

May 3, 1938.

P. KOCH

2,115,725

ROTARY PRINTING MACHINE

Filed July 10, 1936

2 Sheets-Sheet 1

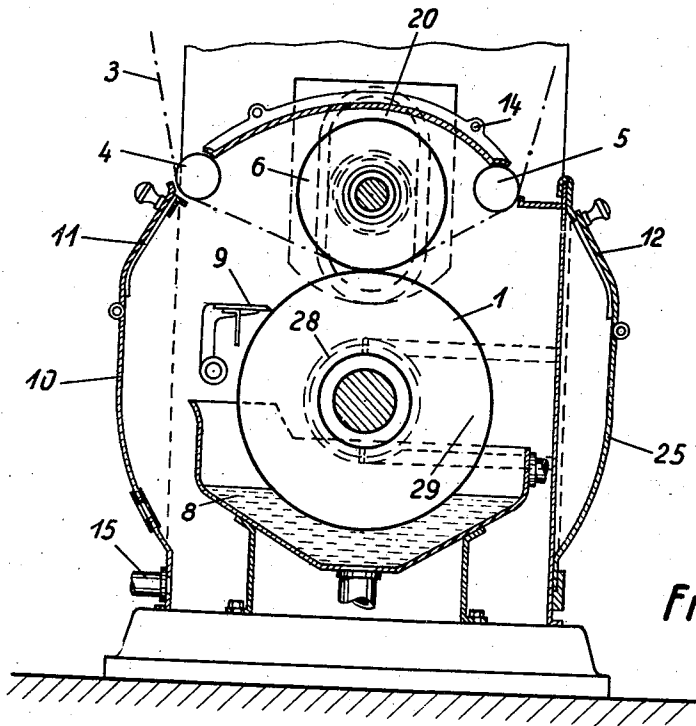


Fig. 1

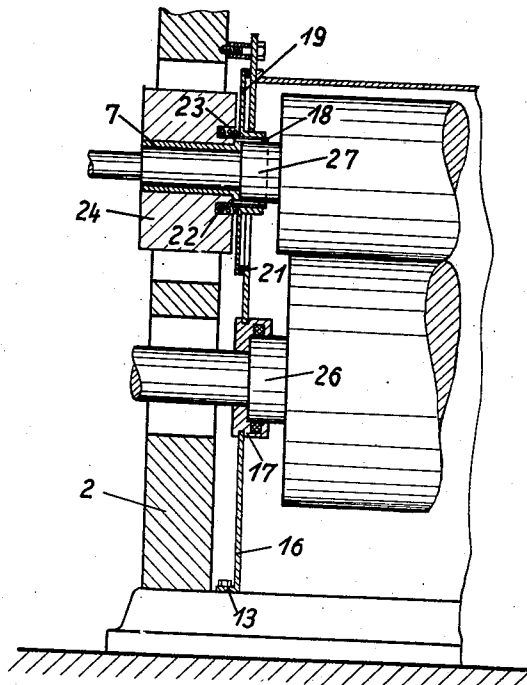


Fig. 2

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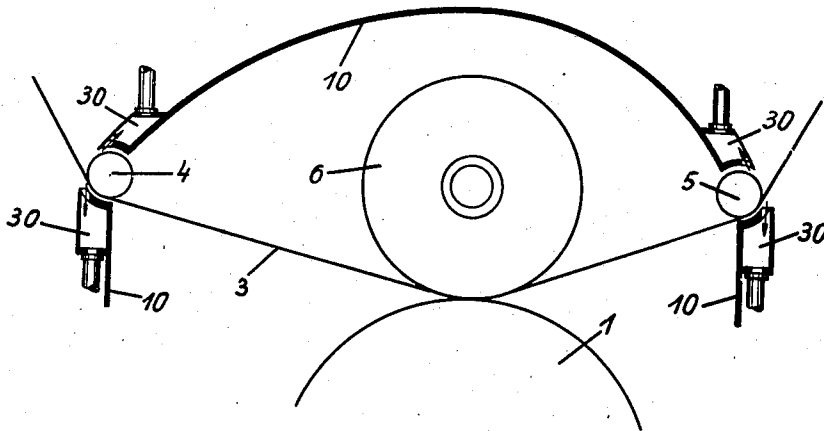


