June 5, 1956 J. O. BOBST 2,748,699

BLOCK-CARRYING DEVICES FOR SHEET OR WEB FED ROTARY PRINTING MACHINES

Filed Feb. 24, 1953 5 Sheets-Sheet 1

Fig. 1.

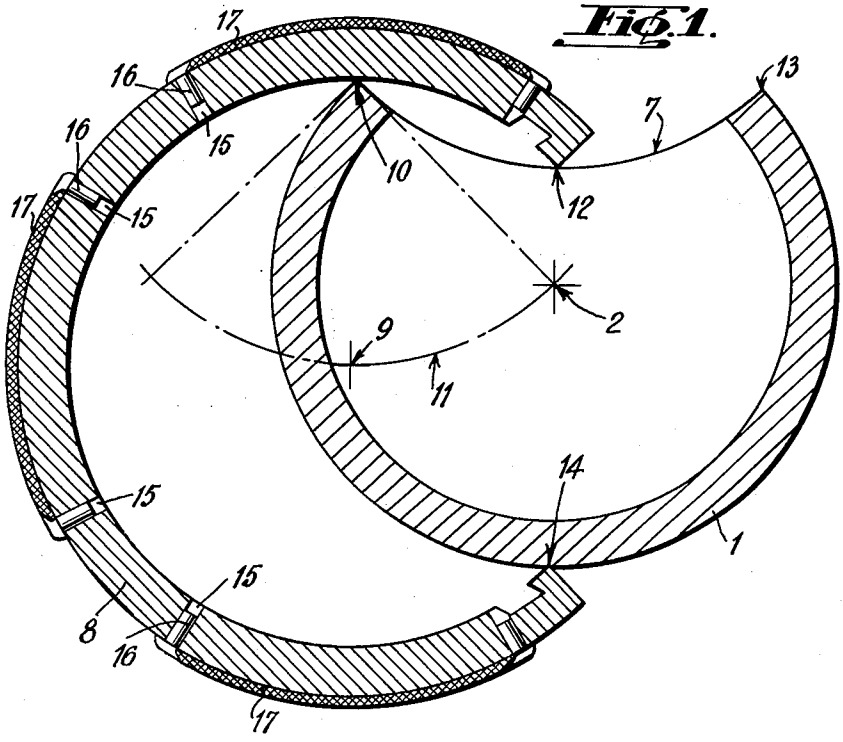

Fig. 2.

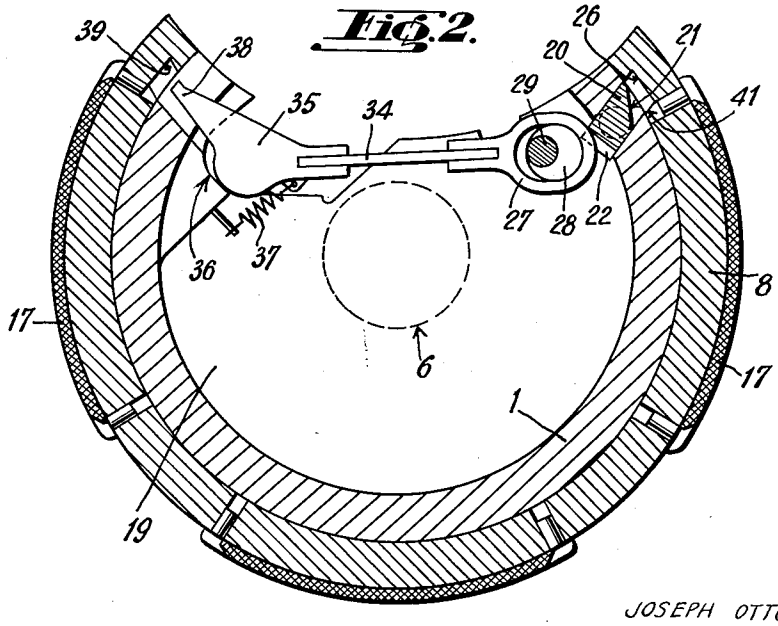

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Fig. 3.

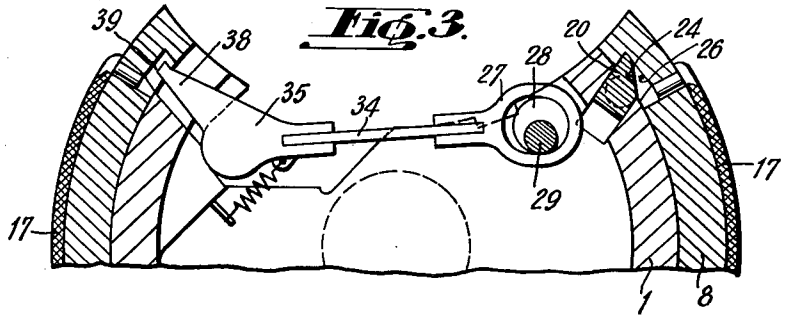


Fig. 4.

