May 1, 1956 R. W. BAILEY 2,743,670

ROTARY PRINTING DRUM FOR DUPLICATING MACHINES

Original Filed July 21, 1949 4 Sheets-Sheet 1

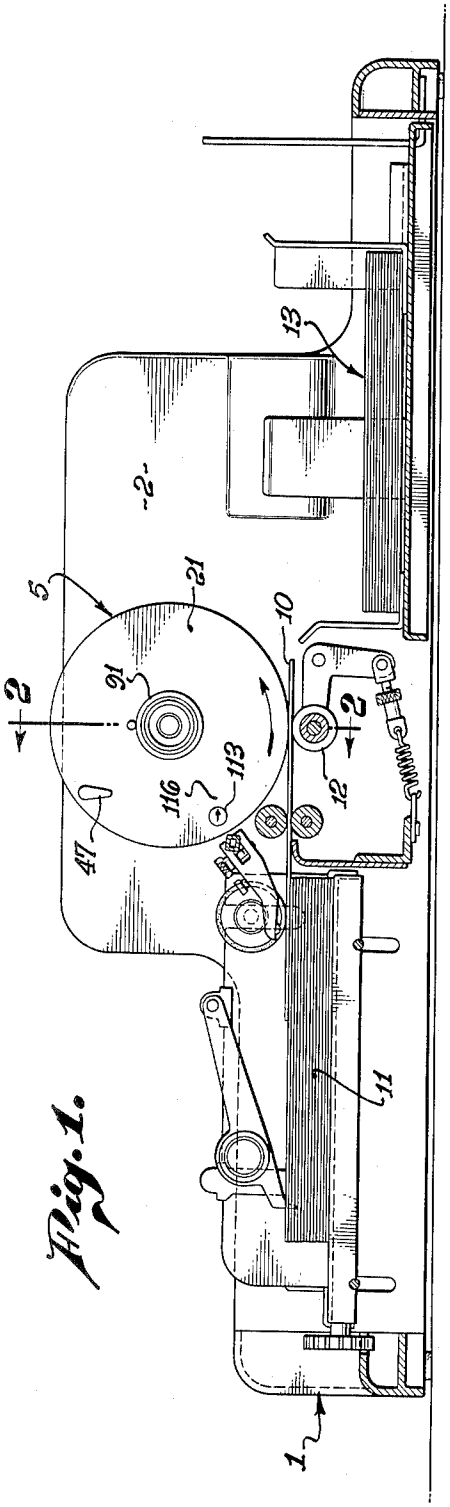

Fig. 1.

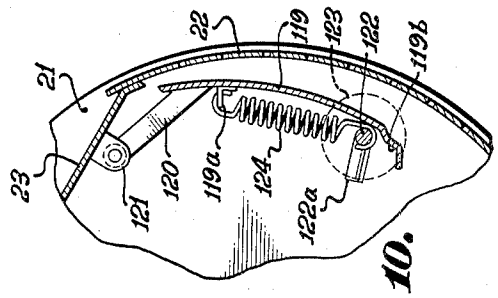

Fig. 10.

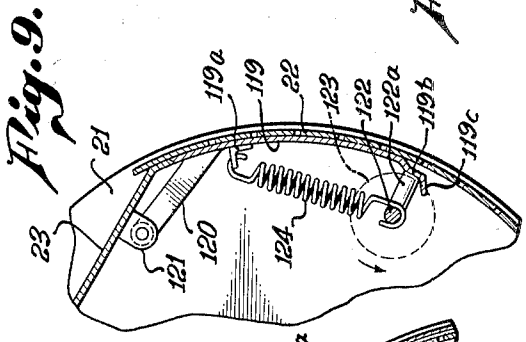

Fig. 9.

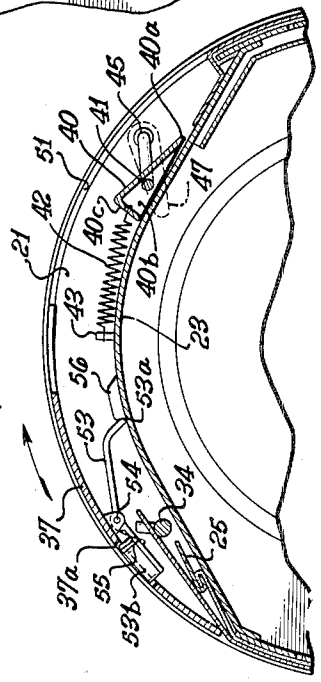

Fig. 7.

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Fig. 2.

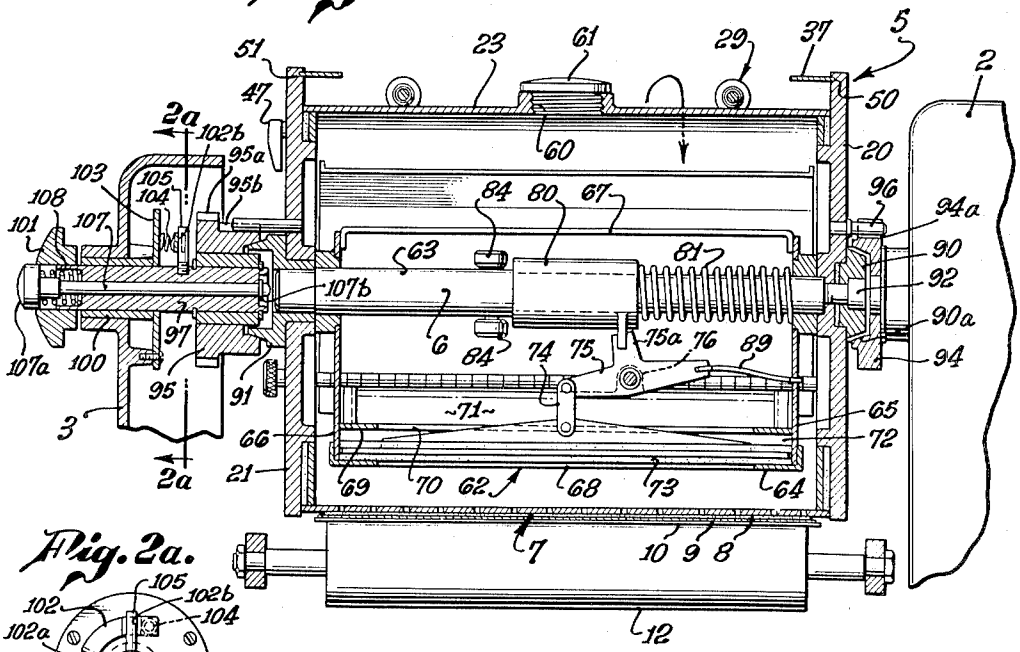

Fig. 2a.

