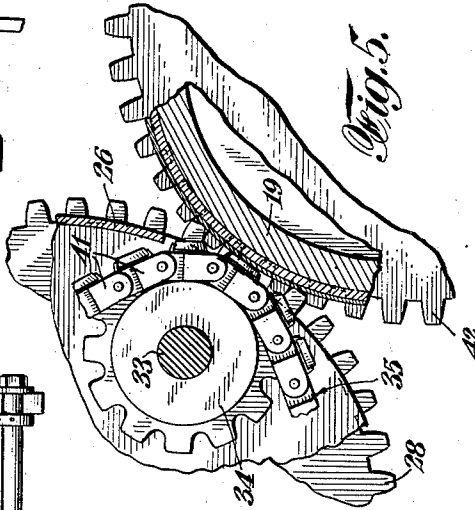
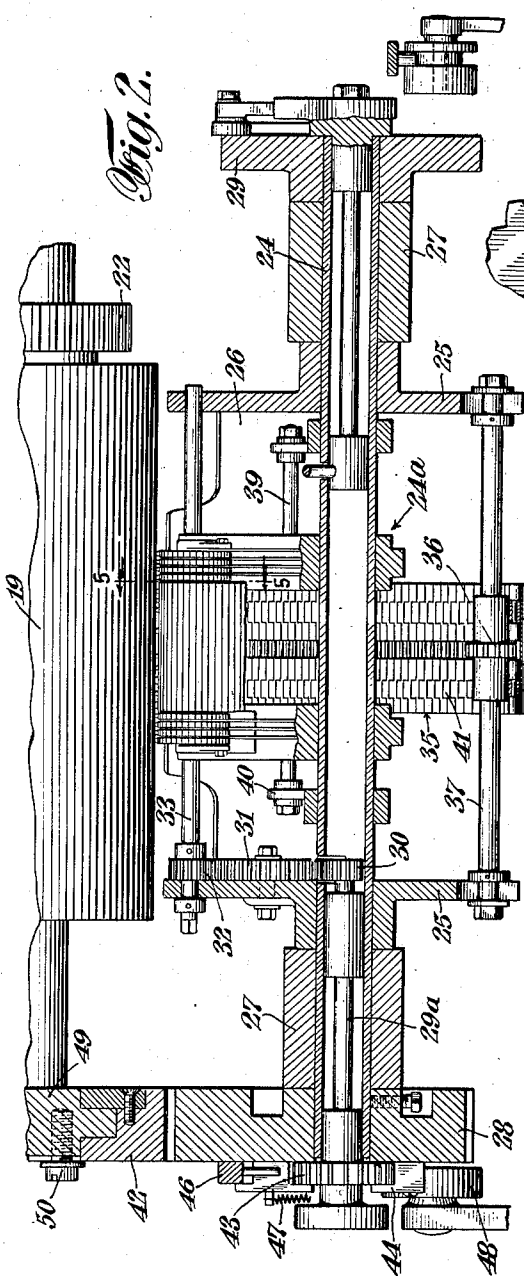
W. P. SHOMAKER

2,116,609

PRINTING PRESS

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2 Sheets-Sheet 2



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2,116,609

PRINTING PRESS

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28 Claims. (Cl. 101—91)

This invention relates to printing presses and more especially to printing presses used in printing church contribution envelopes and the like. Such presses are equipped with a printing cylinder, an impression cylinder, and a numbering and dating cylinder all of the same diameter and geared together to rotate in unison. The dating cylinder carries an endless chain made up of date type-links which are successively brought into printing position upon rotation of the cylinder. This chain is supported by guides which are radially adjustable to permit variation in the number of links in the chain. The maximum number of links which can be included in the chain is limited by the diameter of the cylinder.

An object of this invention is to increase the diameter of the dating cylinder thereby increasing its link capacity without change in the printing and impression cylinders and to rotate said dating cylinder in unison with the other cylinders and at the same peripheral speed during the time that the date type is in printing relation to the impression cylinder.