Fig. 3

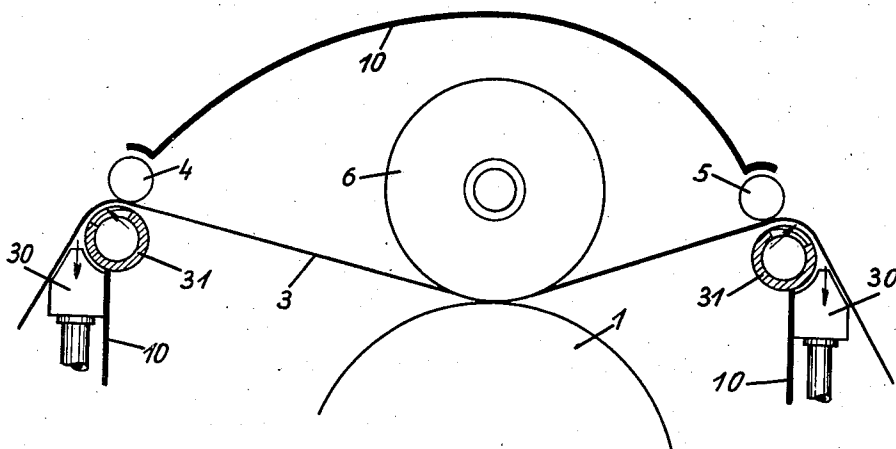


Fig. 4

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UNITED STATES PATENT OFFICE

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ROTARY PRINTING MACHINE

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10 Claims. (Cl. 101—157)

This invention relates to a photogravure rotary machine.

The employment of readily volatile solvents for the printing colors in photogravure printing operations involves a number of drawbacks, such as the drying up of the inked surface of the form cylinder, the endangering of the health of the operators and the considerable losses due to the escape of large portions of valuable solvents. In order to eliminate these defects it has been proposed to encase the inking apparatus which serves for inking the form cylinder in such manner that one of its closing walls is represented by the form cylinder. To prevent the drying up of the inked surface of the form cylinder encased inking apparatus of this type have been constructed in which the knives are arranged shortly before the printing point seen in the direction of rotation of the form cylinder and the ink supply shortly behind the printing point.

These constructions are, however, open to the objection that reciprocating machine parts like the inking knives have to be packed and that the surface of the form cylinder is subjected behind the printing point to increased wear, owing to close frictional engagement of the packing of the inking apparatus, which extends along the form cylinder. The constructions are further rendered particularly complex by the necessity of making allowance for the exchange of the form cylinder when the size is altered and for the motions of parts when the impression is thrown on and off. Furthermore, the form cylinder, according to the known proposals, can be enclosed only over a certain portion of its circumference, since for constructional reasons the blades and the packing opposite thereto can approach the printing point only to a certain extent. A part of the inked surface of the cylinder will necessarily not be enclosed and permit evaporation of the solvent contained in the form.

The invention eliminates the drawbacks at present connected with the use of modern quickly drying colors which permit high speeds in the operation of this class of printing machines by enclosing the entire printing unit including the knives and the inking device. Packing of the enclosing casing is effected by guiding the web of paper through the casing over guide rollers connecting with the casing by means of interposed packing means so as to bring about direct contact or to leave a very narrow air gap. To prevent escape of solvent vapors from the casing the latter is connected with a suction device for producing therein a slight subatmospheric pressure.

Displacements of the cylinders as required for throwing the impression on and off, exchanging the form cylinder, etc. are rendered possible without interference with the gas-tight shutting off of the casing by passing the journals of the enclosed cylinders, and if necessary also the journals of the adjustable guiding cylinders by means of interposed stuffing boxes through the side walls of the casing in such manner that the cylinder bearings with their associated stuffing boxes can be displaced in a slot in the side walls, which is gas-tight shut off by a covering plate elastically pressed against the side wall and provided with a packing at its edge. If the web is to be guided out of the casing in such direction that with its printed side it is to move over a guiding device disposed at the web inlet or outlet it is advisable to construct the guiding devices along the lines of known guiding devices provided with outlet openings for the currents of compressed air which carry the web. If it is desired to avoid connecting the casing with a suction device and to permit the development of a slight superatmospheric pressure inside the casing to insure better saturation of the gaseous contents of the casing with the vapors of the solvent, special suction devices can be arranged beside the guiding devices at the web inlet or outlet. The casing according to the invention may further be connected with means for recovering the vapors of the solvent and be supplied with a circulating protective gas to prevent fires and explosions.