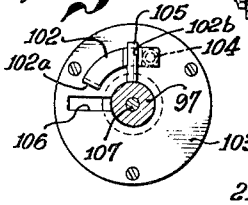

Fig. 3.

Fig. 8.

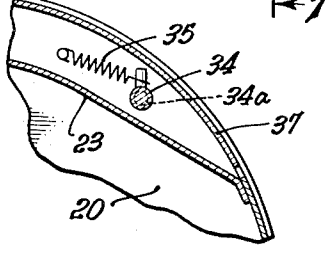

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Fig. 4.

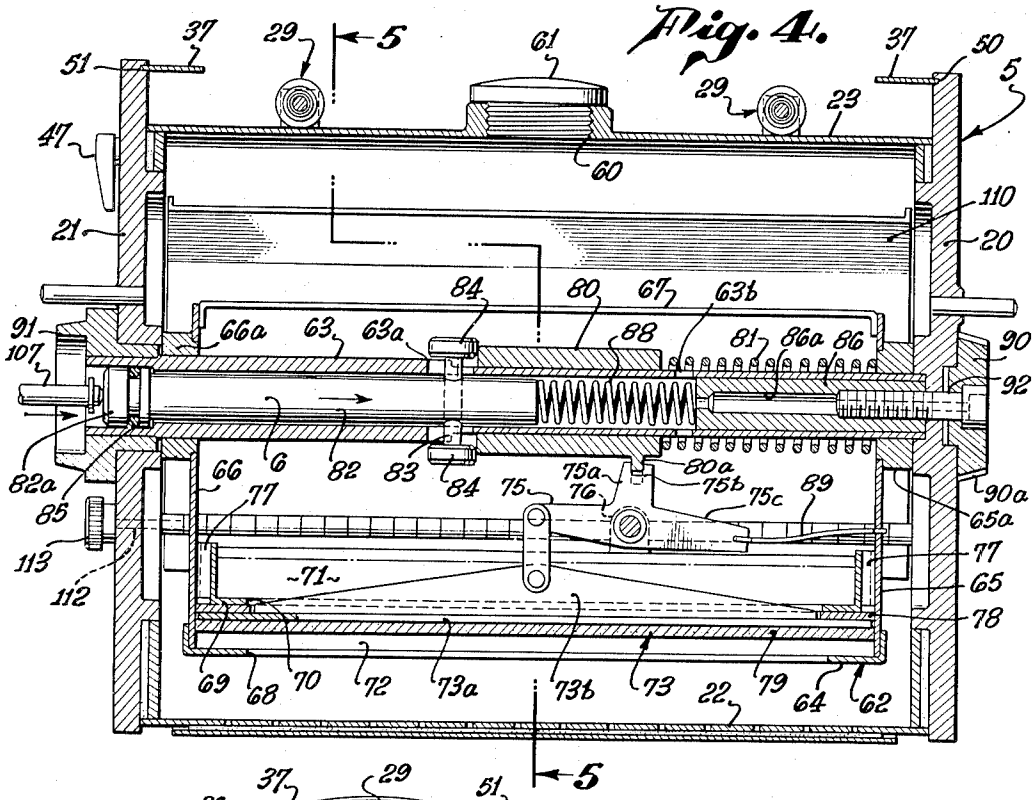
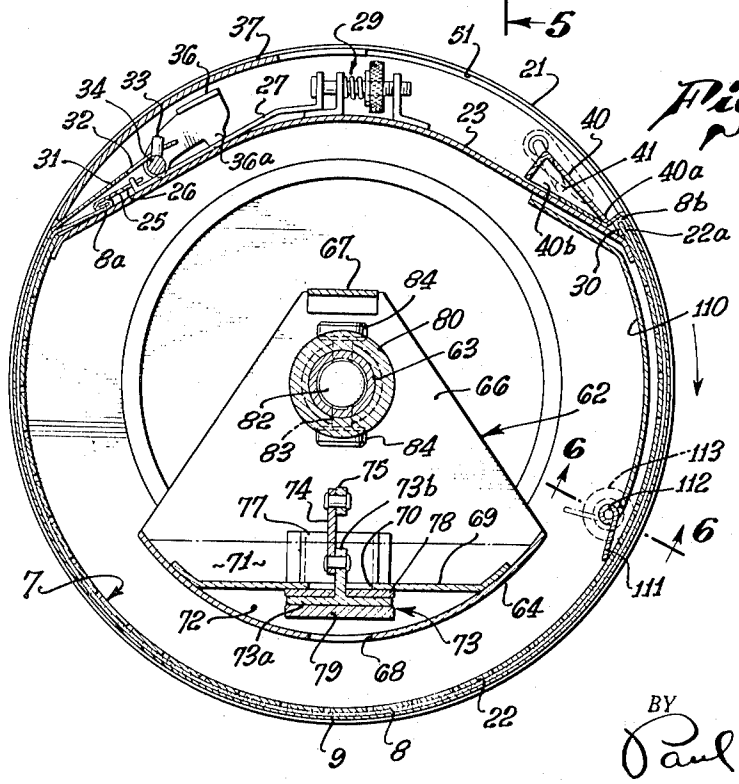


Fig. 5.



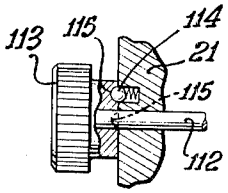


Fig. 6.

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Fig. 11.

