March 3, 1959 W. KOCH 2,875,692

INK ROLLER INTERRUPTER FOR ROTARY PRINTING MACHINES

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Fig. 1

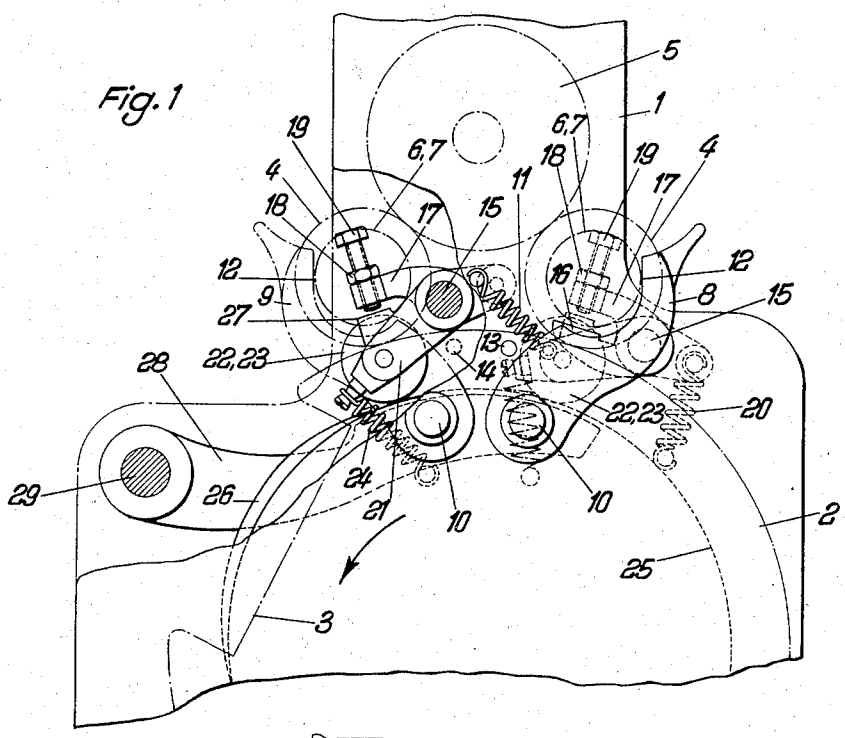
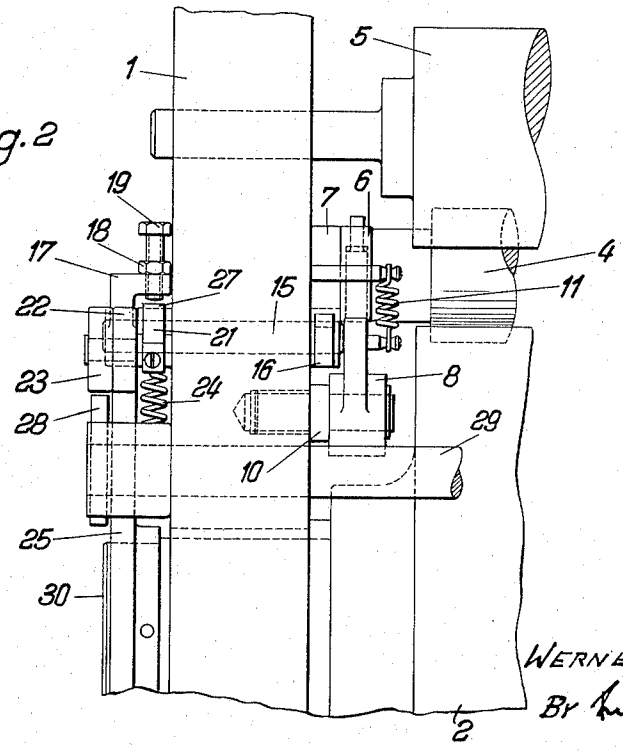