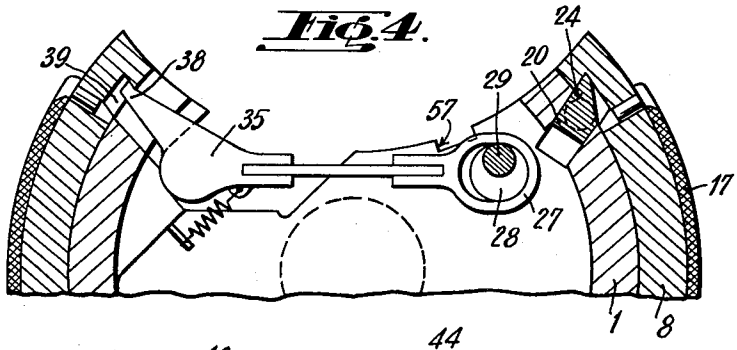
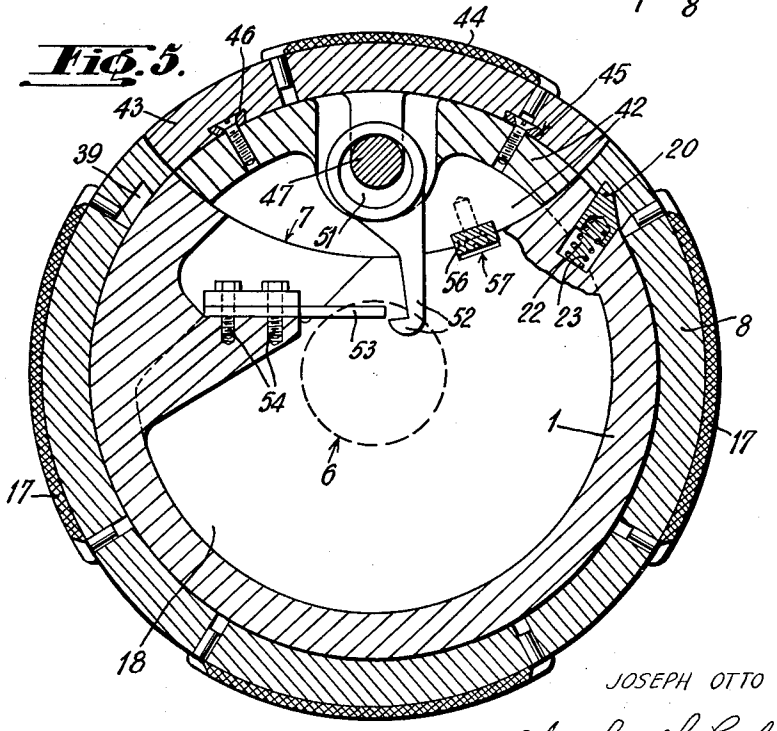


Fig. 5.



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BLOCK-CARRYING DEVICES FOR SHEET OR WEB FED ROTARY PRINTING MACHINES

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Fig. 6.

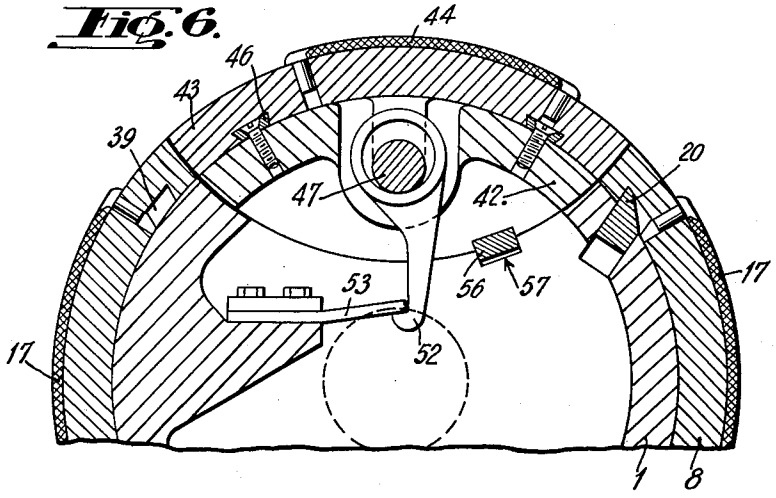

Fig. 9.

