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W. CHIPPERFIELD

DUPLICATING MACHINE

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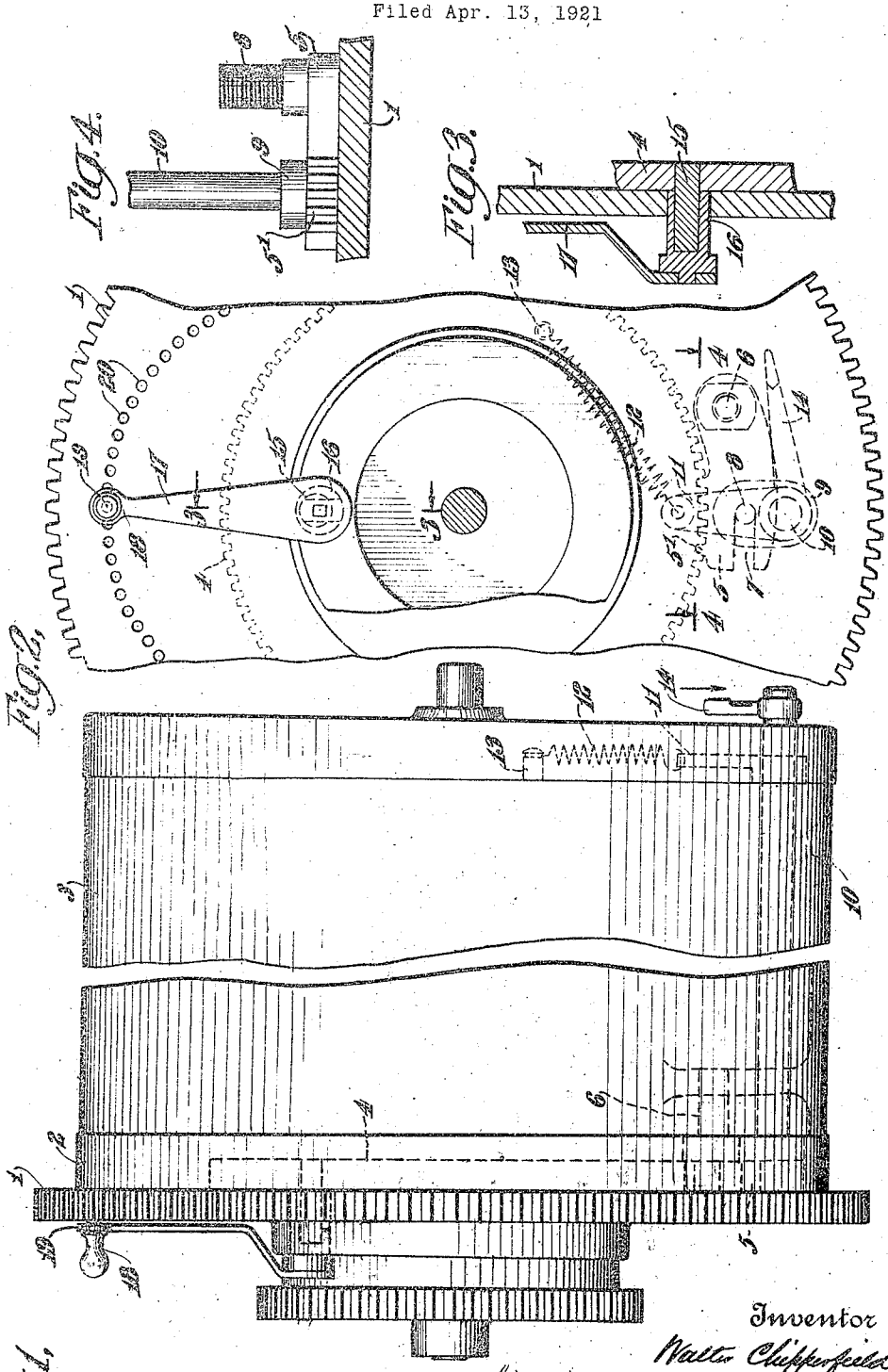

Fig. 4.

Fig. 3.

Fig. 2.

Fig. 1.

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UNITED STATES PATENT OFFICE.