Fig. 2



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Fig. 3

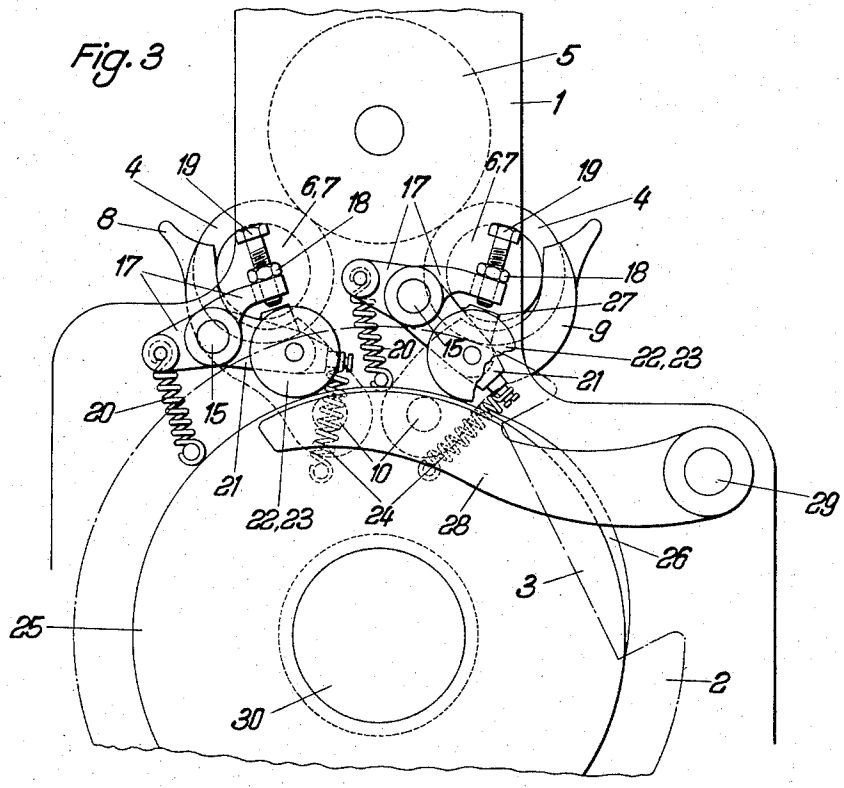
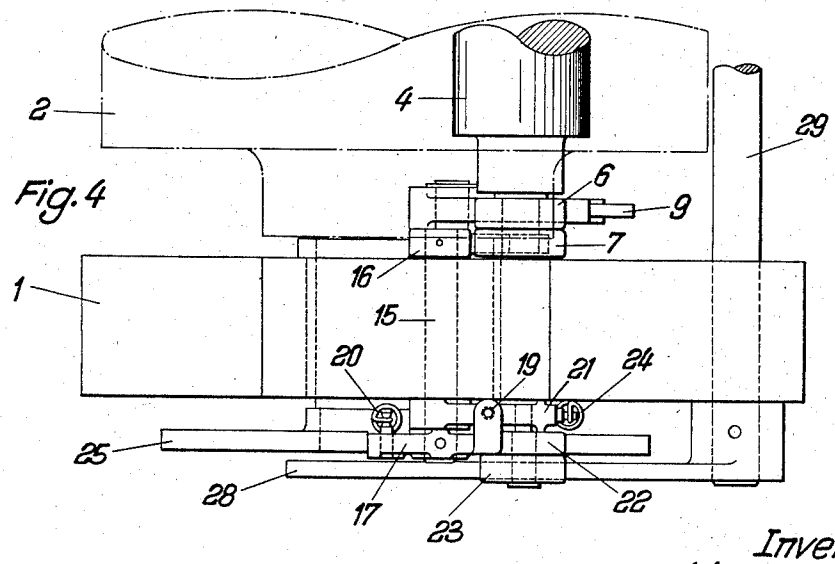