According to this invention, the dating cylinder is of larger diameter than the impression cylinder and is provided with an endless chain of type links adapted to be brought successively into printing position. Both cylinders are provided with intermeshing gears having pitch diameters equal to one-half the sum of the diameters of the cylinders and being eccentrically mounted on the cylinders, the amount of eccentricity being equal to the difference between the pitch diameter of the gears and the diameters of the cylinders. The impression cylinder is tangent to the pitch circle of its gear and a date link in printing position lies in peripheral alignment with the pitch circle of the date cylinder gear. The arrangement of the gears and cylinders is such that when the date cylinder is in printing position, the contacting surfaces are in peripheral alignment with the pitch circles of the gears. Thus at the time of printing, the peripheral speed of the date type exactly equals the peripheral speed of the impression cylinder so that a sharp printing impression results. The impression cylinder is driven at a constant rate of speed and the gears above mentioned effect complete rotation of the dating cylinder for each rotation of the impression cylinder.

Other objects, novel features and advantages of this invention will be apparent from the following specification and accompanying drawings, wherein:

Fig. 1 is a fragmentary central vertical section of a printing press embodying the invention;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is an end view from the left of Fig. 2;

Fig. 4 is an end view from the right of Fig. 2, and

Fig. 5 is an enlarged fragmentary section on the line 5—5 of Fig. 3.

Magazines 10 containing envelopes or the like to be printed are mounted on an endless chain 11 and are caused to move horizontally by driving means, not shown. A suction block 12 is reciprocated in timed relation to the magazines and is operative to withdraw the bottom envelope from the magazines in succession. An oscillating picker 13 transfers the envelope to the feed plate 14 from which it is delivered to the feed rollers 15. The mechanism just described, together with the means for operating the same is disclosed in detail in Shomaker and Jones Patent No. 1,855,132, issued April 19, 1932, and is not further described herein as it does not constitute part of the present invention.

A printing cylinder 16 is rotatably mounted on a sleeve 17 which is fixed to an eccentric shaft 18 journaled in the press frame so that by rotation of the shaft, the printing cylinder may be moved toward and away from the impression cylinder 19. The impression cylinder 19 is fixed to a rotatable shaft 20 having its ends journaled in the frame of the press. The printing and impression cylinders are of equal diameter and at one end the sleeve 17 and the shaft 20 are provided with intermeshing gears 21 and 22, the pitch diameter of which equals the diameter of the printing and impression cylinders. The shaft 20 is driven at a constant rate of speed by mechanism not disclosed. The impression cylinder 19 is provided with an automatically actuated finger 23 by which an envelope is gripped and held during the printing thereof.

The dating and numbering cylinder 24 comprises a hollow axle 24 upon which are mounted collars 25 between which extends a shield 26. The axle 24 is journaled in bearings 27 and has a gear 28 fastened to one end and a collar 29 fastened to the other end. In one end of the axle 24 is rotatably mounted a shaft 29^a at the inner end of which is provided a pinion 30. This pinion meshes with a pinion 31 carried by a collar 25 and extending through a slot in the axle 24. The pinion 31 in turn meshes with a pinion 32 fixed to a shaft 33 having its ends journaled in the collars 25. The shaft 33 is provided with a notched roller 34 and an endless chain 35 passes

around this roller which is in driving engagement therewith and also around guide rollers 36 supported by rods or shafts 37 extending between the collars 25 and around a guide roller 38 on a shaft 39 supported by arms 40 mounted on the axle 24 for angular adjustability to vary the tension of the chain 35. This chain is composed of a series of type links 41 pivotally connected together and located within the periphery of the collars 25, except that the link located on the roller 34 is in position to cooperate with the impression cylinder, the shield serving to prevent contact of an envelope with the dating chain except at the printing point.

The dating and numbering cylinder 24^a is provided with numbering wheels actuated intermittently by mechanism shown but not described, such mechanism being described in detail in Jones and Shomaker Patent No. 1,792,642, issued February 17, 1931, and forming no part of the present invention.