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DUPLICATING MACHINE.

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(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, WALTER CHIPPERFIELD, a subject of the King of Great Britain, residing at Kinkora Great Nelmes, Hornchurch, Essex, England, have invented certain new and useful Improvements in Duplicating Machines (for which I have filed an application in Great Britain January 19, 1920, No. 1,648, Patent No. 162,053), of which the following is a specification.

My invention relates to improvements in and relating to duplicating and like rotary printing machines. It has for its object the provision of suitable means for effecting certain adjustments, to provide the correct head spacing and fine line adjustments necessary in such machines. In machines of this type the printing cylinder usually receives its motion from a spur gear which may be fitted loosely upon a boss secured to or formed integral with one of the side plates of the cylinder. Connection between the cylinder and the spur gear has been provided by means of removable devices such as clamps which are operated by means of a key, the movement of which in a counter-clockwise direction has released the clamp from binding contact with the cylinder wall. When the clamp has been released, the cylinder may be moved in either direction, independently of the spur gear, for regulation of the head space on the sheets on which copies are made.

Such an arrangement has certain disadvantages, among which the possible slipping of the cylinder may be mentioned, and the necessity of considerable skill on the part of the operator in order to gauge the exact amount of movement necessary to the cylinder to obtain the head space required. With such devices also it has been almost impossible to obtain a very fine line adjustment.

By my present invention means are provided for obtaining the required adjustments for head space and fine line spacing in a positive and certain manner, these means furthermore considerably reducing the amount of skill required in making the adjustments.

In order that my invention may be more clearly understood attention is hereby directed to the accompanying drawings forming part of this application and illustrating one embodiment of my invention. In the drawings Fig. 1 represents a side elevation of the printing cylinder of a rotary duplicating machine, embodying my invention, Fig. 2 is a partial side view thereof and Figs. 3 and 4 are sections taken respectively on the lines 3—3 and 4—4 of Fig. 2, showing certain details of the construction.

Referring to the drawings, in the construction illustrated the main spur gear 1 is mounted upon a boss formed on or secured to one of the side walls 2 of the printing cylinder 3 of a rotary duplicating machine. Gear 1 is provided with a boss or flange, concentric with gear 1, on which is loosely mounted a toothed wheel or gear 4. The teeth of this wheel normally mesh with the teeth of a rack 5′ formed on a lever 5, which is pivoted at one end on a pin 6, which is carried by cylinder 3, the teeth of wheel 4 and rack 5 preferably being machine-cut.

The free end of the rack lever 5 is slotted as is shown at 7 for the reception of a pin 8 carried by a crank 9 which is secured to a spindle 10. This spindle is rotatably mounted in the side discs 2, 2 of the cylinder, adjacent to the periphery of the cylinder.

The lever 5 is normally held by spring pressure in position such that teeth 5′ will mesh with the teeth of wheel 4. This may be effected by the provision of an arm 11 on spindle 10, the upper end of this arm being normally held in the position indicated in dotted lines in Fig. 2 by means of a spring 12 which may be secured to a pin 13 on the inner surface of one of the end plates 2 of the cylinder. This spring exerts rotative effect on spindle 10 to hold pin 8 in the position shown in Fig. 2 in which the teeth of rack 5′ will mesh with the teeth of wheel 4 to constitute a positive or driving connection between gear 1 and cylinder 3.

The hand lever 14 is also secured on spindle 10 beyond the end of the printing cylinder. By movement of this hand lever the spindle 10 is rotated sufficiently to cause pin 8 secured to crank 9 to force down the rack lever 5 so that the teeth thereon are freed from the teeth of wheel 4, whereupon the printing cylinder may be moved in either direction to effect the required head space independently of gear 1. On releasing hand lever 14, spring 12 turns spindle 10 in the opposite direction to cause the teeth of rack lever 5 to reengage the teeth of wheel 4 and so restore the driving connection between the printing cylinder and its gear 1.