Fig. 4



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INK ROLLER INTERRUPTER FOR ROTARY PRINTING MACHINES

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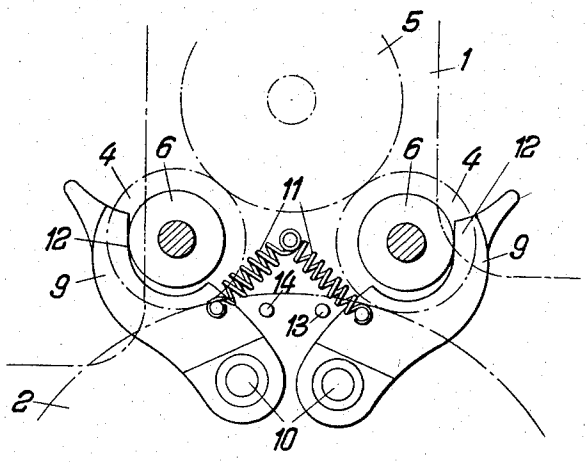


Fig. 5

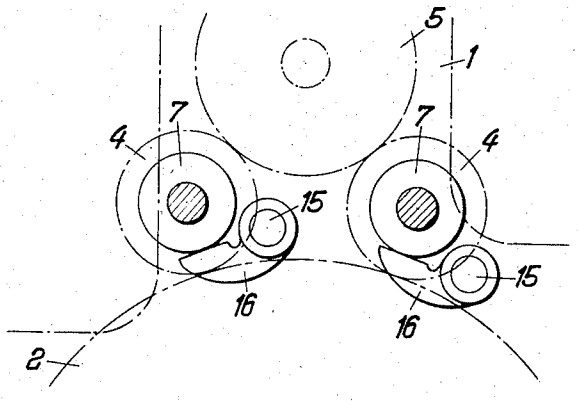


Fig. 6

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2,875,692

INK ROLLER INTERRUPTER FOR ROTARY PRINTING MACHINES

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Application February 23, 1955, Serial No. 490,023

Claims priority, application Germany March 2, 1954

6 Claims. (Cl. 101—352)

This invention relates to printing machines and concerns more particularly, although not exclusively, the inking or the moistening devices of such machines.

In connection with such devices it is the primary object of the invention to prevent the formation of marks and streaks which hitherto were apt to be caused by the abrupt impact of the form rollers on the impression or printing cylinders after the passage of the cylinder gap, and in this respect the invention mainly consists in the provision of improved means for automatically securing the proper inking or moistening of the impression cylinder by the form roller, or rollers, of the printing machine.

Another object of the invention is the provision, in a printing machine, of an improved bearing arrangement for the form rollers and of means, such as a control element, for controlling the cooperation of the said form rollers with the impression cylinder on the one hand and with the vibration roller on the other.

A further object rests in the provision of pressing and lifting means for the form rollers, and of a transmission device between the said control element and the form roller, or rollers, adapted to permit the latter to bridge the gap in the cylinder very smoothly and without losing contact with the vibrator roller.

With these and other objects in view the invention consists in the improved arrangement and devices as set forth in this specification with reference to the accompanying drawings which illustrate a preferred embodiment of the invention by way of example. For the sake of simplicity reference will be made hereinafter to only one form roller, but it must be understood that the invention is also applicable to machines in which a plurality, usually two, form rollers are employed.

In the usual type of printing machines the form roller is journaled at both its ends in roller bearings which can be adjusted to regulate the working pressure of the roller on the impression cylinder which is to be inked, or moistened respectively, and on the vibrator roller. The general arrangement is to press the form roller against the vibrator roller by positive means and against the impression roller by resilient means. In connection with impression cylinders in which the cylindrical printing surface is interrupted by the cylinder gap, abutments must be provided for the roller bearings which prevent the form roller from dropping into the said gap. However, if this arrangement is to function satisfactorily, a comparatively large number of very precisely machined and, therefore, costly elements are required, which are also inconvenient for the reason that they consume considerable space on the machine. A further complication rests in that the diameter of the form roller undergoes certain changes in the course of time, so that adjusting means must be provided to compensate such changes in order to render them ineffective.

