Feb. 17, 1959 W. SÄUBERLICH ET AL 2,873,672

DRIVE MECHANISM FOR PROOFING PRESS

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FIG. 1.

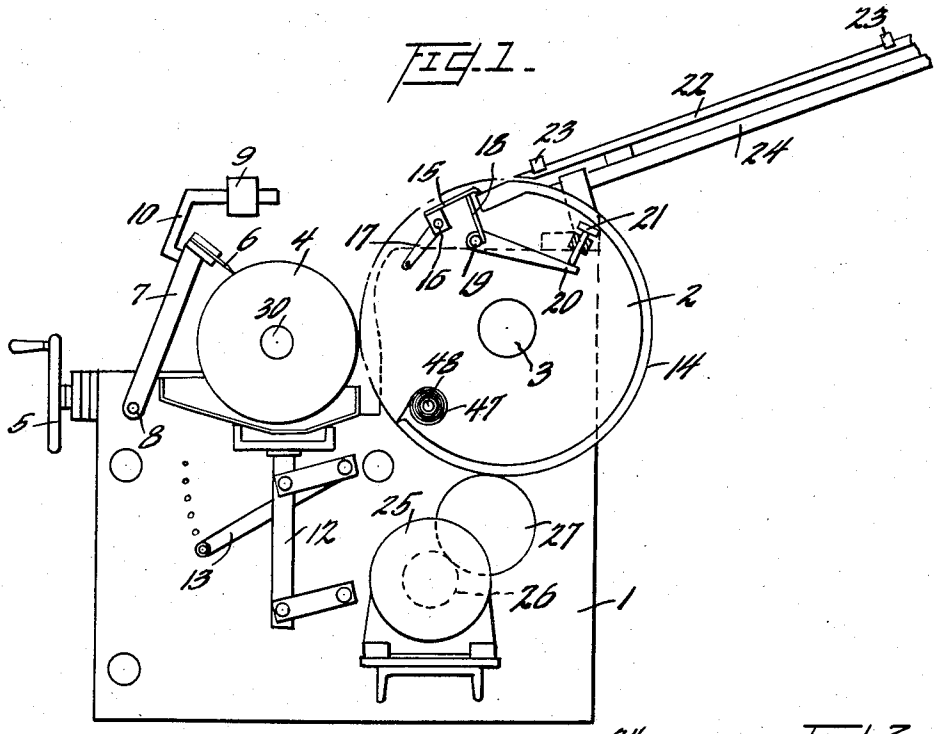


FIG. 2.

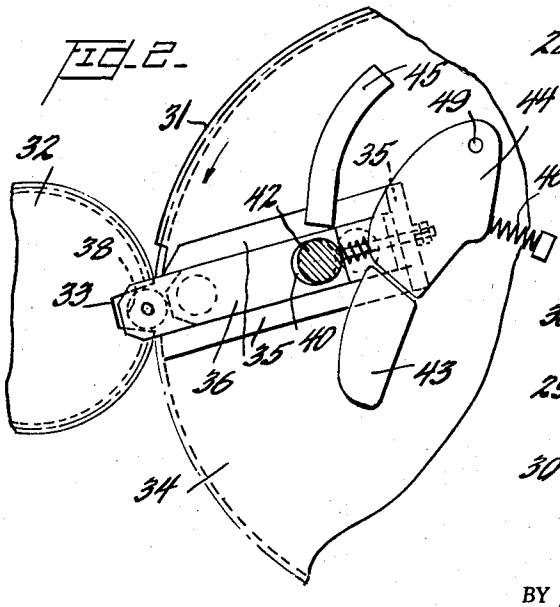
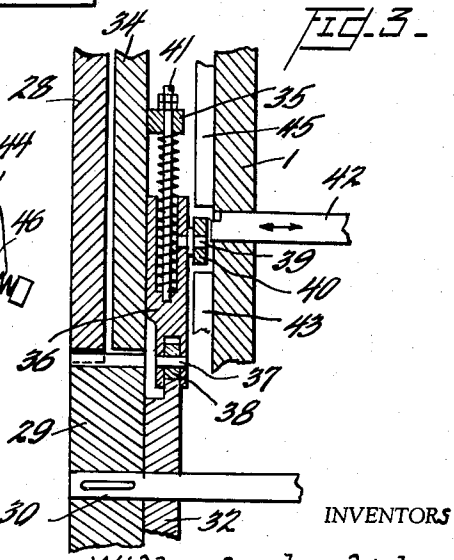


FIG. 3.



