Feb. 8, 1927. 1,616,922

L. RAMDOR

ROTARY PRINTING MACHINE

Filed May 4, 1925 2 Sheets-Sheet 1

FIG. 1.

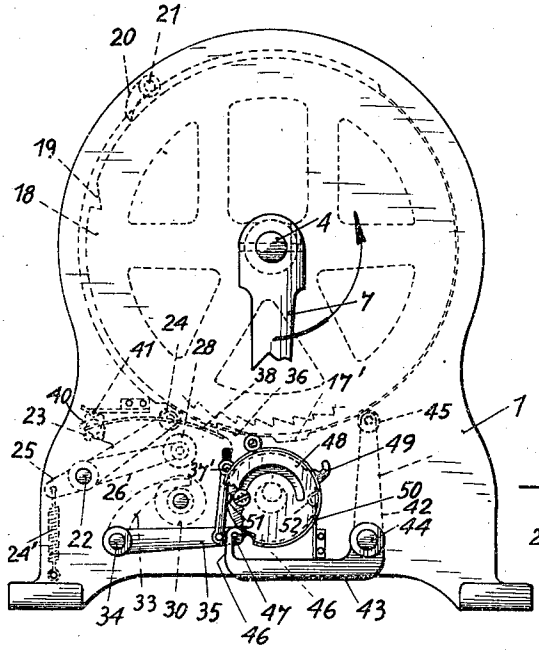


FIG. 2.

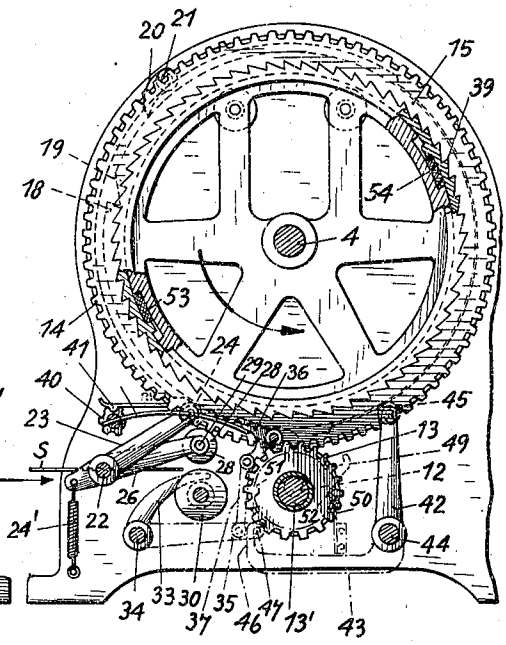


FIG. 3.

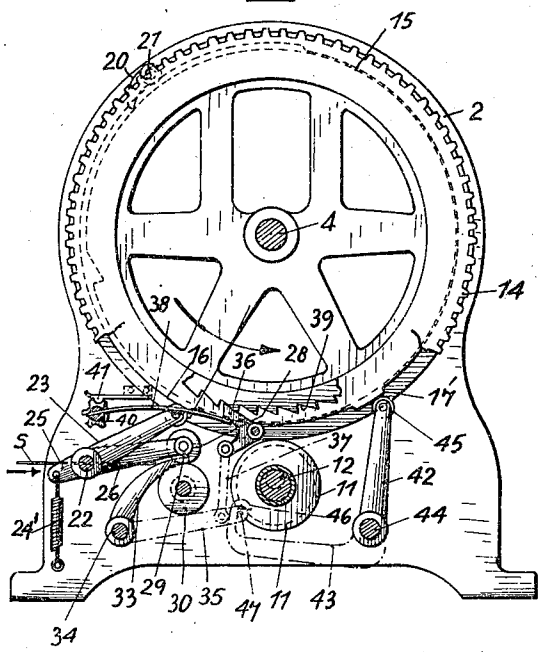
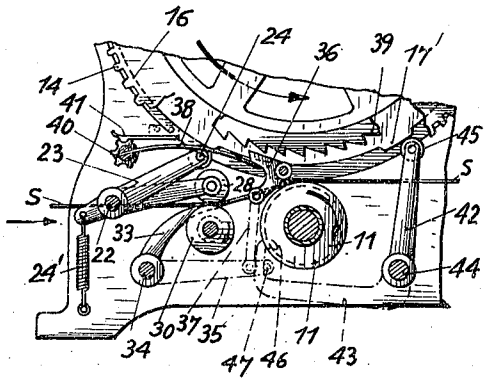


FIG. 4.