During the passage of the cylindrical part of the impression cylinder the form roller remains in contact therewith and the roller bearing has a certain amount

of clearance from its appertaining abutment. During the passage of the cylinder gap, however, the roller bearing comes into contact with the abutment, whereby the distance between the form roller and the cylinder becomes smaller. Since there is a risk that, with too short a distance between the roller bearing and the cylinder, the form roller does not contact the periphery of the cylinder correctly and thus fails to ink, or moisten, the same properly, the said distance is made comparatively large in order to ensure that the roller bearing comes free from the abutment also when the roller or the cylinder should have become distorted.

This known arrangement suffers a great disadvantage inasmuch as the form roller has to be lifted to a considerable height each time when the cylinder gap edge comes into contact with the roller. The coating of the roller consists of a very elastic material and it is evident that the short impact thereon of the gap edge squashes this material for a short interval very considerably before the roller, including the roller bearing, in overcoming the influences of inertia, is lifted. These retarding forces of inertia are yet increased by the frictional forces which are set up in the joints in which the roller is suspended with its bearings. If the roller bearing itself and its suspension have a comparatively large clearance, the impact of the cylinder gap edge may, in addition, have a disturbing effect on the vibration roller and the other rollers.

It has been tried to alleviate these undesirable effects by providing the impression cylinder with an eccentrically ground slope along which the form roller was expected to rise gradually to its predetermined height. However, even this procedure has not been able to remove the ill effects which are produced by the inertia of the heavy roller on its highly elastic cover.

In accordance with the invention all the aforesaid disadvantages are successfully overcome by enlarging the distance between the axis of the form roller and that of the impression cylinder during the passage of the cylinder gap. This way of procedure offers the great advantage that approximately the full circumferential length of the cylinder gap can be utilized for the lifting and returning movement of the roller. In other words: The lifting of the roller from the cylinder occurs gradually and gently without any shock or hard impact, and the repositioning of the roller for the next printing operation takes place just as carefully. In a preferred embodiment of the invention the raising and lowering of the form roller is effected by means of a control cam which rotates in the working sequence of and in synchronism with the printing machine and the movements of which are positively transmitted over adjustable transmission elements to the bearings of the form roller, so that the roller will be positively lifted by always the requisite amount independent of the elasticity of its cover.

In one particular form of carrying the invention into effect a preferably plane spring-actuated pressing member is provided, which acts resiliently on the respective journal of the form roller and thereby maintains the form roller at the same time in contact with both the impression cylinder and the vibration roller. This arrangement, which is of particularly simple construction, ease of attendance and utmost reliability, offers the further advantage that the pressure regulations and subsequent adjustments in view of changes in the diameter of the roller will be wholly unnecessary. Further, by taking into account the weight of the roller and the respective mutual positions of the form roller, the vibration roller, and the impression cylinder, any desired specific pressure in the contacting surfaces of the roller may be obtained by careful design of the contacting surfaces and a corre-

sponding choice in the magnitude of the pressure applied.

The arrangement just referred to has the advantage already mentioned, that no adjustment of the form roller with respect to alterations in its diameter will be necessary, and in that by the resilient contact between the form roller and the vibration roller on the one part and the roller and cylinder on the other, an accurate, faultless inking will be ensured under practically any circumstances even with wabbling or untrue running rollers. Jamming of the roller, as is often the case when positively journalled rollers have been improperly adjusted, is absolutely impossible in the aforesaid arrangement. Any deviations in the roller surface from the geometrically true cylindrical shape compensate themselves without affecting the inking or moistening in any way. A further advantage consists in that the removal of the form roller and its reinsertion or exchange is exceedingly simple.

The arrangement outlined above is further provided with a lifting member which, during the passage of the cylinder gap, acts positively on the bearing of the roller journal over an adjustable transmission device, which latter is actuated by a control cam so as to lift the form roller by a predetermined but adjustable amount, preferably in radial direction, away from the cylinder. The cam rise on the said control cam is of a shape which will return the lifted roller into contact with the impression cylinder shortly before the next printing operation is started.