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DRIVE MECHANISM FOR PROOFING PRESS

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8 Claims. (Cl. 101—153)

This invention relates to proofing presses for the printing industry which are also suitable for carbon tissue transfer.

For making test-prints, proofing presses are being used which are intended for gravure cylinders of different lengths and of different diameters. In most machines of this type only a monochromatic proof is obtainable, because gravure and impression cylinders are being pressed against each other and no means are available for the correct position maintenance of polychromatic prints. However, machines equipped with such means are known, but they have numerous drawbacks. On a machine of this type, the gravure cylinder is rotating and then held in a definite position before the start of the proofing process. It is released only after the masking for the sheet to be printed has been removed and the impression cylinder which is movable by means of screw spindles, has been moved against the gravure cylinder. After the gravure cylinder has re-started, the ink in the ink cups on the gravure cylinder is so dried up, that a satisfactory proof is no longer possible.

In another machine of this type, the defects named above are avoided due to the fact that the gravure cylinder rotates continuously, however, the impression cylinder being driven together with the gravure cylinder, the test sheet is carried along by means of gripping devices while the cylinders are rotating. The correct position of the test sheet is therefore doubtful. Furthermore, the herewith necessary tripping of the impression cylinder which takes place only after gripping the printing sheet, is not advantageous. Finally, another machine of this type is known on which the gravure cylinder rotates continuously, the impression cylinder however, only then, when the testing sheet on the latter is placed in a specific position. In that case, the position of the impression cylinder is independent from the corresponding position of the gravure cylinder and therefore it is necessary that the gravure cylinder, following each proof, rotates backwards as often as the latter previously ran forward, in order to return to the same starting position. This machine becomes indeed complicated due to the required operating parts which are still considerably increased by the additional parts needed for the backward rotation.

It is therefore an object of the invention to provide a machine which makes register maintaining proof printing possible and, notwithstanding its simplicity of construction, has not the drawbacks of all other well known machines. In this machine, the gravure cylinder also rotates continuously while the impression cylinder at first remains stationary, so that the proofing sheet may be placed exactly at a specific place or point on the impression cylinder. According to the invention, both the gravure and the impression cylinders are provided with catching devices one of which can be engaged and disengaged. These devices are arranged in such a manner that, after one of them has been engaged, the impression cylinder is caused to start at a specific position of the gravure cylinder. The one part of the impression cylinder facing the gravure cylinder is such that in its rest position it does not touch the gravure cylinder and consequently does not affect its rotation. After starting up

of the impression cylinder, either a gear wheel of the rotating gravure cylinder engages with a gear wheel segment of the impression cylinder, or the peripheries of both cylinders touch, whereby the testing sheet may be placed between the latter. The further pick-up of the impression cylinder by means of the rotating gravure cylinder takes place either through tooth engagement or by means of contact with the peripheries or through both, either simultaneously or subsequently. Thus, it is possible, that for example, the tooth engagement assures the pick-up, while, following contact of the testing sheet with the periphery of the gravure cylinder, the tooth engagement ends, because the tooth segment of the impression cylinder reaches only up to that point. Then the pick-up takes place only as the peripheries of both cylinders roll off with respect to each other, with the testing sheet remaining between the cylinders or not.

In general, it is desirable that the impression cylinder performs only one rotation and then stops. In order to attain this, the one catching device which is engageable and disengageable is, during the one rotation of the impression cylinder, again pressed into its disengaged, i. e. inactive position by means of a cam or the like placed on the stationary part of the machine. If it is retained therein, then the impression cylinder, returning to its starting position after one rotation, will stand still, because it is released from the gravure cylinder shortly before reaching this point. Its renewed pick-up action ceases, because the catching device is disengaged. Only its re-engaging action starts a new cycle.