The diameter of the circle described by the surface of the operative type-link upon rotation of the dating cylinder 24^a is greater than the diameter of the impression cylinder and in the specification and claims, the diameter of such circle is called the diameter of the printing or dating cylinder 24^a. The cylinders are rotated in unison by gears which effect a single complete rotation of the dating cylinder for each single rotation of the impression cylinder and cause the two cylinders to rotate at the same peripheral speed when in printing relation. The gear 28 meshes with a gear 42 of equal pitch diameter fixed to the shaft 21. The pitch diameter of the gears 28 and 42 is equal to one-half the sum of the diameters of the impression cylinder and dating cylinder. These gears are eccentrically mounted on their respective shafts, the extent of their eccentricity being equal to one-half the difference between the diameters of the dating and impression cylinders. The impression cylinder is tangent to the pitch circle of its gear and the date link in printing position lies in peripheral alignment with the pitch circle of the date cylinder gear. The arrangement of the gears and cylinders is such that when the date cylinder is in printing position, the contacting surfaces of the cylinders are in peripheral alignment with the pitch circles of the gears and the gears are offset in the same direction along the center line of the cylinders. Thus, at the time of printing the peripheral speeds of the two cylinders are equal and a sharp printing impression results.

Means are provided for advancing the date chain a distance equal to the width of a link upon each rotation of the date cylinder. To accomplish this, the shaft 29 is provided with a ratchet wheel 43 which is held in place by cleats 44. A pawl 45 is pivotally connected to the end of an arm 46 pivotally mounted on the gear 28. A spring 47 normally holds the pawl 45 in a retracted position. A roller 48 is supported by the press frame in position to be engaged by the arm 46 upon each rotation of the cylinder to move the pawl 45 into engagement with the teeth of the ratchet wheel 43, thereby advancing the same to the extent of a single tooth. Thus, upon each rotation of the cylinder, the dating mechanism is advanced a single step and a different date is brought into printing position.

The gear 42 is provided with an eccentric circular aperture into which fits a circular hub 49 provided on the shaft 20 and the gear 42 is fixed

to the hub by means of bolts 50. By loosening the bolts 50, the position of the gear 42 on the hub 49 may be changed to vary the distance between the printing point on the impression cylinder and the holding finger 23, thereby making it possible to adapt the machine for use with different size envelopes or to vary the location of the date on the envelope.

I claim:

1. In a device of the character described, impression and printing cylinders of different diameters, congruent intermeshing gears connected to said cylinders for rotating the same in unison, each gear being tangential to its cylinder at one point and said gears being so related to each other as to register said points upon rotation.

2. In a device of the character described, impression and printing cylinders of different diameters, congruent intermeshing gears connected to said cylinders for rotating the same in unison, said gears and cylinders having registering peripheral points equally distant from their axes of rotation.

3. In a device of the character described, impression and printing cylinders of different diameters, congruent intermeshing gears connected to said cylinders for rotating the same in unison, each gear and cylinder having radially aligned points equally distant from their axes of rotation and said gears being so related as to register said points upon rotation of the cylinders.

4. In a device of the character described, different diameter impression and printing cylinders having a predetermined position of printing relationship, and congruent intermeshing gears connected to said cylinders for effecting rotation of the cylinders in unison, said gears and cylinders having registering points equally distant from their axes of rotation.

5. In a device of the character described, an impression cylinder, a printing cylinder of different diameter than said impression cylinder, and intermeshing gears of equal pitch diameter eccentrically mounted on said cylinders, said gears having their pitch circles tangent to said cylinders.

6. A device of the character described, an impression cylinder, a printing cylinder of larger diameter than said impression cylinder, intermeshing gears of equal pitch diameter eccentrically carried by said cylinders, said impression cylinder being tangent to the pitch circle of its gear and the pitch circle of printing cylinder gear being tangent to the said cylinder.

7. In a device of the character described, an impression cylinder, a printing cylinder of different diameter than said impression cylinder, intermeshing gears of equal pitch diameter eccentrically mounted on said cylinders, and type supported by said printing cylinder in peripheral alignment with one point on the pitch circle of the printing cylinder gear, said impression cylinder being tangent to the pitch circle of its gear.

8. In a device of the character described, an impression cylinder, a printing cylinder of larger diameter than said impression cylinder, intermeshing gears of equal pitch diameter eccentrically mounted on said cylinders, and type supported by said printing cylinder in peripheral alignment with one point on the pitch circle of the printing cylinder gear, said impression cylinder being tangent at its printing point to the pitch circle of its gear.