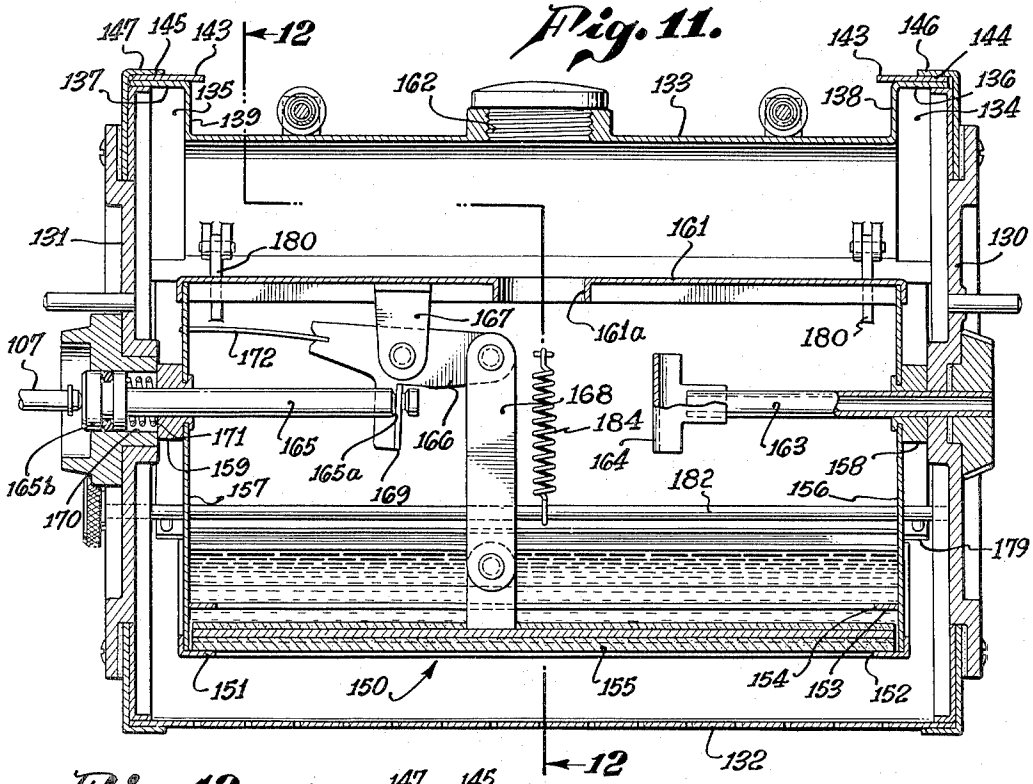


Fig. 12.

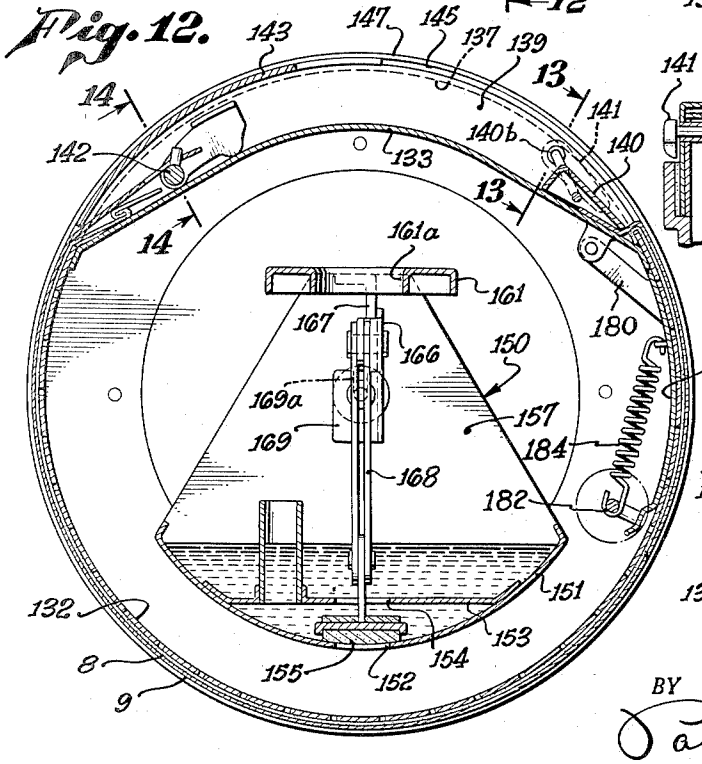


Fig. 13.

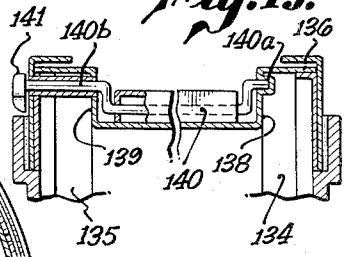
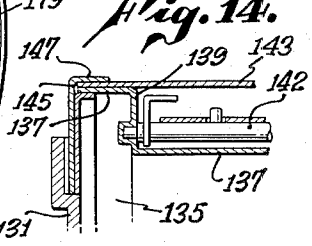


Fig. 14.



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United States Patent Office 2,743,670 Patented May 1, 1956

2,743,670

ROTARY PRINTING DRUM FOR DUPLICATING MACHINES

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Original application July 21, 1949, Serial No. 105,942, now Patent No. 2,697,397, dated December 21, 1954. Divided and this application July 16, 1951, Serial No. 236,984

13 Claims. (Cl. 101—119)

This invention relates to duplicating machines, mimeographs and the like; more particularly, it relates to the rotatable drum commonly provided in such machines for mounting the stencil.

It is an object of this invention to provide an improved drum of this type.

Such drums commonly comprise a perforated cylindrical shell about which the stencil is wrapped, a thin layer of porous material such as muslin being interposed. Ink within the drum and in contact with the shell feeds outwardly through the stencil as the drum is rotated, printing a form in accordance with the cutting of the stencil on paper urged against the stencil by passing between the drum and an impression roller.

This application is a division of an application, Serial No. 105,942, filed July 21, 1949, for Rotary Drum for Duplicating Machines, now Patent No. 2,697,397.

The perforated cylindrical portion of the shell on which the stencil is mounted is usually substantially less than the entire circumference of the drum and somewhat less than the length of a stencil. The remainder of the circumference being offset inwardly to accommodate the stencil mounting means etc., exteriorly thereof. As the drum rotates, the ink on the inner surface of the shell tends to lag behind the movement of the shell, and furthermore is urged outwardly by centrifugal force. The reduced portion of the shell retards the movement of the ink, so that the ink accumulates adjacent the trailing end of the cylindrical shell, the corresponding end of the stencil thus having too much ink while the head or leading end of the stencil has too little.

It is accordingly another object of this invention to provide a duplicator drum so arranged as to prevent such accumulation of ink.

It is another object of this invention to provide a duplicator drum having means to facilitate transfer of ink between the opposite ends of the cylindrical portion of the shell.

Conventional stencils for duplicating machines are usually made of such size as to accommodate matter filling a legal size sheet; on the other hand, a large proportion of the matter to be printed is readily accommodated on a letter size sheet. Thus, there is frequently a space at the lower or trailing end of the stencil which is not used. As discussed hereinbefore, the ink tends to accumulate in the drum shell over this part of the stencil, and frequently builds up sufficiently to escape along the opposite edges of the stencil, or to cause the stencil to wrinkle, as well as other difficulties, particularly when this part of the stencil is not cut. It is accordingly another object of this invention to provide a duplicator drum or the like arranged to prevent leakage of ink and/or injury to the lower or trailing end of the stencil when printing a letter size form.