In order to avoid strong impacts when the two catching devices join and to avoid possible register deviations, it is appropriate to keep the speed of the gravure cylinder relatively low. On the other hand, it is desirable that the proofing is not too slow in order to correspond to normal operating conditions. Both may be obtained, according to the invention, in that the driving speed of the gravure cylinder is reduced at times, especially during the joining of the catching devices placed on the cylinders. If the speed is to be reduced very briefly at this moment, it is possible, for example, through actuation of a lever causing the engaging of the catching devices, to reduce the speed of the driving motor in the usual manner as well as to return to the original speed following the starting drive of the impression cylinder by means of a contact device actuated by the latter. The same action may be attained by means of a brake for example, the latter to be controlled in the same manner by means of the engaging-lever and the impression cylinder, thus exerting a braking action either on the driving motor or on one of the transmission elements connected between the gravure cylinder and the starting motor.

It is an additional improvement as to the degree of accuracy for the register on such a machine, to fix the position of the placed sheets, especially for long-sized sheets in the peripheral direction of the cylinder, by means of a front mark placed on the impression cylinder and by two side-marks placed on the feed table, which are separately or jointly adjustable on a scale.

Finally, it may be an additional embodiment of the inventive idea in connection with the impression cylinder, to provide, if requested, an arrangement permitting the quick recognition of any deviations of register in polychromatic printing. For this purpose means are provided on the impression cylinder for the fastening of a transparent sheet directly above the testing sheet placed on the impression cylinder. During the following printing process with the gravure cylinder intended to be used for the next color, the transparent sheet is being printed and any possible register deviations com-

pared to the testing sheet placed beneath, printed with the previous color, are immediately recognized. Following corrections by means of displacement of the gravure cylinder or refinishing on the latter the printed transparent sheet is replaced with a new one and the proof thereupon repeated. If this transparent proof is corrected and corresponds to the proofs of the previous colors, then the final copy in this color is made on the actual proofing sheet. The handling of the transparent sheet is simplified if an extra supply roll of this material is placed in a recess or groove of the impression cylinder from which the needed length may be removed and retained in a clamping device placed on the impression cylinder.

The pressure between the gravure cylinder and the impression cylinder is regulatable by a fine adjustment of the bearings at both ends of the gravure cylinder. Thereby and by means of the described elements of the machine the latter is particularly suitable and advantageous for transferring of pigment paper or carbon tissue. The gravure cylinder rotates thereby in the ink container then filled with water which will result in a very convenient moistening. In that case, the carbon tissue will take the place of the testing sheet. For the rest, the transfer operation is similar to the proofing operation.

Further objects will be apparent from the following description when considered in connection with the accompanying drawings in which

Figure 1 is a diagrammatic cross section through the machine,

Figure 2 is a side elevation showing the detail of the catching devices on the gravure and the impression cylinders, partly in an enlarged scale, and

Figure 3 is a longitudinal section of a detail of Figure 2, taken along the two shanks of the guiding frame of the catching device.

Between two side walls or frames **1** of the machine there are provided an impression cylinder **2** mounted on an axle or shaft **3** in fixed bearings and a gravure or forme cylinder **4** movably mounted in bearings. The means to adjust the bearings for the gravure cylinder is of well known design and therefore not shown on the drawing, but it is carried out by means of a hand wheel **5** on each side, so that it is possible to mount gravure cylinders of any desired diameter into the machine. In addition to the adjusting means, in the two bearings for the gravure cylinder, it is possible to include, as well known, a further and finer adjusting means, which will permit an accurate mounting and positioning of the gravure cylinder to provide for the desired and correct pressure. If another gravure cylinder of the same diameter is to be mounted, it is also possible by this fine adjustment to set the bearings and thereby adjust the pressure accurately in accordance with the preceding gravure cylinder.