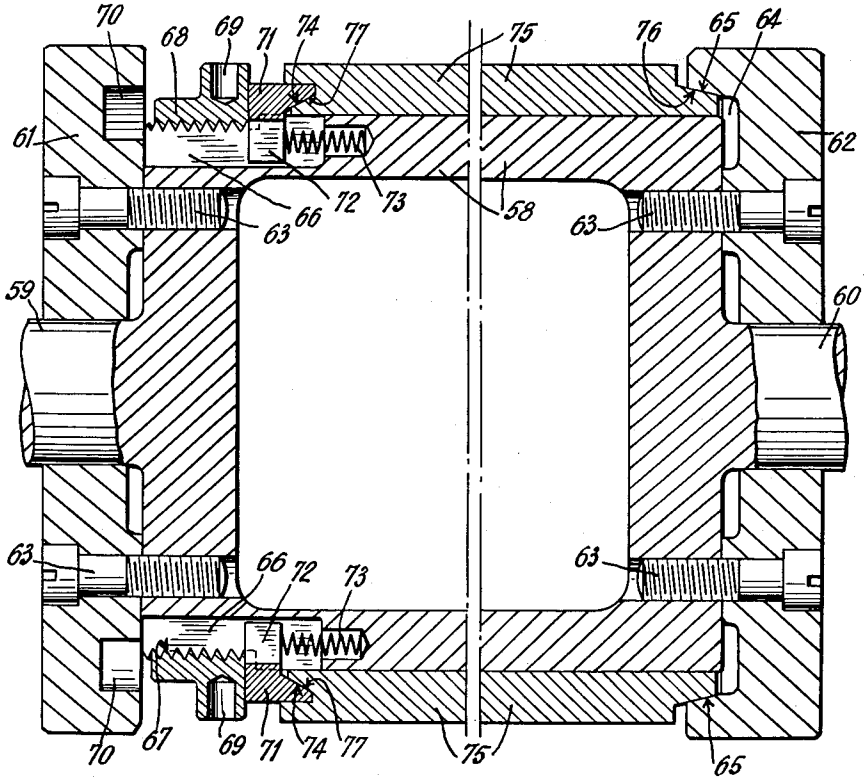

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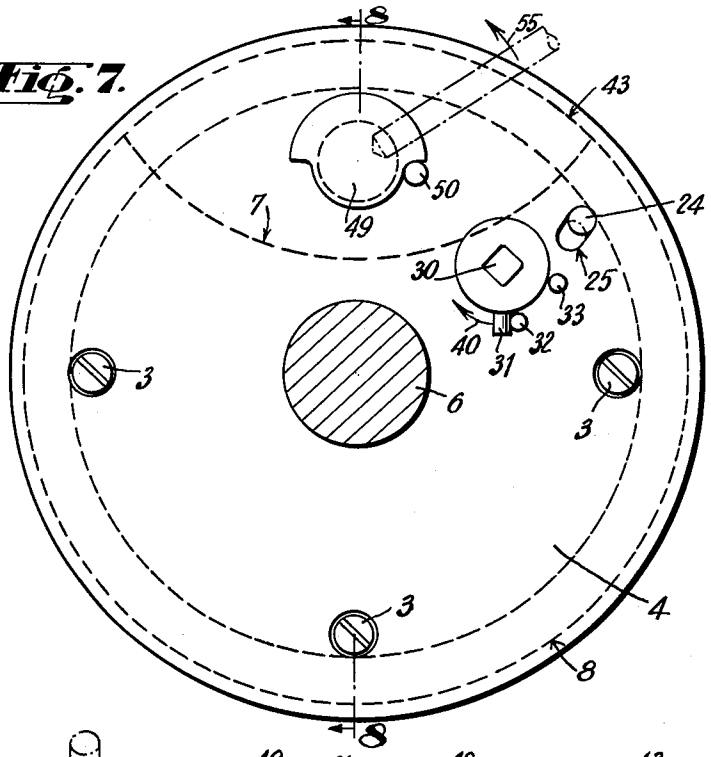
Fig. 7.



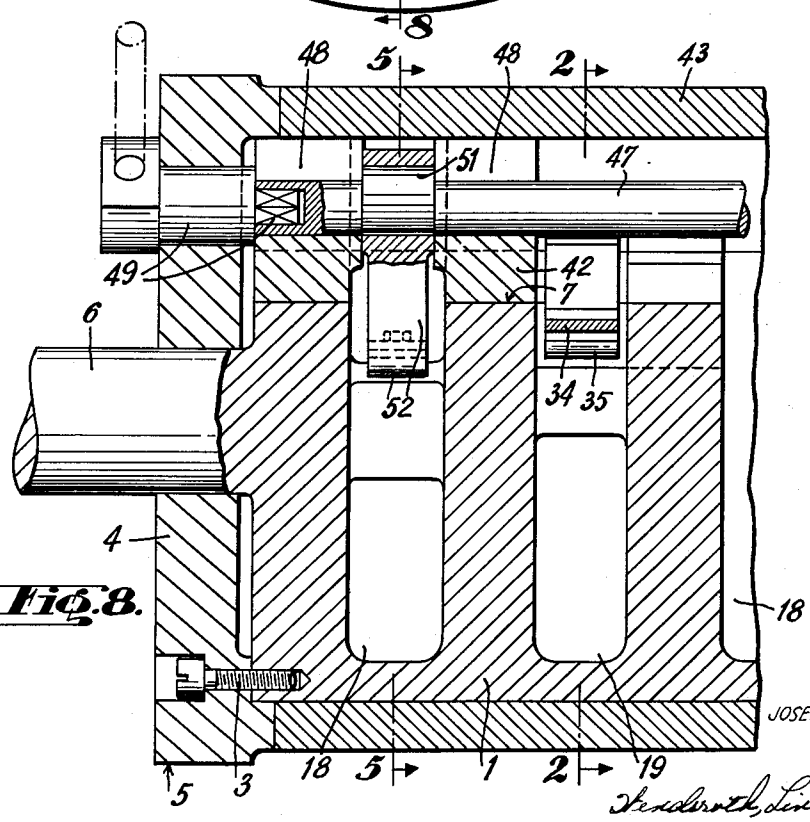


Fig. 8.

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Fig. 10.