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FIG. 5.

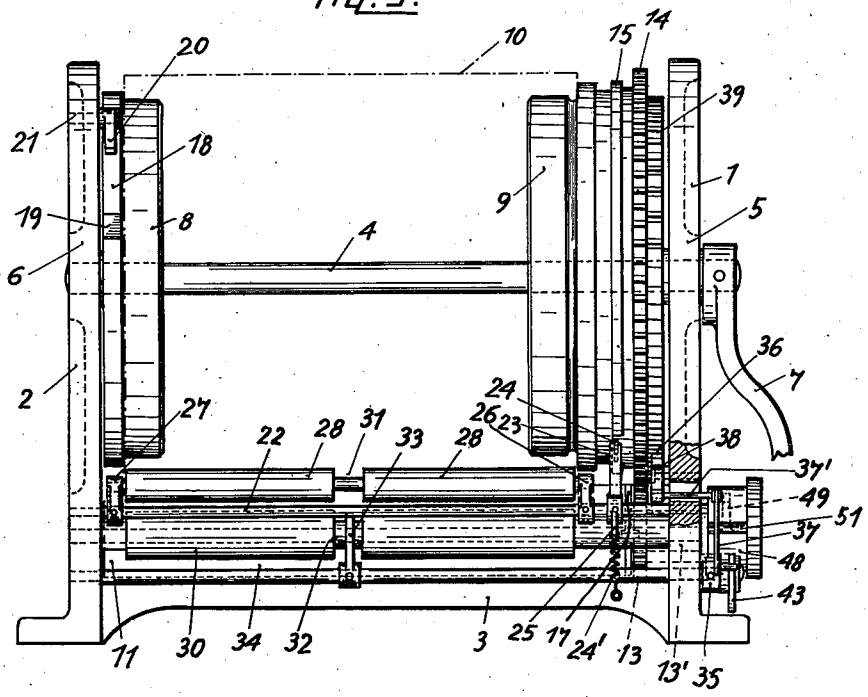
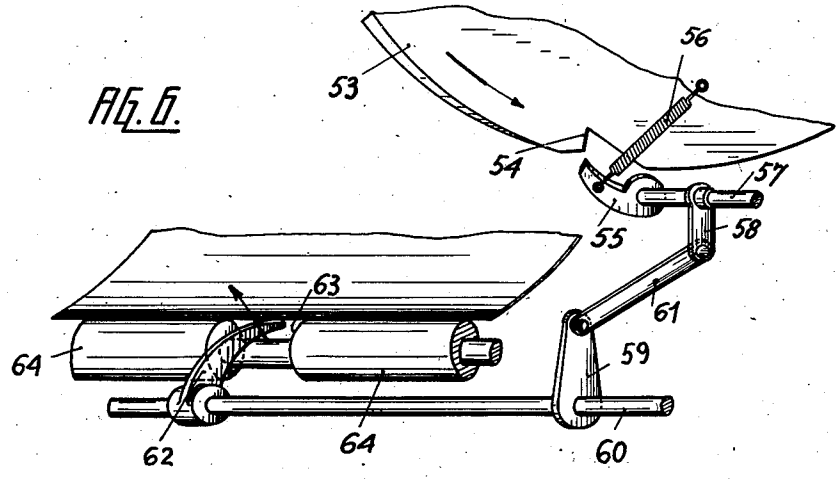


FIG. 6.



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Patented Feb. 8, 1927. 1,616,922

UNITED STATES PATENT OFFICE.

LEOPOLD RAMDOR, OF SEEGEFELD, GERMANY, ASSIGNOR TO THE FIRM DEUTSCHE POST- UND EISENBAHN-VERKEHRSWESEN AKTIENGESELLSCHAFT (DAPAG-EFUBAG), OF STAAKEN, NEAR SPANDAU, GERMANY.