The excess ink will be removed from the gravure cylinder as is usual by a doctor blade or wiper **6** which is mounted on both ends on levers **7** which latter are pivotally mounted on a stationary axle **8** in the machine. When the gravure cylinder is to be changed, the doctor blade can be moved out of the way to the left, Fig. 1, so that it will remain in the lower part of the machine so as not to interfere with the replacement of the gravure cylinder. A weight **9** adjustably mounted on a suitable arm **10** fixed on one or both of the levers **7**, may be used to provide the necessary pressure for the doctor blade. The inking of the gravure cylinder **4** is accomplished by means of a trough **11** into which the cylinder **4** dips and this trough is mounted for up and down movement on a supporting member **12** to hold the trough at the desired level depending upon the diameter of the gravue cylinder. The supporting member is adjustable by means of a manually actuable lever **13** to not only adjust the trough but secure it in adjusted position.

The impression cylinder **2** is mounted in fixed bearings and is partly provided with a smooth surface **14** for the purpose of receiving the proof sheet. Obviously, a rubber sheet or fabric and the like may be provided between the surface and the proof sheet. As shown on the drawing, Fig. 1, this surface **14** of the impression cylinder covers about two thirds of its circumference. At the beginning of this surface the proof sheet is held by grippers **15** which latter may swing around a stationary rod **16** and are held in closed position by one or more springs, connected to the lever **17**, these springs being not shown. Between the grippers **15** one or more abutments **18** are provided which similarly as the grippers are swingable around a stationary rod **19** associated with a lever arm **20** adjustable by a micrometer screw **21**. A spring, not shown, forces the lever arm **20** against a pointed end of the micrometer screw **21**, so that an adjustment of the position of the abutments **18** may be carried out.

The proof sheet placed on table **22** is laid against these abutments. Sheets whose length in the direction of the circumference of the cylinder exceeds their width considerably can be placed against the front lay marks or abutments **18** while the side edges abut against the side marks **23** on the table **22**, these side marks **23** being adjustable according to a scale either singly or combined. The position of the table is accurately fixed relative to the machine frame and thereby also to the impression cylinder, by securing the table to a frame **24** secured to the machine frame. In order to provide for access to the parts of the machine covered by the table, the latter is adjustable or removable by mounting on a rod so that the table may be swung out or away from the position shown in Fig. 1.

The position of the impression cylinder **2** shown in Fig. 1 is in its position of rest or starting position. As already explained, in this position of the impression cylinder a rotation of the forme cylinder is possible and therefore in this position no part of the gravure cylinder touches the the impression cylinder. This means that all of the parts of the impression cylinder which in their position of rest are opposite the gravure cylinder must have a gap or their diameters must be smaller than the diameter of the part **14**. However, without changing distances between the bearings of the gravure and impression cylinders, when a proof is to be pulled a contact between the two must take place as soon as the surface **14** or the proof sheet lies opposite the gravure cylinder.

The drive for the machine is accomplished by a motor **25**, as an electric motor, having a gear **26** secured thereto meshing and driving a gear **27**, the latter meshing with and driving a gear **28** mounted, and separately rotatable, on the shaft **3** of the impression cylinder, sectionally shown in Fig. 3. The gear **28** is in mesh with a gear **29** which latter is approximately twice as wide or thick as the gear **28**, Fig. 3, and which is secured on the shaft **30** of the gravure cylinder. Since all of the gears are constantly in mesh as described, the gravure cylinder **4** will rotate as soon as the motor **25** starts running but the impression cylinder will remain stationary since there is no contact between the gravure and impression cylinders. Also a toothed or gear segment **31** securely mounted on the shaft **3** of the impression cylinder is non-operative since it does not mesh with the gear **29** in the position of rest.

The rotation of the impression cylinder by the roatting gravure cylinder is initiated by an arrangement shown in Figs. 2 and 3. To the gear **29** whose pitch circle diameter equals the outer periphery of the gravure cylinder, there is secured a disk **32** adjacent thereto which in its periphery has a cut-out portion or opening **33**. The toothed segment **31** is carried by a disk **34** which is secured on the shaft **3** of the impression cylinder and thus establishes the firm connection between the toothed segment and the impression cylinder. At the same time this