The journals of the form roller are provided with two mutually independent bearings, preferably roller bearings. The aforementioned pressure members act on the one of these bearings and the lifting member on the other. The object of this arrangement is to avoid any adverse influences on the rotary movement of the form roller by the incessant raising and lowering of same. It is necessary to lift the form roller off the impression roller at the cessation of printing, and for that reason a lifting device is additionally provided which may be of known type but which, in accordance with the invention, is caused to act on the automatic lifting device just referred to.

A further complementary feature of the invention rests in the provision, for instance on the side wall of the machine, of a movable transmission element, which resiliently maintains the corresponding roller bearing on the form roller journal in contact with the control element and so prevents the form roller from dropping into the cylinder gap. This arrangement has the advantage that the movement of the form roller in relation to the impression cylinder during the passage of the cylinder gap and during its working contact on the cylinder can be observed from without and easily regulated which, particularly in the case of such rollers which are inadmissible as by being mounted inside the machine frame, is absolutely necessary.

Referring now to the embodiment of the invention which is shown by way of example in the accompanying sheets of drawings.

Fig. 1 illustrates the arrangement in accordance with the invention as seen from the inside of the partly broken away machine frame.

Fig. 2 is a side elevation of Fig. 1.

Fig. 3 is a view similar to Fig. 1 but seen from the outside of the machine frame.

Fig. 4 represents a plan view of Fig. 3 in which for the sake of better clearness only the control means on the right hand side of that figure are shown.

Fig. 5 is a view taken from inside the machine frame illustrating the roller pressing device, and

Fig. 6 a view similar to Fig. 5 of the lifting device in accordance with the invention.

In the last two figures all parts which do not pertain to the devices mentioned have been omitted.

In these drawings the numeral **1** denotes the side frame of a printing machine. The impression or printing cylinder **2** is covered with the usual printing platen, or tympan, which, however, is not shown in the drawing but which may be fixed in the ordinary manner as by means of clamping strips arranged in the cylinder gap **3**. The form rollers **4** (of which two are shown in Figs. 1, 3, 5 and 6) are in contact with both the impression cylinder **2** and the vibration roller **5** and are each provided on their journals with two roller bearings **6** and **7**.

Pressing levers **8** and **9** are articulated to studs **10**. They are mounted under the action of springs **11** to press with their straight surfaces **12** against the roller bearings **6**, thereby pressing the form rollers **4** into contact with the impression cylinder **2** and, at the same time, with the vibration roller **5**. When the form rollers are taken out of the machine the pressing levers **8** and **9** are prevented from clashing together by the stop pins **13** and **14** respectively.

Turnable in the side wall **1** are short shafts **15** which project to both sides of the said side wall. Journaled to the inner ends of the shafts **15** are the roller bearings **7** (Fig. 2). On the outer ends of the shafts **15** two-arm levers **17** are arranged which, at one of their ends, are provided with set screws **19** which are secured in position by lock nuts **18**. At their other ends the levers **17** are acted upon by springs **20**, of which only one is shown in Fig. 1 and by means of which the lifting arms **16** are held in contact with the roller bearings **7**. At the outside of the side wall **1** freely turnable control levers **21** are arranged, which carry rollers **22**, **23** at their ends. These rollers are adapted to travel over the circumference of a control cam **25**, being pressed into contact with it by springs **24** (Fig. 1). The control cam is fixed to the journal **30** of the impression cylinder shaft and thus takes part in the rotation of the said cylinder at the same speed.

The control cam **25** is provided over part of its circumference with a cam rise **26**, the length of which corresponds to the circumferential length, or the width respectively, of the cylinder gap **3**. It is shaped so that during the interval in which the cylinder gap passes the inking or moistening device it raises each of the form rollers **4** over the roller **22**, control lever **21**, set screw **19**, positioning lever **17**, lifting arm **16** and roller bearing **7** out of contact with the impression cylinder. On the other hand, during the passage of the printing platen of the impression cylinder **2** the rollers **22** rest on the circular part of the control cam **25**, and the set screw **19** and the abutment **27** on the control lever **21** must be mutually so adjusted that a certain clearance is left between these two parts in order to make sure that the form rollers alway remain in contact with the impression cylinder over the circular portion thereof. When however the cylinder gap **3** passes the moistening device, the abutment surfaces **27** come into contact with the set screws **19** and the lifting arms **16** serve as supports for the form rollers over the roller bearing **6** and thereby prevent the form rollers from dropping into the cylinder gap.