It is another object of this invention to provide a duplicator drum or the like, having optionally operable means for diverting the ink from that portion of the drum shell covered by the trailing end of the stencil.

It is another object of this invention to provide a duplicator drum or the like, having optionally operable means for masking that portion of the drum shell covered by the trailing end of the stencil to prevent escape of ink through the shell perforations.

This invention possesses many other advantages and has other objects which may be made more easily apparent from a consideration of several embodiments of the invention. For this purpose there are shown several forms in the drawings accompanying and forming part of the present specification. These forms will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

In the accompanying drawings:

Fig. 1 is a longitudinal sectional view of a duplicating machine, showing in elevation a drum incorporating features of the invention;

Fig. 2 is a transverse section on an enlarged scale and partly in elevation, taken substantially as indicated by line 2—2 of Fig. 1;

Fig. 2–*a* is a detail section, taken substantially as indicated by line 2–*a*—2–*a* of Fig. 2;

Fig. 3 is a top plan view, seen as looking down in Fig. 2;

Fig. 4 is a sectional view, similar to Fig. 2, but on a further enlarged scale and showing a different operating position of the parts;

Fig. 5 is a cross section, taken substantially as indicated by line 5—5 of Fig. 4;

Fig. 6 is a fragmentary section on an enlarged scale, taken substantially as indicated by line 6—6 of Fig. 5;

Fig. 7 is a fragmentary cross section on an enlarged scale, taken substantially as indicated by line 7—7 of Fig. 3;

Fig. 8 is a fragmentary section on an enlarged scale, taken substantially as indicated by line 8—8 on Fig. 3;

Fig. 9 is a fragment of a section similar to Fig. 5, but showing a modified form of the invention;

Fig. 10 is a view similar to Fig. 9 but showing a different operating position of the parts;

Fig. 11 is a sectional view, similar to Fig. 4, but showing another modified form of the invention;

Fig. 12 is a cross section taken substantially as indicated by line 12—12 of Fig. 11; and

Figs. 13 and 14 are fragmentary sections taken substantially as indicated by the correspondingly numbered lines of Fig. 12.

Referring to Fig. 1, a duplicating machine embodying the present invention is shown schematically and comprises a frame generally indicated by the numeral 1, having upstanding side members 2 and 3 (see also Figs. 2 and 3) which cooperate to support the printing drum 5 for rotation about a horizontal axis 6, the drum being driven in a counterclockwise direction by suitable means (not shown). As shown in Fig. 2, the drum 5 has a shell 7 covered in part by an ink pad 8 and a stencil sheet 9, a layer of ink (not shown) being provided on the inner surface of the shell 7 for passage through perforations therein to the stencil. Sheets of paper 10 or other suitable material are fed from the stock pile 11 between the drum 5 and the impression roller 12 to be printed in accordance with the cutting of the stencil, the printed sheets 10 being delivered to the magazine 13.

Referring to Figs. 2 to 8, the drum 5 comprises a pair of circular heads 20 and 21 joined in spaced relation by the shell 7. As best shown in Fig. 5, the shell has a cylindrical perforated portion 22 which is discontinuous, that is, it extends less than a full circumference, the opposite ends thereof being connected by a solid portion 23 spaced ra-

dially inwardly from the cylindrical portion **22**. The ink pad **8** covers the perforate portion **22** of the shell **7**, the opposite or leading and trailing ends **8**–*a* and **8**–*b* thereof being anchored in any suitable manner. Thus, the leading end **8**–*a* may be attached to a plate **25** extending across the drum, by the aid of a hook formed on the plate **25**. The plate **25** has a pair of apertures **26**, each of which is engaged by a member **27** slidable on the solid shell portion **23** and urged in a direction to tighten the pad **8** by adjustable spring means **29**. The opposite ends **8**–*b* may be provided with a similar plate which catches behind a short extension **22**–*a* of the cylindrical shell portion **22**, or as shown in Fig. 5 at **30**, the end of the pad **8** may be merely folded over this extension **22**–*a*, since there is very little force acting on the pad.

The stencil **9** is entirely conventional and comprises a paper stiffener or reenforcing strip **31** at its head or leading end with a plurality of key-hole shaped apertures **32** therein, engageable respectively by projections or fingers **33** formed on a bar **34** extending across the drum **5** and supported for angular movement about its axis by reduced portions **34**–*a* and **34**–*b* engaging suitable openings in the heads **20** and **21** respectively.

The arrangement is such that the bar **34** is oscillatable between a position in which the fingers or projections **33** are inclined away from the stencil as shown in Fig. 5, and prevent its removal, and a position substantially 90° therefrom permitting ready attachment or removal of a stencil. A light tension spring **35** (Figs. 3 and 8) urges the bar **34** to stencil retaining position, a short lever **36** being provided to facilitate operation of the bar **34** to stencil releasing position. For this purpose, the arcuate cover plate **37** must first be moved to permit access to the bar **34**, lever **36**, etc., as will be discussed hereinafter. The lever **36** also serves by means of a lug **36**–*a* engageable with the shell portion **23** to appropriately limit movement of the bar **34** by spring **35**.

The opposite or trailing end of the stencil **9** is also secured to the drum **5**. Thus, as shown in Fig. 5, the length of the stencil sheet **9** is such that the sheet extends beyond the extension **22**–*a* and along the shell portion **23**. An elongated member **40** extending across the drum **5** has a forward edge **40**–*a* adapted to engage the stencil **9** immediately adjacent the extension **22**–*a* for this purpose being rotatably mounted on the bar **41** by the aid of webs **40**–*b*. A pair of tension springs **42** anchored at **43** on the shell portion **23** (see Fig. 7) and connected to a flange **40**–*c* on the member **40** urge the member **40** about the bar **41** so that the edge **40**–*a* presses against the stencil **9**. For moving the member **40** into and out of engagement with the stencil, bar **41** is pivotally mounted in the heads **20** and **21** by offset pintles **44** and **45**, one of which, as **45**, extends through the head **21** and has an operating knob **47** secured thereon.

As clearly shown in Figs. 5 and 7, the pintles **44** and **45** are so located with respect to the points of attachment of the springs **42** as to form an over center arrangement wherein the member **40** in either stencil engaging position or releasing position is urged about the bar **41** by the springs **42** in a clockwise direction. Thus, in stencil engaging position, the forward edge **40**–*a* of the member **40** clamps the trailing end of the stencil **9** against the shell portion **23**, and in stencil releasing position engages the shell portion **23** at a point spaced from said stencil end, thereby releasably maintaining the member **40** against movement.