disk 34 serves as a support for a guiding frame 35 in which a slide 36 is slidably mounted in radial direction to the disk 34 or slightly at an angle thereto. The slide 36 has in its front part a pin or shaft 37, a roller 38 and in its rear part a roller 40 on a shaft 39. The slide 36 guided between the legs of the frame 35 is under the influence of a spring which surrounds a bolt 41. In this way the slide 36 will be urged outwardly, whereby the outermost position is limited by a stop, not shown. This outermost position is shown in the drawing whereas its innermost end position is shown in dotted lines, Fig. 2. In this innermost position the slide 36 is held by the roller 40 being positioned behind an axially movable bolt 42 and being held in a small cut-out portion therein. Fig. 2 shows the bolt 42 as sectioned to more clearly bring out the structure and in the cut-out portion the roller 40 is indicated. On the other side the roller contacts two curved members or cams of which one curved member 43 is rigid and the other curved member 44 is pivotally mounted around a pin or shaft 49 mounted in the side frame 1 of the machine.

If the slide 36 is retracted to the dotted line position, Fig. 2, then the gravure cylinder 2 and the disk 32 connected thereto can be set to rotation by the motor 25 without being impeded by the impression cylinder. If now, after applying a proof sheet which has been gripped by the grippers 15, the impression cylinder is to rotate by the rotating gravure cylinder, the bolt 42 is pulled out to the right. Under the influence of the spring surrounding the bolt 41 the roller 40 and the slide 36 are now free. This now abuts with its roller 38 against the periphery of the disk 32. By the turning of the gravure cylinder, the cut-out portion 33 will come opposite the roller 38 which due to the force of the spring is forced into the cut-out portion and will be carried along by the radial edge of the cut-out portion. In that way, the slide 36 being held in the frame 35 and being secured to the disk 34, the drive for the disk and for the impression cylinder 2 connected with the disk will be initiated. The gravure cylinder and impression cylinder will now rotate together in the directions indicated by the arrows, Fig. 2.

To ensure the entry of the roller 38 into the cut-out portion 33 after release from the bolt 42, there is provided the fixed curved member 43 on the machine frame. In case the slide 36 is not moved forwardly a sufficient distance, the roller 40 will run onto the curved member 43 and then together with the slide the two will be moved forwardly. Fig. 3 shows only the mutual side position of the curved member 43 and the roller 40 whereas their actual position is indicated on Fig. 2.

The drive for the roller 38 through the edge of the cut-out portion 33 extends only for a short rotary angle of the disk 32. This is sufficient, however, to accomplish the engagement of the toothed segment 31 with the gear 29. The further drive of the impression cylinder takes place after the roller 38 leaves the cut-out portion 33 by the engagement of the teeth with each other. Further mutual rotation of both cylinders results in the grippers 15 and the abutments 18 appearing before the gravure cylinder and these elements must obviously be provided radially so far back that they will not contact the gravure cylinder. As the rotation continues, the beginning of the surface 14 will be adjacent the gravure cylinder and thus contact between the two cylinders will result in a pressure particularly so if the surface 14 is provided with a proof sheet thereby causing the printing process to start. By this pressure both the impression and the gravure cylinders will rotate together without the necessity of a toothed contact between the parts. It may be sufficient when the toothed segment 31 has been driven so far until the gravure cylinder and the surface 14 of the impression cylinder contact each other.

In general, it is only desired that there shall be one single revolution of the impression cylinder. Then the slide 36 must be again pulled back from its outer position, before the impression cylinder has completed one revolution. This is accomplished by means of a cam track 45 secured on a fixed part of the machine, the track being in the path of the roller 40. The roller 40 will roll on the cam track and will thereby force the roller radially during this part of the rotation of the impression cylinder, so that the slide 36 will all be moved inwardly. The track 45 extends towards the bolt 42 and if the latter has in the meantime been again brought to its left position, the roller 40 will be guided directly against this bolt. The other side of the roller 40 slides, during this time, along the edge of the curved member 44 and forces this member back against the force of a spring 46. The form of the cam 45 is such that the roller 40 as soon as it contacts the bolt 42, will be held in a cut-out portion of the cam 45 so that it cannot move backwards. Thereby the impression cylinder will be blocked in this position which at the same time is its position of rest or its starting position.