By way of example, the invention is illustrated in the accompanying drawings with respect to a rotary machine printing from the web.

In the drawings, Figure 1 is a cross section of a printing mechanism, simplified in parts; Fig. 2, a longitudinal section thereof; Fig. 3 shows the arrangement of suction devices at the web inlet and outlet; and Fig. 4 shows the arrangement of guiding devices at the web inlet and outlet while the web is guided on the printed side, the guiding devices possessing outlet openings for the currents of compressed air carrying the web.

Referring to the drawings, the form cylinder 1 is arranged in known manner in the machine frame 2. The web 3 is passed over the guide rollers 4 and 5 around the counterpressure cylinder 6 which is arranged in the displaceable bearings 7 for throwing the impression on and off and for adjustments to different sizes. To permit exchange of the form cylinder 1 or finishing work thereon known means may be provided for rolling the cylinder out of the machine frame. Below the form cylinder 1 an ink receptacle 8 is

arranged in known manner whence ink is supplied to the cylinder 1 either directly by dipping or by means of interposed dipping rollers, etc. Excess ink is removed from the inked portion of the form cylinder 1 by a blade or knife 9 of known type, which reciprocates in lateral direction and which is arranged as closely as possible to the printing point in view of the employment of rapidly drying colors.

The printing unit comprising the form cylinder 1 and the counterpressure cylinder 6 is surrounded on all sides by a casing 10 which forms the object of the invention. The casing 10 preferably consists of sheet metal and may be fitted with windows of transparent material and with closable flaps 11, 12. The casing 10 is connected with the machine frame at suitable points, for instance at 13, 14. The web 3 enters and leaves the casing 10 at those points where the web passes over the guiding means 4 and 5 which are either driven by the web or have a drive of their own. The casing 10 is as closely adjacent as possible to those portions of the guiding means 4, 5 not covered by packing means and is further arranged very closely to the surface of the web on the guiding means while direct contact is avoided to prevent slurring. To prevent the escape of solvent vapors at these points also and to permit recovery of the vapors coming from the inking mechanism and the inked portions of the form cylinder and web the casing 10 is connected with a suction device by a conduit 15. To prevent explosions a protective gas can be supplied to the casing 10 and circulate therein. The casing 10 has side walls 16 provided with stuffing-box-like passages 17, 18 for the journals 26, 27 of the cylinders 1, 6. To permit displacement of the cylinder bearings 24 slots 20 are provided in the side walls 16, which are closed by the covering plates 19 preferably provided with a packing coating 21. The springs 22 abutting against the bearings 24 provided with recesses 23 press the plates 19 against the side walls 16 of the casing 10 so as to permit displacement of the bearings 24 without interfering with the tight fitting of the plates. To facilitate the removal of the form cylinder 1 from the casing 10 the wall portion 25 thereof is detachable.

The stuffing box 17 packing the journal 26 of the form cylinder 1 preferably comprises two parts 28 and 29. The part 28 is semicircular and the part 29 is constructed as slide guided in the side wall 16 and tightly hugging with one end the journal 26. To roll out the cylinder 1 the slide 29 is drawn back and the semicircular part 28 turned into a position permitting raising and lowering of the cylinder pivots. Incandescent lamps positioned inside the casing 10 permit observation of the form cylinder 1 and of the inkwell 8 when the casing 10 is closed. In order to permit the insertion of the web 3 the portions of the casing 10 adjacent to the guide rolls 4, 5 are made movable. The drying devices through which the web passes after leaving the casing 10 are arranged in closest proximity to the casing or are directly connected therewith, in which case parts of the drying devices may extend into the space surrounded by the casing 10. At the web inlet and outlet suction devices 30 (Fig. 3) may be provided for drawing off the solvent vapors emerging at these points. The suction devices 30 also serve for catching the air currents coming from the compressed air guiding devices 31 (Fig. 4) provided at these points.