The foregoing manner of mounting the stencil **9** enables the removal of the head end of the stencil first, an important advantage since this end has the reenforcing piece **25** and is free of ink. However, if desired, the stencil **9** may be removed in conventional manner by operating the clamping member **40** to release the trailing or rear end first.

The arcuate plate **37** is provided to form a protection

cover for the head of the stencil **9** and the anchoring means therefor, being mounted for movement about the axis of the drum **5** between a closed position covering said head and stencil means and an open position in which they are exposed for manipulation. For this purpose, the opposite edges of the plate **37** are slidingly accommodated respectively in grooves **50** and **51** in the heads **20** and **21**. A latch member **53** (Fig. 7) is pivotally mounted on the inside of the plate **37** by the aid of ears **54**, being urged by a spring **55** so that its inner end **53**–*a* normally engages the shell portion **23**. The opposite end of the member **53** has a thumb button **53**–*b* thereon accommodated in an opening **37**–*a* in the plate **37**. The inner end **53**–*a* of the member **53** by engaging a stop lug **56** on the shell portion **23**, serves to releasably maintain the plate **37** in closed position. Pressure on the thumb button **53**–*b* disengages the member **53** from the lug **56**, so that the plate **37** may be moved to open position.

The ink for the stencil is supplied to the interior of the drum **5** through an opening **60** in the shell portion **23**, closed by a threaded plug **61**. With the advent of thinner quick drying inks, it is important that the amount of ink in the shell is not excessive ; further it is advantageous to be able to replenish the ink supply in an appropriate amount and without the need of removing the plug **61** every time.

Accordingly, means are provided for containing a body of ink in the drum **5** substantially in excess of the amount for use by the stencil, means operable from the exterior of the drum being provided for releasing the ink in appropriate predetermined amounts.

For containing the body of ink, a stationary cradle **62** is rotatably supported within the drum **5** by the aid of a tubular member **63** extending axially of the drum. The cradle **62** comprises an arcuate bottom forming plate **64** concentric with the perforated shell spaced inwardly therefrom and supported by upright end plates **65** and **66** having hubs **65**–*a* and **66**–*a* which engage the tubular member, or axle **63**. A tie plate **67** extends between the upper ends of the plates **65** and **66**.

The cradle **62** has an elongated opening **68** in the bottom plate **64**, as well as an intermediate plate **69** with a similar opening or aperture **70**, providing first and second or upper and lower ink containing chambers **71** and **72**. A closure member **73** is suspended between the bottom **64** and the intermediate plate **69** by a pivoted link **74** connected to one arm of a lever member **75** rockably supported between upstanding ears formed on the opposite edges of the bottom plate **64**, one of such ears being indicated at **76**, Figs. 2 and 4. As clearly shown in Figs. 4 and 5, the closure member **73** comprises a metal plate **73**–*a* of such size as to overlie the openings **68** or **70** and connected to link **74** by the aid of lug **73**–*b*. A resilient pad **78** is provided on the upper face of plate **73**–*a* for sealing about the aperture **70** when the closure **73** is in its upper position. A similar pad **79** is provided on the lower face of the plate **73**–*a* for sealing about the opening **68** when the closure **73** is in its lower position, this pad **79** however being somewhat thicker to allow for the curvature of the bottom plate **64**.

The arrangement is such that the closure **73** normally closes the bottom opening **68**, the aperture **70** being open, so that the ink chambers **71** and **72** are in free communication but no ink can pass onto the interior surface of the drum **5**. However, the closure **73** is optionally operable to uncover the bottom opening **68** and close the aperture **70**, thus allowing the ink in the lower chamber **72** to flow onto the interior drum surface. Thus, by making the lower chamber **72** of appropriate size, a predetermined amount of ink is delivered at each operation of the closure **73**. After the ink has been released from the lower chamber **72**, the closure **73** is returned to its normal position, closing the opening **68** and opening the aperture **70**, allowing the lower chamber **72** to refill from the

upper chamber 71. To facilitate the emptying and filling of the lower chamber 72, appropriate air vents 77 are provided at each end thereof.

For operating the lever 75 a sleeve 80 is rotatably and slidably mounted on the axial member 63 and has a notched lug 80–*a* engaging a notch 75–*b* in arm 75–*a* of the lever 75. This prevents rotation of the sleeve 80 as well as constraining the lever 75 to swing in accordance with the axial movement of the sleeve 80, a compression spring 81 confined between the sleeve 80 and the end boss 65–*a*, normally maintaining the parts with closure 73 closing the bottom opening 68.

For moving the sleeve 80 to cause the closure 73 to move to its other operating position, a push rod 82 is slidably mounted in the member 63 extending inwardly from one end and having a transverse pin 83 adjacent its inner end projecting through oppositely disposed slots 63–*a* in the member 63. Rollers 84 are provided on the pin 83 for engaging the sleeve 80, since the push rod 82 and pin 83 rotate with the member 63, while the sleeve 80 remains stationary. The outer end of the rod 82 has a slightly enlarged head 82–*a* which is sealed against the bore in member 63 as by a conventional O-ring 85 accommodated in a groove in the head 82–*a*.

The opposite end of the member 63 has an elongated plug 86 secured therein with a through axial opening 86–*a* to be more fully discussed shortly. A compression spring 88 confined between the plug 86 and rod 82 urges the rod 82 outwardly, pin 83 by engagement with the ends of slots 63–*a* serving to limit such movement. Means to be discussed hereinafter are provided for urging the rod 82 inwardly to operate the closure 73.

It will be obvious that the closure 73 must not dwell at an intermediate point with both openings 68 and 70 simultaneously uncovered, since this would prevent proper metering of the ink delivered to the interior of the drum 5. To insure proper operation of the closure 73, it is continually biased by the spring 81 to close the lower opening 68, this force being supplemented by that of a leaf spring 89 confined between arm 75–*c* of the lever 75 and the end plate 65. This spring 89 is arranged in a known manner to exert a force opposing movement of the lever 75 from either limiting position and which increases as the lever reaches an intermediate position. Thus, while the force of spring 81 overrides the force of spring 89, exertion of a force on the lever 75 sufficient to move it from a position in which the closure 73 closes the opening 68 to and through an intermediate position, will insure further movement of the lever 75 in response to spring 89 so that the closure 73 closes the aperture 70.