If the bolt 42 should not have returned to its initial position, a further rotation of the impression cylinder is possible. In order to prevent this, it is necessary to provide a spring to urge the bolt in its blocking position. In this case, the hand lever not shown which moves the bolt to the right to initiate the catching operation must be held either so long until the catching has actually taken place or a locking member is to be used to lock the bolt in its right hand position but which will be automatically set free during rotation of the impression cylinder, so that the bolt may again move to the left into its blocking position. This can, for example, be automatically carried out by dividing the cam track 45 and only the lower part shall be rigid, but the upper part movable. As soon as the roller 40 passes the movable part, this latter will be forced back and thus releases the lock which, for example, may comprise a bar which cooperates with, and enters into, a transverse groove in the bolt 42. By the movement of the curved member 43 the lock will be pulled out.

The above-mentioned speed reduction during the meshing of the roller 38 with the cut-out portion 33 can be controlled from the hand lever which engages the bolt 42. The initial speed can be restored or the brake released directly from the impression cylinder or the disk 34 in that, for example, a lock is freed shortly after the starting of the impression cylinder and in this way actuates the necessary control elements.

If the proof sheet held by the grippers 15 is to be printed with many colors, it often happens that the second or next following color will not be in register with it or the previous applied color. Thus it is often necessary that the proof sheet must be removed and the printing again repeated with other proof sheets. To prevent this, it may be proceeded in such a manner that each following color is not applied directly on the proof sheet but printed on a transparent film stretched on the impression cylinder. Deviations in color can therefore be easily recognized and readily corrected. Only when the copy on the transparent film shows that the color corresponds to the other colors printed upon the proof sheet lying beneath, i. e. when the colors are in register, the film is removed and the proof sheet printed. The same procedure is applied for the other color proofs.

For applying the transparent film, the usual grippers may be used. A simplification may be used when the transparent film may be pulled from a supply roll 47, Fig. 1, mounted on a rod 48 bearing directly in the impression cylinder. The film is pulled over the surface 14 of the impression cylinder and on the proof sheet up to the grippers 15 where it is secured in place. Further grippers or a gripping bar may also be used and the tension in the film or foil can be attained by rotation of the shaft 48 which may be provided with a ratchet wheel cooperating with a movable catch to

maintain and hold the foil or film in a tensioned condition.

The foil or film can also be pulled over the surface 14 and then rolled up on another roll. When the spindles of both rolls are provided with tension means it is possible to thus place the film under the desired tension. Similarly, a rubber blanket placed beneath the proof sheet can be arranged and secured at the impression cylinder.

It is necessary to provide one or both cylinders with known means to adjust the side and length register.

We claim as our invention:

1. A press for use as a proofing press in photogravure printing and for transferring pigment paper and carbon tissue, comprising a frame, an impression cylinder mounted to rotate in the frame, a disc mounted to rotate with the impression cylinder and having a gear segment carried by the disc in the periphery thereof and the impression cylinder and gear segment rotating together, a gravure cylinder rotatably mounted in the frame, a disc secured to rotate with the gravure cylinder, a gear mounted adjacent the disc of the gravure cylinder to rotate therewith, said gear segment of the impression cylinder being of such diameter that it can mesh with the gear of the gravure cylinder which are normally out of mesh means connected to the gear of the gravure cylinder to rotate the latter, means mounted on the disc of the impression cylinder and cooperating with the disc of the gravure cylinder whereby the gear segment of the first-mentioned disc will be momentarily rotated to mesh with the gear of the gravure cylinder to initiate the rotation of the impression cylinder with the gravure cylinder last-mentioned means including an opening in the second-mentioned disc, and a slide mounted for substantial radial movement on the side of the first-mentioned disc so that when the slide engages in the opening the rotation of the impression cylinder will be initiated.

2. A press according to claim 1, in which a guide frame is provided secured on the side of the first-mentioned disc with the slide movable in the guide frame.

3. A press according to claim 1, in which a cam is provided secured to the frame and a roller is provided on the slide so that the cam will contact the roller and retract the slide into its disengaged position.