A very fine line adjustment may be obtained by means which permit slight graduated angular adjustments between gear 1 and wheel 4. In the construction shown a pin 15 extends outwardly from wheel 4, the latter preferably having a slot formed therein within which the squared end of pin 15 is inserted. Gear 1 is provided with a cylindrical opening therethrough through which extends a cylindrical member 16 which has a hand lever 17 secured to or formed integral with the outer end of the same. Member 16 is provided with an eccentrically disposed bore into which pin 15 extends. The outer or upper end of hand lever 17 is provided with a knob 18 and a pin 19 which registers with a series of openings 20 drilled into or through gear 1 adjacent the periphery thereof.

Pin 19 may be freed from one of the perforations 20 and again inserted in a different perforation 20 after arm 17 has been swung through a desired angle. This may be accomplished, for example, by moving the sleeve member 16 outwardly over pin 15 to free pin 19 from its opening 20 and again push the sleeve member 16 inwardly when pin 19 is in the proper adjusted position. As arm 17 swings from one position to another, pin 15 is moved through a much smaller distance, angularly, because of its connection with arm 17, close to the pivotal point thereof, this being effected by the eccentric mounting of pin 15 in pivot member 16. In the preferred arrangement, the movement of arm 17 from one end to the other of the series of perforations 20 is sufficient to rotate wheel 4, and accordingly cylinder 3, relatively to gear 1, an amount approximately equal to one tooth of wheel 4. Accordingly, movement of arm 17 from one opening 20 to the next adjacent opening in either direction affords an extremely minute movement of cylinder 3, and thus a very fine degree of adjustment is obtained.

What I claim is:—

1. In duplicating machines, the combination of a printing cylinder, a gear in the driving train therefor, a lever pivoted to said cylinder, having rack teeth thereon, adapted to mesh with said gear, spring means for holding said teeth in mesh with said gear, a hand lever on the exterior of said cylinder, and means operated by said hand lever for swinging said rack lever away from said gear.

2. In duplicating machines, the combination of a printing cylinder, a gear in the driving train therefor, a lever pivoted to said cylinder, having rack teeth thereon, adapted to mesh with said gear, spring means for holding said teeth in mesh with said gear, a spindle carried by said cylinder, an arm on said spindle, having a pin adapted to coact with said lever to swing the same away from said gear, and a hand lever on the exterior of said cylinder for oscillating said spindle.

3. In duplicating machines, the combination of a printing cylinder, a spur gear in the driving train thereof, having a boss, a toothed wheel loosely mounted on said boss, means for effecting fine adjustments between the relative angular positions of said gear and wheel, and securing the same together, a lever pivoted to said cylinder having rack teeth adapted to mesh with said toothed wheel, spring means for holding said teeth in mesh with said wheel, and hand operated means for swinging said lever away from said wheel.

4. In duplicating machines, the combination of a printing cylinder, a spur gear in the driving train thereof, having a boss, a toothed wheel loosely mounted on said boss, means for effecting fine adjustments between the relative angular positions of said gear and wheel, and securing the same together, toothed means for effecting a driving connection between said wheel and cylinder, and hand operated means for moving said toothed means out of mesh with said wheel, for adjusting the relative angular positions of said cylinder and toothed wheel.

5. In duplicating machines, the combination of a printing cylinder, a spur gear in the driving train thereof, having a boss, a toothed wheel loosely mounted on said boss, means including a rack normally in mesh with said wheel for maintaining a driving connection between said wheel and said cylinder, and means for adjusting the relative angular positions of said cylinder and toothed wheel while said rack is in mesh with said gear, said means comprising a pin extending from said wheel parallel to the axis thereof, an arm pivoted on said gear, adapted to swing over the face thereof, engaging said pin, and means for securing the end of said arm to said gear in different angular positions.

6. In duplicating machines, the combination of a printing cylinder, a spur gear in the driving train thereof, a rotary member,

coaxial with said gear, for driving said cylinder therefrom, said gear having a cylindrical opening therethrough, parallel to its axis, a cylindrical member rotatively mounted in said opening, having an eccentric-bore, a pin secured to said rotary member, extending into said bore, a hand operated arm on the outer end of said cylindrical member, adapted to swing over the face of said gear, and means for securing the outer end of said arm to said gear at different angularly spaced points adjacent the periphery of the gear.

This specification signed this 18th day of March, 1921.

WALTER CHIPPERFIELD.