9. In a device of the character described, im-

pression and printing cylinders having printing points at different radial distances from their respective axes, congruent intermeshing gears connected to said cylinders for rotating the same in unison and effecting registration of said printing points, each of said printing points being in peripheral alinement with a point on the pitch circle of its associated gear.

10. In a device of the character described, impression and printing cylinders having registering printing points at different radial distances from their respective axes, congruent intermeshing gears connected to said cylinders, said gears having points registering coincidentally with the registration of said printing points and being spaced from their respective cylinder axes equally with said printing points.

11. In a device of the character described, impression and printing cylinders having printing points at different distances from their respective axes, and inter-meshing gears of equal pitch diameter eccentrically mounted on said cylinders, each printing point being in peripheral alinement with a point on the pitch circle of its associated gear.

12. In a device of the character described, an impression cylinder, a printing cylinder of different diameter than said impression cylinder, intermeshing gears eccentrically mounted on said cylinders, the pitch diameter of said gears being equal to one-half the sum of the cylinder diameters and the amount of eccentricity of each gear being equal to one-half the difference between the cylinder diameters and said gears being offset in the same direction along the center line of said cylinders when the same are in printing relation.

13. In a device of the character described, impression and printing cylinders having printing points at different distances from their respective axes, intermeshing gears of equal pitch diameter eccentrically mounted on said cylinders, and means for angularly adjusting the printing cylinder gear relative to the printing cylinder, each printing point being in peripheral alinement with a point on the pitch circle of its associated gear.

14. In a device of the character described, impression and printing cylinders having printing points at different distances from their respective axes, inter-meshing gears of equal pitch diameter eccentrically mounted on said cylinders, each printing point being in peripheral alinement with a point on the pitch circle of its associated gear, a chain of type-links supported by said printing cylinder with one type-link arranged in printing position and means for advancing said chain upon rotation of the printing cylinder to bring the type-links successively into printing position.

15. In a device of the character described, impression and printing cylinders having printing points at different distances from their respective axes, inter-meshing gears of equal pitch diameter eccentrically mounted on said cylinders, each printing point being in peripheral alinement with a point on the pitch circle of its associated gear, a chain of type-links supported by said printing cylinder with one type-link arranged in printing position, and means for advancing said chain upon rotation of the printing cylinder to bring the type links successively into printing position, the pitch radius of said gears being equal to one-half the sum of the distances of the printing points from their axes and the amount

of eccentricity of said gears being equal to the difference of said distances.

16. In a device of the character described, an impression cylinder having a fixed rotational axis and its contact surface coaxial therewith, a printing cylinder co-operating with said impression cylinder and carrying type at a different distance from its rotational axis than the radius of the contact surface of said impression cylinder, intermeshing gears connecting said cylinders for effecting one to one rotation of said cylinders and effecting printing relation of said type and contact surface at equal peripheral speed.

17. In a device of the character described, an impression cylinder having a fixed rotational axis and its contact surface coaxial therewith, a printing cylinder co-operating with said impression cylinder and carrying type at a greater distance from its rotational axis than the radius of the contact surface of said impression cylinder, inter-meshing gears connecting said cylinders for effecting one to one rotation of said cylinders and effecting printing relation of said type and contact surface at equal peripheral speed.

18. In a device of the character described, an impression cylinder, a printing cylinder of different diameter than said impression cylinder, intermeshing gears of equal pitch diameter eccentrically mounted on said cylinders, a multiple type-link chain supported by said printing cylinder with one type-link in peripheral alinement with a point on the pitch circle of the printing cylinder gear, said impression cylinder being tangent at its printing point to the pitch circle of its gear, and means for advancing said chain upon rotation of the printing cylinder to bring the type-links successively into printing position.

19. In a device of the character described, an impression cylinder, a printing cylinder of larger diameter than said impression cylinder, intermeshing gears of equal pitch diameter eccentrically mounted on said cylinders, a multiple-type-link chain supported by said printing cylinder with one type-link in peripheral alinement with a point on the pitch circle of the printing cylinder gear, said impression cylinder being tangent at its printing point to the pitch circle of its gear, and means for advancing said chain upon rotation of the printing cylinder to bring the type-links successively into printing position.