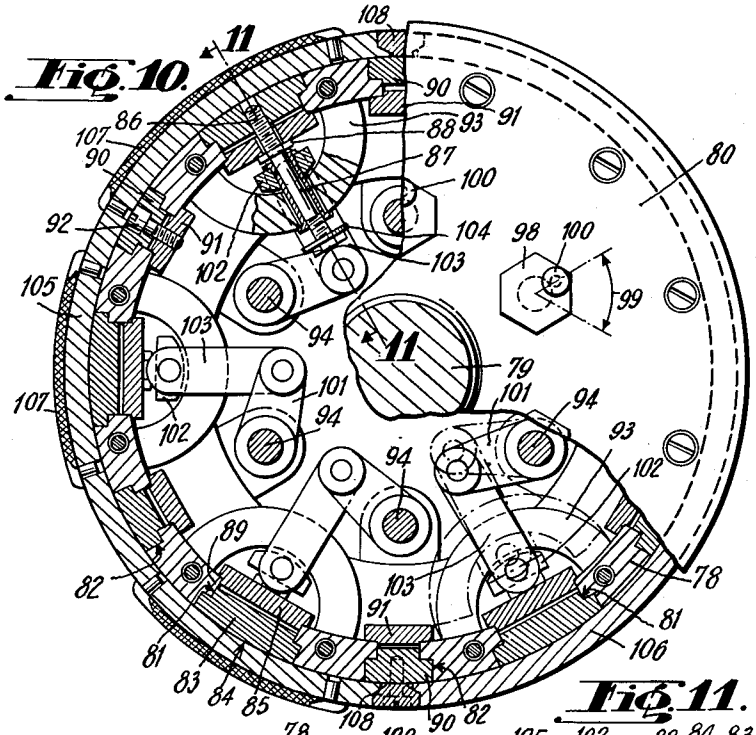
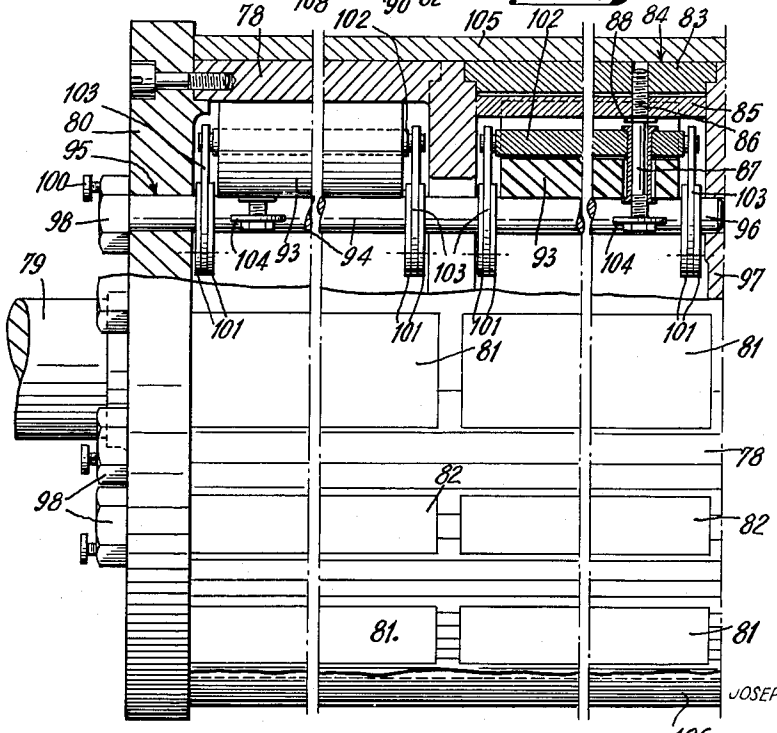


Fig. 11.



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United States Patent Office 2,748,699 Patented June 5, 1956

2,748,699

BLOCK-CARRYING DEVICES FOR SHEET OR WEB FED ROTARY PRINTING MACHINES

Joseph Otto Bobst, Lausanne, Switzerland

Application February 24, 1953, Serial No. 338,436

Claims priority, application Switzerland March 29, 1952

5 Claims. (Cl. 101—378)

Everyone knows that in letterpress printing machines—printing off a flat forme—the printing elements (blocks) constituting the forme and held in the chase (metallic frame) can be fixed and prepared away from the producing machine, which considerably reduces the time during which the latter stands idle. This preparation also consists in correcting each printing element of the forme by an appropriate make-ready in order to ensure a good quality of the impression from the first sheets. When the block support is constituted by a one-piece base, the size of which generally corresponds to the size of the impression furnished by the machine, and on which the printing elements are fixed, the work in question may also be done away from the production press.

This, however, has not yet been possible in the case of rotary sheet or web fed machines. Actually, rotary production presses need to stand idle during the whole of the time required for the correct placing and fixing of all the blocks on the plate cylinder of the rotary press. It would of course be possible, in these machines, to consider removing each plate cylinder from the machine and, in order to save time, replacing it by a spare cylinder already fitted with the blocks. Such a removal and replacement of the cylinders would however, owing to the weight of the latter, be very laborious and require a lot of time, and the ultimate saving in time would therefore scarcely be worth while.

In addition, for first rate work, in order to obtain an impression of good quality, a make-ready, often requiring protracted pasting on and cutting out work on each impression cylinder of the rotary press, is indispensable, and this correspondingly increases the time during which the rotary press stands idle.

The object of the present invention is to suppress the majority of these idle periods and consequently to increase the efficiency of rotary presses. It concerns a block-carrying device for sheet or web fed rotary printing machines, and comprising a cylinder, a rigid block-carrying sleeve, means independent of the cylinder for fastening blocks quickly and securely to this sleeve, and means for removably fastening the said sleeve (fitted with the blocks and ready for the impression) to the said cylinder and for removing it easily from the said cylinder without undoing the latter.