ROTARY PRINTING MACHINE.

Application filed May 4, 1925, Serial No. 27,919, and in Germany January 14, 1924.

My invention relates to rotary printing machines and more especially to machines of the kind in which a printing drum or a segment carrying the type cooperates with an impression cylinder such as ribbon and stencil printing machines.

In such machines it may happen that sheets are spoiled when the impression cylinder gets into direct contact with the type on the segment. In this case the impression cylinder is soiled by the type and the ink adhering to the impression cylinder soils the rear side of the paper. This occurs when the machine is operated without a sheet of paper being fed into the machine or if the sheet is not fed in proper time so that the type gets into contact with the impression cylinder before the paper has entered between the cylinder and the segment, or if the machine is rotated too far backwards.

Means hitherto proposed for overcoming these drawbacks fail to operate when the paper is not fed in proper time. They do not prevent contact of the impression cylinder and the type when the machine is rotated backwards beyond its initial position and contact between the impression cylinder and the segment when no paper is fed into the machine is prevented by shifting the impression cylinder. The mechanism required for this purpose complicates the machine considerably.

It is an object of my invention to overcome these drawbacks and in particular to eliminate complicated mechanism for shifting the impression cylinder by providing means which automatically prevent rotation of the cylinder when no sheet is fed into the machine so that shifting of the impression cylinder is altogether dispensed with and therefore no complicated mechanism for effecting this is required. The automatic locking means are also operated when the paper is not fed in proper time so that soiling is prevented in this case as well.

To this end I provide automatic means for periodically locking and releasing said printing drum during each operation of the machine, and means which are operatively connected with the locking means and adapted to prevent their operation while there is a sheet in the machine, that is, the automatic locking and releasing means do not perform their functions while the machine is in regular printing operation.

It has already been proposed to provide machines in which the operative parts are permanently locked and are only released when a sheet is fed into the machine. As compared with periodically operated automatic locking and releasing means like applicant's, this prior system involves the drawback that the release must be effected by the object on which the machine is to perform its functions. Thus for instance a catch is provided in the path of this object and by moving the catch aside the object releases the means locking the operative parts. In the machine according to my invention, on the other hand, where the locking and releasing operations are performed by the machine automatically and independently of the sheet, the sheet does not release the locking means. While a comparatively stiff object, such as a closed letter, may be able to move aside a catch or the like against the action of a pull-back spring without being damaged, the edge of a sheet of paper cannot perform such functions. In the new machine, the sheet enters the machine without being held up by a catch or the like, but when it has entered the machine, it is engaged by a catch not on its edge but from below and this catch is operatively connected with the locking mechanism so as to be rocked about a shaft when the locking mechanism becomes operative. It cannot perform its rocking motion when it is arrested by the sheet and therefore the printing drum will not be locked while there is a sheet in the machine.

It is another object of my invention to prevent backward rotation of the machine beyond a certain position so that soiling of sheets from that cause is also eliminated.

In the drawings affixed to this specification and forming part thereof a machine embodying my invention is illustrated diagrammatically by way of example. In the drawings—

Fig. 1 is an end elevation of the machine;

Figs. 2, 3, and 4 are similar end elevations with one of the end plates removed, showing various positions of the parts;

Fig. 5 is a front elevation viewed from the left in the preceding figures, and

Fig. 6 is a perspective illustration of a modified locking device.

Referring first to Figs. 1 to 5, 1 is the right hand and 2 is the left hand end plate of the machine frame, the plates being held in position by a transverse stay 3. 4 is a shaft rotating in bearings 5 and 6 forming part of the end plates, and 7 is a crank secured on the end of the shaft which projects beyond the end plate 1, this crank being provided with a suitable handle (not shown). 8 and 9 are circular plates keyed onto the shaft 4 on which the printing drum or segment 10 is secured as shown in dot-and-dash lines in Fig. 5.

An impression cylinder 11 is secured below the segment 10 on a shaft 12 which is supported in the end plates 1, 2 by eccentric journals, so that the impression cylinder can be shifted by rotating the journals. Devices of this kind are well known in the art and need not be discussed in detail.