20. In a device of the character described, an impression cylinder, a printing cylinder of larger diameter than said impression cylinder, and intermeshing gears eccentrically mounted on said cylinders, the pitch diameter of said gears being equal to one-half the sum of the diameters of the cylinders and the amount of eccentricity of said gears being equal to the difference between said pitch diameter and said cylinder diameters.

21. In a device of the character described, an impression cylinder, a printing cylinder of larger diameter than said impression cylinder, intermeshing gears eccentrically mounted on said cylinders, the pitch diameter of said gears being equal to one-half the sum of the cylinder diameters and the amount of eccentricity of said gears being equal to one-half the difference of said cylinder diameters, and type supported by said printing cylinder in peripheral alinement with a point on the pitch circle of the printing cylinder gear.

22. In a device of the character described, an impression cylinder, a printing cylinder of larger

diameter than said impression cylinder, and intermeshing gears of equal pitch diameter eccentrically mounted on said cylinders, said gears being offset equally and in the same direction along the center line of said cylinders in the printing position of said cylinders.

23. In a device of the character described, an impression cylinder, a printing cylinder of larger diameter than said impression cylinder, intermeshing gears of equal pitch diameter eccentrically mounted on said cylinders, said gears being offset equally and in the same direction along the center line of said cylinders in the printing position of said cylinders, and type chain supported by said printing cylinder in peripheral alinement with a point on the pitch circle of the printing cylinder gear.

24. In a device of the character described, an impression cylinder, a printing cylinder of larger diameter than said impression cylinder, intermeshing gears eccentrically mounted on said cylinders, the pitch diameter of said gears being equal to one-half the sum of the cylinder diameters and the amount of eccentricity of each gear being equal to one-half the difference between the cylinder diameters and said gears being offset in the same direction along the center line of said cylinders when the same are in printing relation.

25. In a device of the character described, an impression cylinder, a printing cylinder of larger diameter than said impression cylinder, intermeshing gears eccentrically mounted on said cylinder, the pitch diameter of said gears being equal to one-half the sum of the cylinder diameters and the amount of eccentricity of each gear being equal to one-half the difference between the cylinder diameters and said gears being offset in the same direction along the center line of said cylinders when the same are in printing relation, and type supported by said printing cylinder in peripheral alinement with a point on the pitch circle of the printing cylinder gear.

26. In a device of the character described, an impression cylinder, a printing cylinder of larger diameter than said impression cylinder, inter-

meshing gears eccentrically mounted on said cylinders, the pitch diameter of said gears being equal to one-half the sum of the cylinder diameters and the amount of eccentricity of said gears being equal to one-half the difference of said cylinder diameters, a multiple type-link chain supported by said printing cylinder with one type-link in peripheral alinement with a point on the pitch circle of the printing cylinder gear, and means for advancing said chain upon rotation of the printing cylinder to bring the type links successively into printing position.

27. In a device of the character described, an impression cylinder, a printing cylinder of larger diameter than said impression cylinder, intermeshing gears of equal pitch diameter eccentrically mounted on said cylinders, said gears being offset equally and in the same direction along the center line of said cylinders in the printing position of said cylinders, a multiple type-link chain supported by said printing cylinder with one link in peripheral alinement with a point on the pitch circle of the printing cylinder gear, and means for advancing said chain upon rotation of the printing cylinder to bring the type links successively into printing position.

28. In a device of the character described, an impression cylinder, a printing cylinder of larger diameter than said impression cylinder, intermeshing gears eccentrically mounted on said cylinder, the pitch diameter of said gears being equal to one-half the sum of the cylinder diameters and the amount of eccentricity of each gear being equal to one-half the difference between the cylinder diameters and said gears being offset in the same direction along the center line of said cylinders when the same are in printing relation, a multiple type-link chain supported by said printing cylinder with one type-link in peripheral alinement with the pitch circle of the printing cylinder gear, and means for advancing said chain upon rotation of the printing cylinder to bring the type links successively into printing position.

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