The accompanying drawing depicts, by way of example, several embodiments of the device according to the invention.

Fig. 1 is a diagrammatic cross-sectional view of the first embodiment, and is destined to illustrate the principle of this embodiment.

Fig. 2 is a view of a cross-section, along 2—2 in Fig. 8, of this first embodiment, and showing the parts in a first position.

Fig. 3 is a view similar to Fig. 2 but showing the parts in a second position.

Fig. 4 is a view similar to Fig. 2 but showing the parts in a third position.

Fig. 5 is a view of a cross-section, along 5—5 in Fig. 8, and showing certain parts in a first position.

Fig. 6 is a view similar to Fig. 5 but showing the said parts in a second position.

Fig. 7 is an end view of this first embodiment seen from the left in Fig. 8.

Fig. 8 is a view of a partial longitudinal section, along 8—8 in Fig. 7, of this first embodiment.

Fig. 9 is a view of a partial longitudinal section of a second embodiment.

Fig. 10 is a view of a partial cross-section of a third embodiment.

Fig. 11 is a view of a partial longitudinal section along 11—11 in Fig. 10.

The device depicted in the Figs. 1 to 8 comprises, in principle, a cylinder 1, belonging to a sheet or web fed rotary printing machine, this cylinder being mounted in a frame, which is not shown, so as to be able to revolve about its geometrical axis 2. This cylinder 1 is fixed at each end, by means of screws such as 3, to a flange 4 provided with a circular bearing face 5 destined to cooperate with roller bearing means, which are not shown, of the rotary machine. In addition, the cylinder is fitted at each end with a portion of driving shaft 6 serving to rotate it about its geometrical axis 2.

The cylinder 1 is provided with a longitudinal channel 7, the cross-section of which is fusiform and symmetrical, i. e. the part which in Fig. 1 is required to make the cylinder 1 whole is fusiform and symmerical and bounded by two arcs of a circle. In other words, the radius of curvature of this channel, as seen in cross-section in Fig. 1, is equal to the outer radius of the cylinder 1 itself.

The device in question comprises, in addition, a sleeve 8, formed by a rigid part in the shape of a portion of a hollow cylinder extending over more than half a circumference, as can be seen in the drawing. In fact, in the example shown, this portion of a hollow cylinder extends over three quarters of a circumference. The inner radius of this sleeve 8 is equal (not taking into account the tolerances necessary for mounting it) to the radius of the cylinder 1. This sleeve is destined to be adapted to the cylinder 1 without having to remove the latter from the machine, as will now be described.

To place the sleeve 8 on the cylinder 1, this sleeve is first brought, in relation to the cylinder 1, to the position shown in Fig. 1, which can be done with ease. The geometrical axis of the sleeve 8 is then situated in 9. The sleeve 8 is then rotated about its point of contact 10 with the cylinder 1 in such a manner that the geometric axis 9 moves along the arc of a circle 11, which is concentric with 10, until it coincides with the geometric axis 2 of the cylinder. This is possible on condition that, simultaneously with this movement of the axis 9 along the arc 11, the sleeve is gradually rotated about its own axis in the anticlockwise direction in Fig. 1, in such a manner that its extreme edge 12 approaches the line of contact 10 as the axis 9 comes nearer to 2. When the axes 9 and 2 coincide and the edges 10 and 12 are in contact, the sleeve is in place on the periphery of the cylinder 1.

To remove the sleeve thus brought into position, the same operations can be effected in exactly the contrary sequence, i. e. the axis 9 is made to move along the arc 11 and, simultaneously, the edge 12 is made to move away from the edge 10 by sliding it along 7. It is also possible—and that is the method to be preferred with this embodiment—to rotate the sleeve 8 in the anti-clockwise direction about the axis 2 for a certain angle, then to swing this sleeve about the edge 13, which is symmetrical to 10, so as to bring the extreme edge 14, which is symmetrical to 10, in contact with 7. Then the sleeve

may be rotated about the edge **13** so as to cause the centre **9** of this sleeve to describe from **2** an arc of a circle concentric with **13**.

The sleeve **8** is fitted with means, independent of the cylinder, for fastening blocks quickly and securely to this sleeve. This means can be of a known type and of the same kind as that used for fixing blocks to the cylinders of rotary presses. In the example shown, cylindrical holes **15**, shown diagrammatically, are drilled in the sleeve to take special clamps **16** which hold down the blocks **17**. One could naturally make use of any other known means of fixing the blocks to the cylinders of rotary presses, with this difference, that this means would not, as has been the case up to now, be provided on the cylinder itself, but on the sleeve (for instance dovetail grooves cut in the sleeve and cooperating with tenons engaging in the blocks). In the drawing, only a few holes **15** are shown, that is those in which the clamps **16** are engaged. It must be understood that, in order to enable blocks to be fixed at will in any desired position to the sleeve, there are in reality a multitude of holes **15**, evenly distributed over the whole of the lateral surface of the sleeve.