4. A press according to claim 1, in which a cam track is provided mounted on the machine frame, and in which means are provided on the last-mentioned means operating with the cam track to control the operation of said last-mentioned means.

5. A press according to claim 1, in which a container is provided under the gravure cylinder to provide a fluid thereon for transferring pigment paper and carbon tissue.

6. A press for use as a proofing press in photogravure printing and for transferring pigment paper and carbon tissue, comprising a frame, an impression cylinder mounted to rotate in the frame, a disc mounted to rotate with the impression cylinder and having a gear segment carried by the disc in the periphery thereof and the impression cylinder and gear segment rotating together, a gravure cylinder rotatably mounted in the frame, a disc secured to rotate with the gravure cylinder, a gear mounted adjacent the disc of the gravure cylinder to rotate therewith, said gear segment of the impression cylinder being of such diameter that it can mesh with the gear of the gravure cylinder, means connected to the gear of the gravure cylinder to rotate the latter, means mounted on the disc of the impression cylinder and cooperating with the disc of the gravure cylinder to momentarily rotate the gear segment of the first-mentioned disc to mesh with the gear of the gravure cylinder to initiate the rotation of the impression cylinder with the gravure cylinder, said last-mentioned means including an opening in the second-mentioned disc, and a slide mounted for substantial radial movement on the side of the first-mentioned disc so that when the slide engages in the opening the rotation of the impression cylinder will be initiated, a spring provided on the first-mentioned disc to urge the slide into the opening of the second-mentioned disc, a cam track mounted on the machine frame, and means provided on the last-mentioned means operating with the cam track to control the operation of said last-mentioned means.

7. A press for use as a proofing press in photogravure printing and for transferring pigment paper and carbon tissue, comprising a frame, an impression cylinder mounted to rotate in the frame, a disc mounted to rotate with the impression cylinder and having a gear segment carried by the disc in the periphery thereof and the impression cylinder and gear segment rotating together, a gravure cylinder rotatably mounted in the frame, a disc secured to rotate with the gravure cylinder, a gear mounted adjacent the disc of the gravure cylinder to rotate therewith, said gear segment of the impression cylinder being of such diameter that it can mesh with the gear of the gravure cylinder, means connected to the gear of the gravure cylinder to rotate the latter, means mounted on the disc of the impression cylinder and cooperating with the disc of the gravure cylinder to momentarily rotate the gear segment of the first-mentioned disc to mesh with the gear of the gravure cylinder to initiate the rotation of the impression cylinder with the gravure cylinder, said last-mentioned means including an opening in the second-mentioned disc and a slide mounted for substantial radial movement on the side of the first-mentioned disc so that when the slide engages in the opening the rotation of the impression cylinder will be initiated, and a spring provided on the first-mentioned disc to urge the slide into the opening of the second-mentioned disc.

8. A press for use as a proofing press in photogravure printing and for transferring pigment paper and carbon tissue, comprising a frame, an impression cylinder mounted to rotate in the frame, a disc mounted to rotate with the impression cylinder and having a gear segment carried by the disc in the periphery thereof and the impression cylinder and gear segment rotating together, a gravure cylinder rotatably mounted in the frame, a disc secured to rotate with the gravure cylinder, a gear mounted adjacent the disc of the gravure cylinder to rotate therewith, said gear segment of the impression cylinder being of such diameter that it can mesh with the gear of the gravure cylinder, means connected to the gear of the gravure cylinder to rotate the latter, means mounted on the disc of the impression cylinder and cooperating with the disc of the gravure cylinder to momentarily rotate the gear segment of the first-mentioned disc to mesh with the gear of the gravure cylinder to initiate the rotation of the impression cylinder with the gravure cylinder, said last-mentioned means including an opening in the second-mentioned disc, and a slide mounted for substantial radial movement on the side of the first-mentioned disc so that when the slide engages in the opening the rotation of the impression cylinder will be initiated, a spring provided on the first-mentioned disc to urge the slide into the opening of the second-mentioned disc, a cam fixed on the frame, and a roller mounted on the slide and when in contact with the cam the slide will be moved inwardly back from its outer position after engagement in the opening in the disc of the gravure-cylinder.

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