A pinion 13 is seated on the journal 13′ which is carried in the right-hand end plate 1 and connected with the impression cylinder 11 by means of a clutch 17 as shown in dotted lines in Fig. 5, so that rotation is imparted to the impression cylinder when the pinion 13 is rotated. A gear wheel 14 is keyed onto a shaft 4 and meshes with the pinion 13. A cam disc 15 is integral with or connected to the said gear wheel 14 and provided with two cams 16 and 17′.

A disc 18 is secured to or integral with the plate 8 at the other end of the shaft 4 and provided with a notch 19 which is adapted to be engaged by a pawl 20 on a pin 21 in the end plate 2. This pawl does not interfere with the forward rotation of the segment which is indicated by the arrows in Figs. 1, 2 and 3, but prevents backward rotation beyond a certain point from the initial position of the segment.

A shaft 22 extends across the frame in front of the impression cylinder 11. A double-armed lever 23, 25 keyed onto this shaft and equipped with a roller 24 at one end which is adapted to cooperate with the large cam face 16 of the disc 15. A pull-back spring 24′ is attached to the arm 25 and tends to hold the roller 24 engaged with the cam 16.

Two arms 26 and 27 are keyed onto the shaft 22 and a cylinder 28 is carried on a pin in the eyes of the levers 26, 27. Another cylinder 30 is rotatably carried on a shaft secured to the end plates 1 and 2. Rotation is imparted to the cylinder 30 from the gear wheel 14 by suitable gearing which has not been shown as it would have confused the drawings. Both cylinders are recessed at 31 and 32, respectively, and a feeler finger 33 on a shaft 34 is adapted to enter both recesses alternately. 35 is an arm keyed to the end of the shaft 34 which projects beyond the end plate 1. This lever is connected with a pawl 36 fulcrumed in the end plate 1 by a connecting rod 37 and a long pin 37′ which extends through a slot in the end plate 1. The pawl 36 is adapted to engage the teeth of a ratchet wheel 39 which is keyed onto a shaft 4 beside the gear wheel 14. A blade spring 38 tends to force a pawl 36 into the teeth of the ratchet wheel 39. The other end of the spring may be secured to a pin on which a ratchet wheel 40 is seated. A spring catch 41 engages the ratchet wheel and it will be understood that the pressure which this spring 38 exerts on the pawl 36 may be varied by varying the position of the ratchet wheel 40.

A bell-crank lever 42, 43 is carried on a pin 44 at the rear of the impression cylinder 11 and the arm 42 of the lever carries a roller 45 adapted to cooperate with the short cam face 17′ on the cam disc 15. A hook 46 at the end of the arm 43 is adapted to engage a pin 47 at the end of arm 35.

A sleeve 48 is keyed onto the end of the journal 13′ on which the pinion 13 is free to rotate as described. A hook 49 projecting from this sleeve can engage the pin 47 of the arm 35 when sleeve 48 is rotated about 180° from the position shown in Figs. 1 and 2. A spring catch 50 cooperates with two notches 51 and 52 in sleeve 48 so as to hold it in its final positions.

The operation of this machine is as follows:

Fig. 1 shows the initial position of the machine in which the ends of the cam faces 16 and 17′ are at some distance from the rollers 24 and 25 at the ends of the arms 23 and 42, respectively. The cylinders 28 and 30 are somewhat spaced apart and pawl 36 is out of mesh with the teeth of the ratchet wheel 39. The feeler finger 33 is in the recess 32 of the cylinder 30.

When the crank 7 is rotated anti-clockwise as indicated by the arrows in the several figures, the cam 16 will depress the arm 23 against the action of the spring 24′ so that a sheet *s* which is fed into the machine from the left in Fig. 2, is gripped between the cylinders 28 and 30 and fed forward between the segment 10 and the impression cylinder 11, as shown in Fig. 4. Shortly after the lever 23 has been engaged by the cam 16, the lever 42 is engaged by the cam 17′ so that it is rotated on its pin 44 and the hook 46 at the end of the lever 43 is shifted away from the pin 47 at the end of the lever 35. The spring 38 tends to move the pawl 36 into the teeth of the ratchet wheel 39, but is prevented from doing so by the feeler finger 33 which is held in the recess 32 of cylinder 30 by the sheet *s*. This is the normal operation of the machine.