The drum 5 is mounted in the duplicator by the aid of the conical hubs 90 and 91 secured respectively to the drum heads 20 and 21, hub 90 being secured by a special screw 92 threaded into the plug 86. The hubs 90 and 91 respectively engage members 94 and 95 providing conical cups for receiving the conical surfaces of the hubs 90 and 91, and rotatably supported by the upstanding side members 2 and 3 of the frame 1. One of these cup members, as 94, may be power driven, the drum 5 being in driving relation therewith by a pin 96 in the head 20 engaging slot 94–*a* in the cup member 94.

The screw 92 has a central aperture leading from the aperture 86–*a* in the plug 86 to the space between the hub 90 and cup 94 (see Fig. 2), communication between this space and the atmosphere being provided by one or more transverse grooves 90–*a* in the surface of the hub 90. The aperture 86–*a* opens into the interior of the member 63 which communicates freely with the interior of drum 5 by ports 63–*b*. In this way, atmospheric pressure within the drum is assured at all times.

The other cup member 95 is rotatably mounted on the inner end of a short hollow shaft 97, but is restrained against axial movement thereon, and may be optionally driven by means independent of the means driving the member 94, such as a hand crank (not shown) for rotating the drum 5. For this purpose the member 95 includes an integral spur gear 95–*a* and a driving pin 98 is provided in the head 21 engaging a slot 95–*b* in the member 95.

The shaft 97 is supported for angular and axial movement in the frame upright 3 by means of a bushing 100 fixed therein, a knob 101 being secured on the outer end of shaft 97 to facilitate its operation. Appropriate movement of the shaft 97 and member 95 thereon to the left (Fig. 2) will disengage the member 95 from the hub 91 and allow the drum 5 to be moved to the left to disengage the hub 90 from the other cup 94, freeing the drum 5 for removal from between the uprights 2 and 3. Similarly, movement of the shaft 97 and member 95 to the right will secure the drum 5 after it is replaced.

The shaft 97 is resiliently urged to drum retaining position by a detent arm 102 pivotally mounted at 102–*a* on a plate 103 secured within the upright 3 about the shaft (Figures 2 and 2–*a*). The arm 102 inclines from the end 102–*a* away from the plate 103 to the free end which is urged inwardly or toward the drum 5 by a compression spring 104, there being a recess 102–*b* adjacent the free end normally engaged by a pin 105 projecting from the shaft 97. The spring 104 thus serves to maintain the drum 5 in operating position by urging the cups 94 and 95 and their respective hubs into engagement.

When it is desired to remove the drum, the operator, by means of the knob 101 exerts sufficient turning force in a counterclockwise direction, referring to Fig. 2–*a*, on shaft 97, to force the pin 105 out of the recess 102–*b*, the shaft 97 then being rotated about 90° to align pin 105 with a slot 106 extending through the plate 103 and axially in bushing 100. The shaft 97 together with the cup member 95 is then moved axially to the left to disengage the member 95 and hub 91. Inward and clockwise movement of the shaft 97 will cause engagement of pin 105 and detent notch 102–*b*, thus locking drum 5 in place.

An operating rod 107 for actuating the ink feeding mechanism is slidable in the bore of the hollow shaft 97, having a head 107–*a* projecting from the knob 101 and confining a spring 108 against the end of the shaft 97. The spring 108 urges the rod 107 outwardly, a suitable stop member 107–*b* on the rod 107 limiting such movement by contact with the inner end of the shaft 97. The inner end of rod 107 is adapted to contact push rod 82 so that suitable pressure exerted on the head 107–*a* will actuate the closure 73 in the manner previously discussed.

The rotation of the drum 5 causes the ink on the inner surface of the cylindrical shell portion 22 to accumulate adjacent the trailing end of the shell 22 where it joins the inwardly spaced shell portion 23. This is objectionable in any case since it results in an excessive ink supply for the trailing end of the stencil and especially since the last several inches of the stencil are not cut or used in a large proportion of the work. Accordingly, means are provided optionally operable for masking this portion of the shell 22.

Thus, as shown in Figs. 4 and 5, a plate 110 is provided extending between the heads 20 and 21 and in spaced relation over the trailing end of the shell portion 22 and the adjacent end of the inwardly spaced shell portion 23. At the leading end of the plate 110, a control flap 111 is provided, secured on a bar 112 extending longitudinally of the drum 5 and rotatably mounted at its opposite ends in the drum heads 20 and 21 respectively. Bar 112 projects through the head 21 having an operating knob 113 secured on its outer end.

The arrangement is such that the flap 111 may be positioned as indicated by full lines to prevent entry of ink between the shell 22 and the masking plate 110 or as indicated by the broken lines to permit ink to enter freely. However, it is to be noted that in the latter case the thickness of the ink layer acting on the trailing end of the shell 22 and the stencil 9 can never exceed the

distance by which the masking plate **110** is separated from the shell. As shown in Fig. 6, a spring pressed ball **114** may be provided in the head **21** engageable with either of a pair of recesses **115** in the knob **113** for retaining the flap **111** in adjusted position, appropriate indicia **116** (Fig. 1) being provided on the head **21** cooperating with a mark on the knob **113** to indicate the position of the flap **112**.

A modified form of means for masking the trailing end of the cylindrical shell portion is shown in Figs. 9 and 10. Therein an arcuate plate **119**, adapted to closely engage the inner surface of the shell **22**, is supported for swinging movement into and out of contact with the shell by a plurality of longitudinally spaced arms such as indicated by **120** pivoted respectively to lugs **121** on the inside of the shell portion **23**. A longitudinally extending shaft **122** is rotatably supported at its opposite ends in the heads **20** and **21** respectively, an operating knob 123 being provided on one end thereof as before.

One or more springs **124** tensioned between the shaft **122** and lugs **119**–*a* on the plate **119**, urge the plate inwardly of the shell **22**, such movement being opposed by the engagement of a cam surface **119**–*b* with projecting cam means **122**–*a* on the shaft **122**, as shown in Fig. 9. Upon rotation of the shaft **122** to disengage the cam **122**–*a* and the cam surface **119**–*b*, the plate **119** swings inwardly against shaft **122** as a stop, allowing free passage of ink over the trailing end of the shell **22** (Fig. 10). Reverse rotation of the shaft **122** reengages the cam **122**–*a* and cam surface **119**–*b* and returns the plate **119** to its masking position, an extension **119**–*c* of the cam surface **119**–*b* serving as a stop to appropriately limit rotation of the shaft **122** by engaging the cam **122**–*a*.