Owing to the positioning levers **17** being arranged at the outside of the machine frame, their timed up and down movement permits of a good observation of the correct working of the rollers which themselves are invisible from without.

When putting the impression cylinder at rest at the cessation of printing it is necessary to lift the form rollers away from the cylinder. For this purpose a hand lever **28** is provided which acts on the rollers **23** (Fig. 3) and which is operated in known manner by means of the shaft **29**.

What I claim is:

1. In a printing machine, a rotary plate cylinder having a peripheral gap, a vibration roller, a form roller, yieldable pressure means for holding said form roller in contact with both the said plate cylinder and the said vibration roller, a lifting arm engageable with the form roller for increasing the axial distance between said plate

cylinder and said form roller during the passage of the cylinder gap, and two loose roller bearings freely positioned on the form roller shaft, one of said roller bearings being subjected to the pressing force of said pressure means while the other is subjected to the lifting force of the said lifting arm during the passage of the entire cylinder gap during each revolution of the cylinder.

2. A printing machine as set forth in claim 1, in which said pressure means comprises a pressure arm having a recessed wall portion in which the said roller bearing on the form roller shaft is loosely seated and a straight side wall portion along which the said roller bearing is free to move in substantially vertical direction.

3. In a printing machine, a plate cylinder having a peripheral gap therein, a vibration roller, a form roller, a pressure arm for holding said form roller in contact with both the said plate cylinder and the said vibration roller, a lifting arm engageable with the form roller for increasing the axial distance between said plate cylinder and said form roller during the entire passage of the cylinder gap, two loose roller bearings freely positioned on the form roller shaft, one of said roller bearings being subjected to the pressing force of said pressure arm while the other is subjected to the lifting force of said lifting arm during the entire passage of the said cylinder gap, and an additional means for lifting the form roller from the plate cylinder independently of the relative rotational position of the cylinder and the form roller when the cylinder is at rest.

4. In a printing machine having a plate cylinder, a peripheral gap therein, a vibration roller, a form roller and a pressure member in engagement with said form roller as set forth in claim 3, the provision of spring means acting on said pressure member for yieldingly holding said form roller in contact with both the said plate cylinder and the said vibration roller.

5. In a printing machine including a rotary plate cylinder having a peripheral gap therein, an ink distributing vibration roller, a form roller for applying ink from said vibration roller to the plate cylinder, and means for interrupting the contact of said form roller with said plate cylinder during the passage of the cylinder gap, said means comprising a pressure member in cooperation with

said form roller, spring means acting on said pressure member tending to maintain said form roller in contact with both the plate cylinder and the vibrator roller, a lifting arm for lifting said form roller to enlarge the axial distance between said plate cylinder and said form roller, a control element positively operated by the printing machine in synchronism with the working cycle thereof for positively lifting said form roller for the entire passage of the cylinder gap in said plate cylinder, and intermediate spring control means between said control element and said lifting arm for transmitting a lifting movement of said form roller only during the passage of the entire gap in the plate cylinder past said form roller with each revolution of the cylinder, said intermediate spring control means for lifting the form roller away from the plate cylinder during the entire passage of the cylinder gap including a rocking shaft carried by the machine frame, a control lever loosely mounted upon said rocking shaft, a roller at the free end of said control lever for contact with said control element, a positioning lever fixed to said rocking shaft and cooperating with said control lever, adjusting means acting between said control lever and said positioning means, and spring means for rolling said roller in contact with said control element for positively transmitting the lift of said control element to said form roller during the passage of the entire gap in said plate cylinder under the form roller during each revolution of the cylinder.

6. A printing machine having the means for lifting the form roller away from the plate cylinder as claimed in claim 5, in which a hand operated means is provided for raising the said lifting means independent of said control element when and while the said plate cylinder is at rest.

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