Now assuming that a sheet *s* has been fed into the machine inadvertently after the

crank has been rotated through such an angle that the arms 23 and 42 have already been operated by their respective cams 16 and 17, as indicated in Fig. 3. As soon as the hook 46 at the end of the arm 43 releases the pin 47, the spring 38 forces the pawl 36 into the teeth of the ratchet wheel 39, as in this case the finger 33 is not retained by the sheet *s* and can thus move upwards into the recess 31 of cylinder 28. Rotation of the segment 10 is therefore prevented so that the impression cylinder 11 can not get in contact with the type on the segment.

If it is desired to rotate the segment 10 backwards or if this is done inadvertently, such rotation is limited by the pawl 20 and the notch 19 in the disc 18. This prevents rotation of the segment to such an extent that the type on the segment gets into contact with the impression cylinder 11.

When it is desired to ink the segment, provision must be made for rotating the printing drum alone and to shift the impression cylinder while the drum is being rotated so that the impression cylinder will not be smeared with ink which would cause soiling of the paper on the back. A hook 49 is secured on the sleeve 48. When the sleeve is rotated 180 degrees as described, the impression cylinder is shifted away from the segment due to its eccentric arrangement and the pin 47 is arrested by the hook 49 so that the pawl 36 cannot engage the teeth of the ratchet wheel 39 and the printing drum is free to rotate while its inking cylinder is kept away from the segment.

A flexible connection which may be a strip of rubber 53 or a spring 54, as shown in Fig. 2, may be inserted between the rim of the ratchet wheel 39, and the printing cylinder 10 so as to provide a resilient connection between these parts and to prevent damage to the cylinder when the pawl 36 suddenly arrests the ratchet wheel 39.

Referring now to Fig. 6 the ratchet wheel 39 is here replaced by a disc 53 which has a single tooth or notch 54 and is arranged between the cam disc 15 and the gear wheel 14 exactly as the ratchet wheel 39 in the other figures. It is an object of this modification to simplify the machine and to reduce its initial cost by replacing the complete ratchet wheel by a circular disc with a notch which can be manufactured on a quantity production basis.

When the machine is not supplied with sheets, the pawl 55 is forced into the notch 54 by the spring 56 when the notch comes round and the disc 53 is now arrested, exactly as the ratchet wheel 39 in the other figures. But when a sheet is fed into the machine as shown in Fig. 6 the finger 62 is depressed, lifting the pawl 55 out of reach of the tooth 54 and the disc 53 is free to rotate. The pawl is seated on a shaft 57. A lever 58 is keyed onto said shaft and connected with a lever 59 on a shaft 60 by means of a connecting rod 61. This shaft carries the finger 62 which corresponds to the finger 33 of the machine illustrated in Figs. 1 to 5. The finger is adapted to engage in a recess 63 of a cylinder 64 which corresponds to the cylinder 30.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:—

1. Rotary printing machine comprising a printing drum, means for rotating said printing drum, an impression cylinder adapted to cooperate with said printing drum, means for feeding sheets between said drum and said impression cylinder, automatic means operatively connected with said drum for periodically locking said printing drum against rotation, and for periodically throwing in said sheet feeding means, and means controlled by the sheets fed into the machine for rendering said locking means inoperative while there is a sheet in the machine.

2. Rotary printing machine comprising a printing drum, means for rotating said printing drum, an impression cylinder adapted to cooperate with said printing drum, means for feeding sheets between said drum and said impression cylinder, a cam operatively connected with said drum and adapted to throw in said feeding means, automatic means for periodically locking said printing drum against rotation, a cam also operatively connected with said drum and adapted to release said automatic locking means, and means controlled by the sheets fed into the machine for rendering said locking means inoperative while there is a sheet in the machine.

In testimony whereof I affix my signature.

LEOPOLD RAMDOR.