In Figs. 11 and 12 a modified form of ink cradle is shown in connection with a modified form of printing drum, but it is to be understood that there is no especial cooperation between these modified forms, as the drum of Fig. 11 could as well employ the ink cradle of Figs. 2 to 5, and the drum of Fig. 2 et seq. could equally as well employ the ink cradle of Figs. 11 and 12.

Referring to Figs. 11 and 12, the printing drum shown therein is generally quite similar to the previously described drum comprising circular heads **130** and **131** joined by a shell having a discontinuous cylindrical perforated portion **132** with its ends joined by an inwardly spaced portion **133**.

However, to prevent the previously discussed accumulation of ink adjacent the trailing end of the cylindrical shell portion **132**, a pair of channels **134** and **135** are provided in the inwardly spaced shell portion **133** connecting said trailing end with the leading end of this portion **132**. Thus, the width of the shell portion **133** is less than the space between the heads **130** and **131** so that the opposite edges thereof are spaced from the heads, means **136** and **137** being provided adjacent the heads **130** and **131** respectively forming narrow continuations of the cylindrical shell portion **132** connecting its opposite ends. The means **136** and **137** are connected at their outer edges respectively to the heads **130** and **131** and at their inner edges by upstanding walls **138** and **139** to the shell portion **133**. It will be apparent that ink accumulation adjacent the trailing end of the cylindrical shell portion **132** will flow longitudinally along the shell to the channels **134** and **135** and thence via the channels to the leading end of the shell portion **132**. Since these channels **134** and **135** form a continuation of the cylindrical shell portion **132**, free flow of the ink results.

The described arrangement has important advantages in providing a uniform distribution of ink over the stencil, avoiding excessive inking of the trailing end of the stencil while assuming an ample supply of ink for the head end.

The inking pad **8** and the stencil **9** may be secured to the drum in substantially the same manner as in the first described form of the invention. However, as shown in Fig. 13, the anchoring means **140** for the trailing end of the stencil **9**, similar to that previously described, is rotatably supported by engagement of the pintles **140**–*a* and **140**–*b* with the channel walls **138** and **139** respectively, pintle **140**–*b* extending across the channel **135** and through the head **131**, an operating knob **141** being fixed on its outer end. Likewise one end of the anchoring bar **142** for the head of the stencil **9**, similar to that previously described, is rotatably supported by the channel wall **139** as shown in Fig. 14, the other end being similarly supported by the channel wall **138**.

An arcuate protective cover **143** is provided as before, slidably mounted in grooves **144** and **145** defined respectively by the channel bottoms **136** and **137** and flanges **146** and **147** on the heads **130** and **131**.

The stationary cradle **150** for containing the ink is generally quite similar to that of the first described form of the invention and comprises an arcuate bottom wall **151** with an elongated opening **152** and an intermediate apertured wall **153** with an opening **154**, a closure member **155** similar to that of the first described form of the invention being provided for controlling the openings. The cradle **150** is rotatably supported with respect to the drum by end plates **156** and **157** secured to hubs **158** and **159** and braced by a top spacer plate **161**. This plate **161** has an opening **161**–*a* for facilitating the passage of ink from the drum opening **162**.

The hub **158** is rotatably mounted on a tube **163** fixed in the head **130** and extending inwardly therefrom to provide an air vent for the interior of the drum, a protective cover **164** being provided to prevent accidental entry of ink into the tube **163**. The other hub **159** is rotatably supported on the axially extending push rod **165** which operates the closure **155**.

A lever member **166** is rockably mounted on the spacer plate **161** by the aid of a bracket **167** and is connected to the closure by a link **168**. The lever member **166** has a crank-like lateral extension **169** with a slot **169**–*a* for accommodating a reduced neck **165**–*a* on the push rod **165**. The push rod **165** has a packed head **165**–*b* at its outer end slidable in a bore **170** provided in the drum head **131**, a spring **171** confined between the head **165**–*b* and hub **159** urging the push rod **165** outwardly, to cause the closure **155** to close the bottom opening **152**. Appropriate pressure exerted on the push rod **165**, as by the operating rod **107** will cause the closure **155** to uncover the bottom opening **152** and close the aperture **154**, thus delivering a metered quantity of ink as determined by the volume defined between the cradle bottom **151** and the plate **153**. Upon release of the push rod **165**, the closure **155** returns to its normal position closing the bottom opening **152**. A flat spring **172** engages an extension **166**–*a* of the lever **166** for insuring movement thereof to insure movement of the closure **155** to close either of the openings **152** or **154**, in a manner similar to that in the first described form of the invention.

As in the first described form of the invention, it may be desirable to provide optionally operable means for masking the trailing end portion of the shell portion **132**, for which purpose, an arrangement substantially identical with that disclosed in Figs. 9 and 10 is shown. Thus, an arcuate plate **179** adapted to closely engage the inner surface of shell **132**, and corresponding with plate **119** of Figs. 9 and 10, is supported for angular movement toward and away from shell **132** by a pair of arms **180**, and is optionally movable into and out of masking position by the aid of a rotatable cam shaft **182** and tension spring **184** all as before.

I claim:

1. A rotatable printing drum for a duplicating machine, having heads and a shell comprising a perforate cylindrical portion adapted to have a stencil sheet secured thereon, and a radially inwardly spaced imperforate portion offset from said perforate portion, said drum being adapted to have a body of ink distributed in a layer over the inner surface of said shell for passage through said shell and

said stencil, rotation of said shell causing said ink layer to move on said surface toward the rear end of the stencil; and means comprising a fixed plate inwardly spaced from said shell and extending over the rear of the perforate portion thereof, and a gate pivoted adjacent the forward edge of said plate, optionally operable to close the opening between said plate and said shell and divert the ink layer to the inside surface of said plate.

2. A rotatable printing drum for a duplicating machine, having heads and a shell with a perforate cylindrical portion adapted to have a stencil sheet secured thereon, and an imperforate portion, said drum being adapted to have a body of ink distributed in a layer over the inner surface of said shell for passage through said shell and said stencil, rotation of said shell causing said ink layer to move on said surface toward the rear end of the stencil; means comprising a plate adapted to mask the perforations in the rear portion of said shell and mounted for movement in entirety into and out of contact with the inner surface of said shell; means urging said plate out of contact with said shell; and optionally operable means for moving said plate into contact with said shell; said plate when moved in entirety out of contact with said shell defining between the shell and the plate a through passage through which ink may flow.