From what precedes, it may be seen that blocks may be fixed to a sleeve **8** while the rotary press is working. One need only have two sleeves, one of which is working to effect impressions, while the blocks are being fixed and adjusted to the other. The sleeve which has been at work is then removed from the cylinder, which only takes a short time, and is replaced by the other sleeve, on which the blocks have been previously adjusted and made ready.

The means provided to fix the sleeve (fitted with blocks and ready for the impression) removably to the cylinder and to remove it easily from the said cylinder without undoing the latter, will now be described. The cylinder **1** is provided internally with two series of transversal chambers **18** and **19**, which alternate, as may be seen in Fig. 8. Each chamber **19** contains a mechanism such as that which may be seen in Figs. 2, 3 and comprising, on the one hand a catch **20** with a bevelled face **21** and sliding in a slot **22**, in which are lodged compression springs **23** tending to push the catch **20** outwards (see Fig. 5). This catch extends over the whole length of the cylinder and is provided at each end with a pin **24**, prolonging the catch and extending through an oblong hole **25** in the corresponding flange **4** and protruding slightly on the outside of the latter. These pins indicate the position of the catch. In order to simplify the drawing, the compression springs **23** have been omitted in Figs. 3, 4 and 5.

The catch **20** is destined to cooperate with a slot **26** provided on the inside of the sleeve **8** near its right hand end, as seen in the drawing (Figs. 1 to 5). The direction in which the catch **20** moves is inclined on the radius of the drum passing through this catch in order to ensure, as will be seen later, a more secure fastening of the sleeve to the cylinder.

On the other hand, each chamber **19** is provided with a part **27** mounted on an eccentric **28** keyed to a shaft **29** extending over the whole length of the cylinder and arranged to rotate in the flanges **4**, which form bearings for it. At one end the shaft **29** is provided with a square part **30** enabling it to be maneuvered by means of a spanner. A radial pin **31**, destined to cooperate with fixed stops **32**, **33** provided on the flange **4**, delimits the ends of the angular motion of the shaft **29**.

The part **27** is fixed to a flexible metal blade **34**, which forms a spring and is fixed on the other hand to a second catch **35**, resting against a part **36** inside the chamber **19** and acted upon by a traction spring **37**, which tends to keep it in contact with this part **36**. The active part of the catch **35** is visible at **38** and is destined to engage in a corresponding slot **39**, provided on the inside surface of the left hand end (in the Figs. 1 to 5) of the sleeve **8**.

The means which has been described functions in the following manner:

The sleeve **8** having been fitted to the cylinder in the manner described above, is in the position shown in Fig. 2, and it is now required to secure it in that position in relation to the cylinder. In order to do this, one need only turn the eccentrics **28** by acting on the square part **30** of the shaft **29** by means of a spanner, so as to bring the pin **31** from its position of rest (in which it is in contact with the stop **33**) to its active position (in which this pin is in contact with the stop **32**) by a rotation of three quarters of a complete revolution. After the first quarter turn, the parts are in the position shown in Fig. 3, in which the part **38** of the catch **35** penetrates inside the sleeve but does not yet cooperate with the edge of the slot **39**. Another half turn of the spanner and the parts are in the position shown in Fig. 4, in which the part **38** of the catch is pushed with considerable force against the inclined face of the slot **39**. As for the catch **24**, as soon as it comes opposite to the corresponding slot **26**, it is driven into the latter by the springs **23**, so that it then occupies the position shown in Figs. 3, 4 and 5. The sleeve is thus firmly fixed to the cylinder. To free it it is sufficient to turn the shaft **29** back by three quarters of a turn, as shown by the arrow **40**, and to make the sleeve **8** slide, as has been seen above, on the outside surface of the cylinder by rotating it about the axis **2** in the anti-clockwise direction in the drawing. The bevelled face **21** of the catch **20**, by coming into contact with the edge **41** of the slot **26**, enables this catch to be pushed back and efface itself.

The cylinder, thus fitted with the block-carrying sleeve as shown in Fig. 4, is now ready for impression. It is however evident, that in this case, a quarter of the periphery of the cylinder can effect no impression, as this part is taken up by the longitudinal channel **7** of the cylinder. When it is desired to use the whole of the periphery of the cylinder for impression, a complementary portion of a cylinder **42** is fitted into the channel **7** and, in juxtaposition with the cylinder **1**, forms a complete geometrical cylinder, as may be seen in Fig. 5. This complementary portion of a cylinder is provided with a complementary piece **43**, removably fastened to it. This piece **43** forms a quarter of a hollow cylinder, which in juxtaposition with the sleeve **8** forms a complete geometrical cylinder. In this case it may be said of the sleeve that it is formed by the two parts **8** and **43**. The piece **43** carries members, such as **44**, which are fixed to it in any appropriate manner. In the example shown, the complementary piece **43** is fixed to the portion of a cylinder **42** by means of dovetail grooves **45** provided on the inside surface of **43** and in which are engaged heads **46** of a complementary shape, which are fixed in a permanent fashion on the outer surface of **42**.

The blocks such as **44** are naturally fitted to the piece **43** and adjusted to their exact working position away from the machine. It is therefore the piece **43** fitted with blocks ready for work which is fitted to the portion of a cylinder **42**.