The invention is applicable also to the arrange-

ment of a plurality of printing units in a common casing, particularly to sheet fed rotary machines; in the latter instance the guiding means 4, 5 are constructed as sheet transmitting cylinders, etc. and fitted with grippers.

I claim:—

1. In a rotary photogravure machine, a printing cylinder, an impression cylinder, and a casing completely and closely enclosing said printing cylinder and said impression cylinder.

2. In a rotary photogravure machine, a printing cylinder, an impression cylinder, means for applying volatile ink to said printing cylinder, a reciprocable blade for removing excess ink from said printing cylinder, and a casing completely and closely enclosing all of the aforesaid elements, whereby vapor formed by the evaporation of the ink is confined.

3. In a rotary photogravure machine, a frame, a printing cylinder rotatably mounted in said frame, an impression cylinder rotatably mounted in said frame, and a casing substantially conforming to the outline of said frame for completely enclosing both of said cylinders.

4. In a rotary photogravure machine, a frame, a printing cylinder, an impression cylinder, shafts for said cylinders rotatably mounted in said frame, a casing within said frame and completely enclosing both of said cylinders, said casing being formed with openings for the passage of said shafts, and packing means for providing a substantially gas tight closure of said openings around said shafts.

5. In a rotary photogravure, a rotatable printing cylinder, a rotatable impression cylinder, a casing completely enclosing both of said cylinders, openings formed in said casing for the passage of a strip of material to and from said cylinders, guide rollers for said strip rotatably mounted adjacent to said openings, and packing means between said casing and a portion of the surface of said rollers not contacted by said strip, the portion of the surface of said rollers which is contacted by said strip being spaced closely to said casing.

6. In a rotary photogravure machine, a rotatable printing cylinder, a rotatable impression cylinder, a casing completely enclosing both of said cylinders, openings formed in said casing for the passage of a strip of material to and from said cylinders, guide rollers for said strip rotatably mounted adjacent to said openings, packing means between said casing and a portion of the surface of said rollers not contacted by said strip, the portion of said surface which is contacted by said strip being spaced closely to said casing, and suction means connected to the interior of said casing for preventing the outflow of gas through the spaces between the rollers and the casing.

7. In a rotary photogravure machine, a printing cylinder, an impression cylinder, means for applying volatile ink to said printing cylinder, a reciprocable blade for removing excess ink from said printing cylinder, a casing completely enclosing all of the aforesaid elements for confining vapor formed by the evaporation of the ink, slot like openings formed in said casing for the passage of a strip of material to and from said cylinders, and suction producing means connected to the interior of said casing for preventing the outflow of said vapor through said openings.

8. In a rotary photogravure machine, a frame, a printing cylinder, an impression cylinder, shafts

for said cylinders, journals displaceably mounted in said frame for rotatably carrying said shafts, means for applying ink to said printing cylinder, a blade for removing excess ink from said printing cylinder, a casing within said frame and completely enclosing said cylinders, said means and said blade, said casing being formed with openings for the passage of said shafts, the openings being elongated for permitting displacement of said shafts, plates for covering said openings supported by said journals and displaceable therewith, and resilient means for pressing said plates against said casing.

9. In a rotary photogravure machine, a frame, a printing cylinder, an impression cylinder, a casing completely enclosing both of said cylinders, openings formed in said casing for the passage of a strip of material to and from said cylinders, hollow guide rods for said strip disposed adjacent to said openings, means for supplying air under pressure to said guide rods, said

guide rods being formed with openings for delivering air under pressure against said strip of material for supporting the strip out of contact with said rods.

10. In a rotary photogravure machine, a frame, a printing cylinder, an impression cylinder, means for applying volatile ink to said printing cylinder, a blade for removing excess ink from said printing cylinder, a casing for completely enclosing all of the aforesaid elements for confining vapor formed by the evaporation of the ink, slot like openings formed in said casing for the passage of a strip of material to and from said cylinders, conduits having elongated openings disposed adjacent to said slot like openings, and suction producing means connected to said conduits for removing vapor tending to escape through said slot like openings from within said casing.

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