3. In a rotatable printing drum for a duplicating machine, a pair of spaced heads connected by a shell, said shell comprising a perforate cylindrical portion adapted to have a stencil sheet secured thereon, and a radially inwardly spaced imperforate portion offset from said perforate portion, said drum being adapted to have a body of ink distributed in a layer over the inner surface of said shell for passage through said shell and said stencil, rotation of said shell causing said ink layer to move on said surface toward the rear end of the stencil; means comprising a plate adapted to mask the perforations in the rear portion of said shell; means pivotally mounting said plate for bodily movement within the shell for movement between a position masking said perforations and a position wherein they are open; means resiliently urging said plate to one of said positions; and cam means operable from the exterior of the drum for optionally moving said plate to the other position said plate when in position to open said perforations, cooperating with said cylindrical portion to form a passage through which ink may flow on the interior of said shell past both ends of the plate.

4. In a rotatable printing drum for a duplicating machine: a pair of spaced heads connected by a shell; said shell having a perforate discontinuous cylindrical portion and a radially inwardly spaced portion joining the ends of said cylindrical portion; and channel forming means providing a continuation of said cylindrical portion of restricted width between said ends adjacent said heads for facilitating ink movement within the drum in response to rotation thereof, said continuations having substantially the same radius as said cylindrical portion.

5. In a rotatable printing drum for a duplicating machine: a pair of spaced heads connected by a shell; said shell having a perforate discontinuous cylindrical portion and a radially inwardly spaced portion joining the ends of said cylindrical portion intermediate said heads and having its opposite edges spaced therefrom respectively; means forming a continuation of said cylindrical portion joining said ends adjacent said heads and connected thereto facilitating ink movement within the drum; said continuations having substantially the same radius as said cylindrical portion; and upstanding walls joining the edges of said continuations and of said inwardly spaced portion respectively.

6. In a rotatable printing drum for a duplicating machine: a pair of spaced heads connected by a shell, said shell comprising a perforate discontinuous cylindrical portion and a radially inwardly spaced portion joining the ends thereof; means forming channels in said inwardly spaced portion connecting said ends for facilitating ink movement within the drum in response to rotation thereof; and optionally operable means to control passage of ink through said shell, comprising a bodily movable plate extending over a part of said cylindrical portion, means mounting said plate for bodily movement toward said shell and into contact therewith throughout its area and away from said cylindrical portion to provide a passageway open at both ends between said plate and said cylindrical portion; and means for moving said plate.

7. A rotatable drum for a duplicating machine, including a perforate shell adapted to have ink distributed over the inner surface thereof, a radially inwardly spaced imperforate shell portion offset from said perforate shell, a pair of spaced heads connected by said shell, channel forming means constituting a continuation of said imperforate portion adjacent the heads of said shell, having substantially the same radius as said perforate shell facilitating the passage of ink, said perforated shell adapted to have a stencil sheet secured over the outer surface thereof, means for masking perforations in said shell, and means operable at will for rendering said masking means operative, said masking means when inoperative, forming with said shell a passage open at both ends through which ink may flow.

8. A rotatable drum for a duplicating machine, including a perforate shell adapted to have ink distributed over the inner surface thereof, a radially inwardly spaced imperforate shell portion offset from said perforate shell, a pair of spaced heads connected by said shell, channel forming means constituting a continuation of said imperforate portion adjacent the heads of said shell, having substantially the same radius as said perforate shell facilitating the passage of ink, said perforated shell adapted to have a stencil sheet secured over the outer surface thereof, masking means positioned within said shell operable for excluding flow of ink through perforations covered by the uncut trailing end portion of the stencil, and means for rendering said masking means operative and inoperative, said masking means when inoperative forming with said shell a passage open at both ends to provide for the flow of ink in either direction between the masking means and said shell.

9. In a rotatable drum for a duplicating machine, a pair of spaced heads connected by a shell, said shell having a perforate portion adapted to have ink distributed over the inner surface thereof and a stencil sheet mounted over the outer surface thereof, a radially inwardly spaced imperforate portion offset from the perforate portion, and passage forming means within the drum adjacent the heads and forming a continuation of said imperforate portion having the same radius as said perforate portion for conducting ink between the ends of said perforate portion independently of flow of ink over said offset portion.

10. A rotatable drum for a duplicating machine, including a shell having a perforate portion adapted to have ink distributed over the inner surface thereof and a stencil sheet secured over the outer surface thereof, masking means interiorly of said shell operable for preventing flow of ink through perforations in said perforate portion, and masking means including a plate mounted in inwardly spaced relation to the inner surface of a part of said perforate portion, and a gate movable into and out of position preventing flow of ink between said plate and said part of said perforate portion; and means operable exteriorly of said shell for so moving said gate.

11. A rotatable drum for a duplicating machine, including a shell having a perforate section adapted to have ink distributed over the inner surface thereof and a stencil sheet secured over the outer surface thereof, an imperforate section between the ends of said perforate section and offset therefrom, masking means interiorly of said shell operable for preventing flow of ink through

perforations in said perforate section, said masking means including a plate mounted in inwardly spaced relation to the inner surface of a portion of said perforate section and a portion of said imperforate section, a gate movable into and out of position preventing flow of ink between said plate and said portions and means operable exteriorly of said shell for so moving said gate.

12. In a rotatable drum for a duplicating machine, a pair of spaced heads connected by a shell, said shell having a perforate portion adapted to have ink distributed over the inner surface thereof and a stencil sheet secured over the outer surface thereof, masking means interiorly of said shell operable for preventing flow of ink through perforations in said perforate portion, including a plate mounted for bodily movement within said shell for movement into and out of a position preventing flow of ink through perforations in said perforate portion, and means for so moving said plate, said masking means when inoperative forming with said shell a passage open at both ends to provide for the flow of ink therethrough in either direction between said plate and said shell.

13. A rotatable drum for a duplicating machine, a pair of spaced heads connected by a shell, said shell having a perforate portion adapted to have ink distributed over the inner surface thereof and a stencil sheet secured over

the outer surface thereof, masking means interiorly of said shell operable for preventing flow of ink through perforations in said perforate portion, including a plate mounted for bodily movement within said shell for movement into and out of a position preventing flow of ink through perforations in said perforate portion, means for so moving said plate, including a spring urging said plate out of position preventing said flow of ink, and means operable exteriorly of said shell for moving said plate into said flow preventing position said masking means when inoperative forming with said shell a passage open at both ends to provide for the flow of ink therethrough in either direction between said plate and said shell.

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