The fitting of the portion of a cylinder **42** necessarily takes place after the sleeve **8** has been fitted to and secured on the cylinder as shown in Fig. 4. The following means is provided to retain the portion of a cylinder **42** on the main body **1**: a shaft **47** extends longitudinally along the whole length of **42** and can rotate about its own axis. This shaft is engaged in radial slots **48** which form bearings for it. At one end, the shaft is provided with a square hole destined to cooperate with a corresponding key **49** capable of turning for half a turn between a working position shown in Fig. 7 and an inactive position. A stop **50** limits the angular movement of this key. Each chamber **18** is provided with an eccentric part **51** of the shaft **47**, a hook being fitted on this eccentric part. The

inactive position of the shaft **47** corresponds to the position of the hook **52** shown in Fig. 5, whereas the working position corresponds to Fig. 6. An elastic metallic blade **53** is also arranged inside each chamber **18** and securely fixed to the cylinder **1** by screws **54**. When the shaft **47** is in the position shown in Fig. 5, the hook **52** is not engaged with the blade **53** and the assembly formed by the portion of a cylinder **42** and the complementary piece **43** is independent of **1** and of **8**. By giving the shaft **47** a half turn from its inactive position, the hooks **52** are brought, by the action of the eccentrics **51**, to the position in which they cooperate with the blade **53**. During the last part of this rotation of the shaft, the hook **52** exerts a substantially radial traction on the blade **53**, and this has the result of effectively securing the complementary portion on the main body of the cylinder **1**.

To ensure the exact positioning of the complementary portion of a cylinder **42** on the main part **1**, the portion **42** is also provided with a key **56**, fixed to this part **42** and destined to engage in a key-way **57** cut in the surface of the channel **7** (Fig. 5).

In the second embodiment, which is shown in Fig. 9, one sees a cylinder **58** with the two portions of shafting **59**, **60** at its ends, and the two end flanges **61**, **62** fixed to this cylinder by means of screws **63**. The flange **62** is provided, on the face facing the cylinder, with an annular groove **64** the outer side **65** of which forms a conical surface. At its opposite end, the cylinder **58** is provided with longitudinal slots **66** and with an exterior screw thread **67**. A nut **68** cooperates with the thread **67** and is provided with radial holes **69** enabling it to be rotated. The flange **61** is provided, in that part which is opposite to the nut **68**, with an annular groove **70**, which allows the nut to move towards the left in Fig. 9 when it is partially disengaged from the thread **67**.

A ring **71** is also provided, which surrounds the cylinder **58** in that part of it which is provided with the slots **66**. This ring is provided with radial projections which are permanently engaged in the slots **66**. Compression springs **73** act on the ring **71** so as to push it up against the nut **68** and keep it constantly in contact with it. The side of the ring **71** removed from the nut is provided with an annular conical face **74** forming, so to speak, the counterpart of **65**.

On the cylinder which has just been described is fitted in a removable manner a block-carrying sleeve **75**, formed by at least two complementary parts each of which is in the shape of a portion of a hollow cylinder adapted to the cylinder **58**. The sleeve **75** can be formed, for instance, by two half cylinders or by four complementary quarters of a cylinder.

At each of its two ends the sleeve is provided with an annular conical surface **76**, **77**, respectively. The surface **76** is destined to cooperate with the corresponding surface **65**, whereas the surface **77** is destined to cooperate with the corresponding conical surface **74**.

As in the preceding embodiment, the members are secured to the various sections of the sleeve by any appropriate means, which are not shown, and this takes place away from the machine and without undoing the cylinder from the rotary press. The various portions of the sleeve are then placed on the cylinder and secured as will now be described. To begin with, the nut is moved completely over to the left in Fig. 9, so as to leave between the ring **71** and the flange **62** a space in the axial direction which is sufficient to allow the portions of the sleeve **75** to be applied to the outside surface of the cylinder **58**. This having been done, the nut **68** is screwed towards the right. The conical face **65** coming into contact with **77** pushes the sleeve **75** to the right until its conical face **76** rests against the corresponding conical face **65**. A subsequent tightening up of the nut **68** has the effect of blocking the sleeve on the cylinder, and the machine is ready to work. To remove the sleeve, one need only unscrew the nut **68** until it has completely moved over to the left in the drawing.

In variants, other means as those described for the quick and secure fastening of the blocks to the sleeve could be provided, and other means as those shown could be used to fasten the sleeve in a removable manner to the cylinder. The sleeve could also be formed by any number of sections fastened in a removable manner to the cylinder. In this case the sleeve could be divided into sections not only circumferentially but longitudinally also. In the first embodiment the sleeve **1** could extend over more than three quarters of the circumference.

It must be understood that the sleeves may be indifferently fitted with original blocks and at the same time with stereotype, galvanotype or other solid blocks having the same thickness as rotary press stereotype blocks.

In the embodiment shown in Figs. 10 and 11, the cylinder **78**, with its driving shaft **79** and flanges, one of which only is shown at **80**, has a series of rectangular openings **81** in its lateral walls, these openings being arranged in rows parallel to the generants of the cylinder. Between the rows of openings **81** are rows of similar openings **82**, differing from the former only in that their width is less (width measured in the peripheric direction of the cylinder). The cylinder is made of magnetic material, and pieces of non-magnetic metal are fitted in the openings **81** and **82**, as will be described. A piece of non-magnetic material **83**, the outer surface of which completes the cylindrical surface of revolution of the cylinder **78**, is placed in each opening **81**. Another piece of non-magnetic material **85** is placed in each opening **81** at its inner end. The pieces **83** and **85** are held in place in the opening **81** by clamping, by means of the threaded end **86** of a rod **87** and of a nut **88** screwed onto **86**. The threaded end **86** is screwed into the piece **83** and the nut **88** presses on the piece **85**, so that the pieces **83** and **85** clamp the shoulders **89** of the cylinder between them.

In each opening **82** are placed an outer piece **90** and an inner piece **91**, both of these pieces being made of non-magnetic material. These two pieces are held in place by means of screws **92**. The pieces **90** have a surface which is a portion of a cylinder and completes the outer surface of the cylinder **78**.

The middle portion of a permanent magnet **93** can slide on each rod **87**, the two ends of this magnet being arranged to come each in contact with portions of the inner surface of the cylinder **78** comprised between an opening **81** and an opening **82**. When the magnets are thus in contact with the cylinder **78**, they are in their working position. In order to enable them to be withdrawn from this working position and brought to the position of rest shown by dots and dashes in Fig. 10 for one of those magnets, the following mechanism is provided:

In the example shown, six rows of magnets **93** are provided. Two control shafts **94** parallel to the axis of the cylinder and each able to turn in **95** in one of the flanges **80** are provided for each row of magnets. Each shaft **94** extends approximately over half the length of the cylinder and turns at one end in one of the flanges **80**. At their other ends **96**, these shafts turn in a transversal median rib **97** of the cylinder. These shafts are each provided at their outer end with a hexagonal head **98**, destined to take a spanner, by means of which they can be turned for ⅙ of a turn between a working position and a position of rest, as shown in **99** in Fig. 10. Each hexagonal head is provided with a set screw **100**. Each shaft **94** carries levers **101** at the rate of a pair for each magnet controlled by this shaft **94**. These levers are arranged at either end of the magnet and actuate a part **102**, arranged inside the branches of the magnet **93**, by means of connecting links **103**.

The free end of each rod **87** is provided with an adjustable stop **104** formed by a washer and a nut, the latter being screwed onto a threaded terminal part of the rod **87**.

When the shaft **94** is in one of its angular positions, the corresponding magnets **93** are in the working po-

sition shown by full lines in Fig. 10; for the other angular these magnets are forced to relinquish their contact with the cylinder and come to the position of rest shown by dotted and dashed lines in Fig. 10. The return to the working position is effected by turning the shaft **94** in the opposite direction.

In the drawing is shown a block-carrying sleeve formed by two parts **105**, **106** of practically semi-cylindrical shape. This sleeve is made of magnetic metal and is put in place on the cylinder after it has been fitted with blocks, such as **107**, correctly adjusted in their working position and fastened by any known appropriate means. To fix and secure the sleeve **105**, **106** to the cylinder **78** one proceeds as follows: The magnets are first of all brought to their position of rest, i. e. away from the cylinder **78**. One of the parts **105**, **106** is fitted to the periphery of the cylinder **78** in the correct position. This having been done, all the magnets situated opposite to this part of the sleeve are brought to their working position. In this way, the magnetic circuit of the magnets is closed through this part of the sleeve and the region of the cylinder **78** comprised between the magnet and this part of the sleeve, so that the said sleeve is energetically applied to the periphery of the cylinder by the magnetic attraction. One then proceeds in the same manner with the other semi-cylinder and the machine is ready to function. Two strips **108** of non-magnetic material are provided to ensure the correct positioning of the half-sleeves **105**, **106**. These strips are fixed once and for all to two diametrically opposed pieces **90** by means of screws.

The parts made of non magnetic material mentioned above could, for instance, be made of hard brass.

The magnets must of course be sufficiently powerful and in sufficient number to ensure that the block-carrying sleeves with their blocks **107** are held energetically on the cylinder with the desired security, in spite of the centrifugal force exerted when the machine is running. As each shaft **94** only controls a limited number of magnets, the effort required of the operator to bring the magnets from their working position to their position of rest is not exaggerated.

What I claim is:

1. A block carrying device for sheet or web fed rotary printing machines comprising a cylinder having a longitudinal channel therein, a complementary part adapted to fit into said channel to complete said cylinder, means removably attaching said complementary part to said cylinder, a hollow rigid two-part sleeve having an interior diameter equal to the diameter of said cylinder, means independent of said cylinder for fastening the blocks quickly and securely to the outer surface of said two-part sleeve, means removably fastening the first part of said sleeve to the cylinder, and means removably fastening the second part of said sleeve to the complementary part of said cylinder, said first part of the sleeve extending over more than half of the circumference of the cylinder.

2. A block carrying device as claimed in claim 1 in which said complementary part of said cylinder has a symmetrical cross section and the bottom of said channel is curved concavely with a diameter equal to the diameter of said cylinder.

3. A block carrying device as claimed in claim 1 in which the first part of said sleeve extends over at least seven tenths of the circumference of said cylinder.

4. A block carrying device as claimed in claim 1 in which the first part of said sleeve extends over three fourths of the circumference of said cylinder.

5. A block carrying device as claimed in claim 1 in which said cylinder is provided with catches, said sleeve having slots adjacent the edges thereof, said catches cooperating with said slots retaining said sleeve firmly on said cylinder.

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