July 25, 1950 H. F. BRAY 2,516,613

SYSTEM OF SETTING PAPER POSITIONING PARTS ON A PRINTING MACHINE

Filed Oct. 22, 1945 6 Sheets-Sheet 1

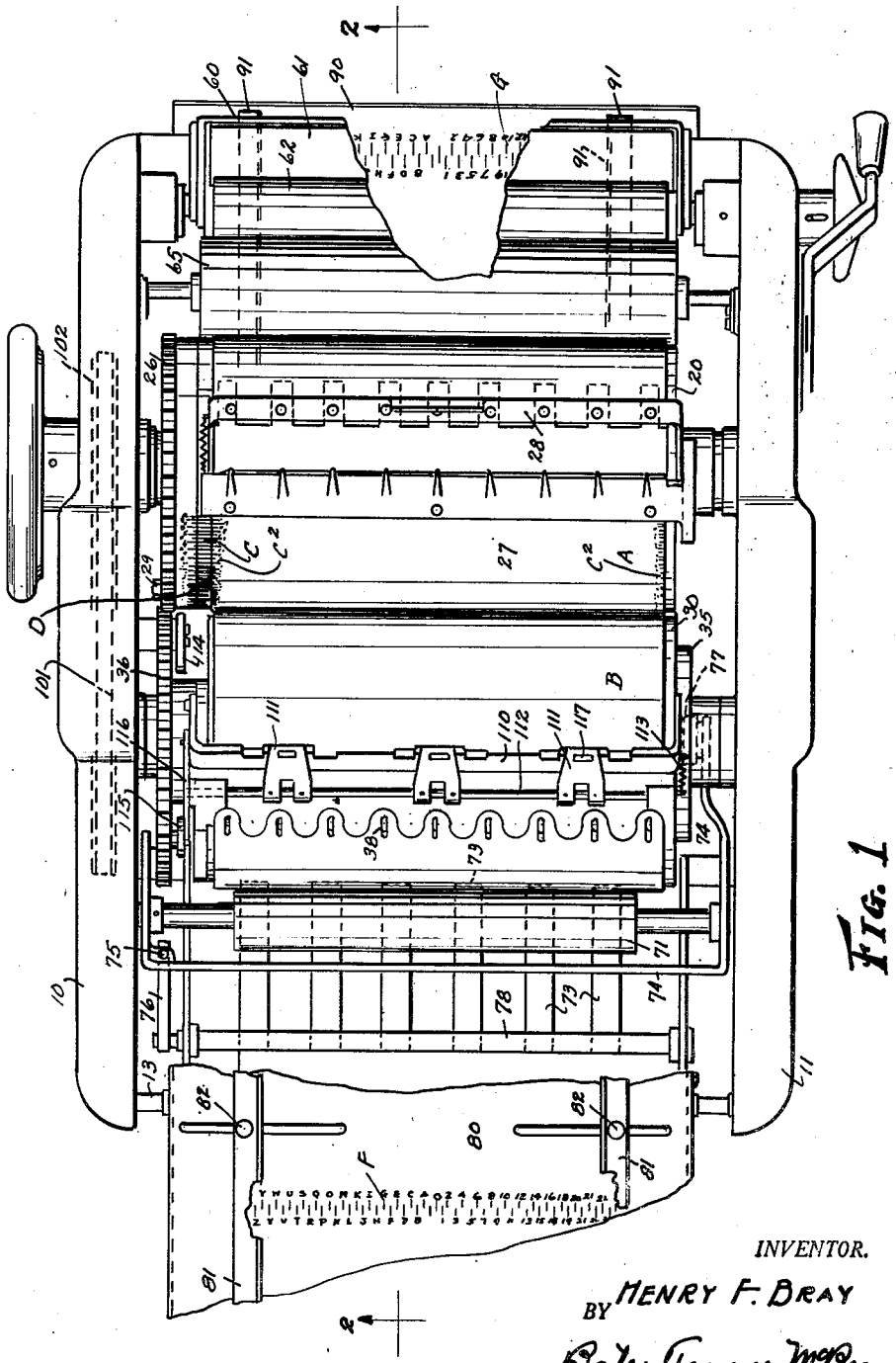

FIG. 1

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SYSTEM OF SETTING PAPER POSITIONING PARTS ON A PRINTING MACHINE

Filed Oct. 22, 1945 6 Sheets-Sheet 2

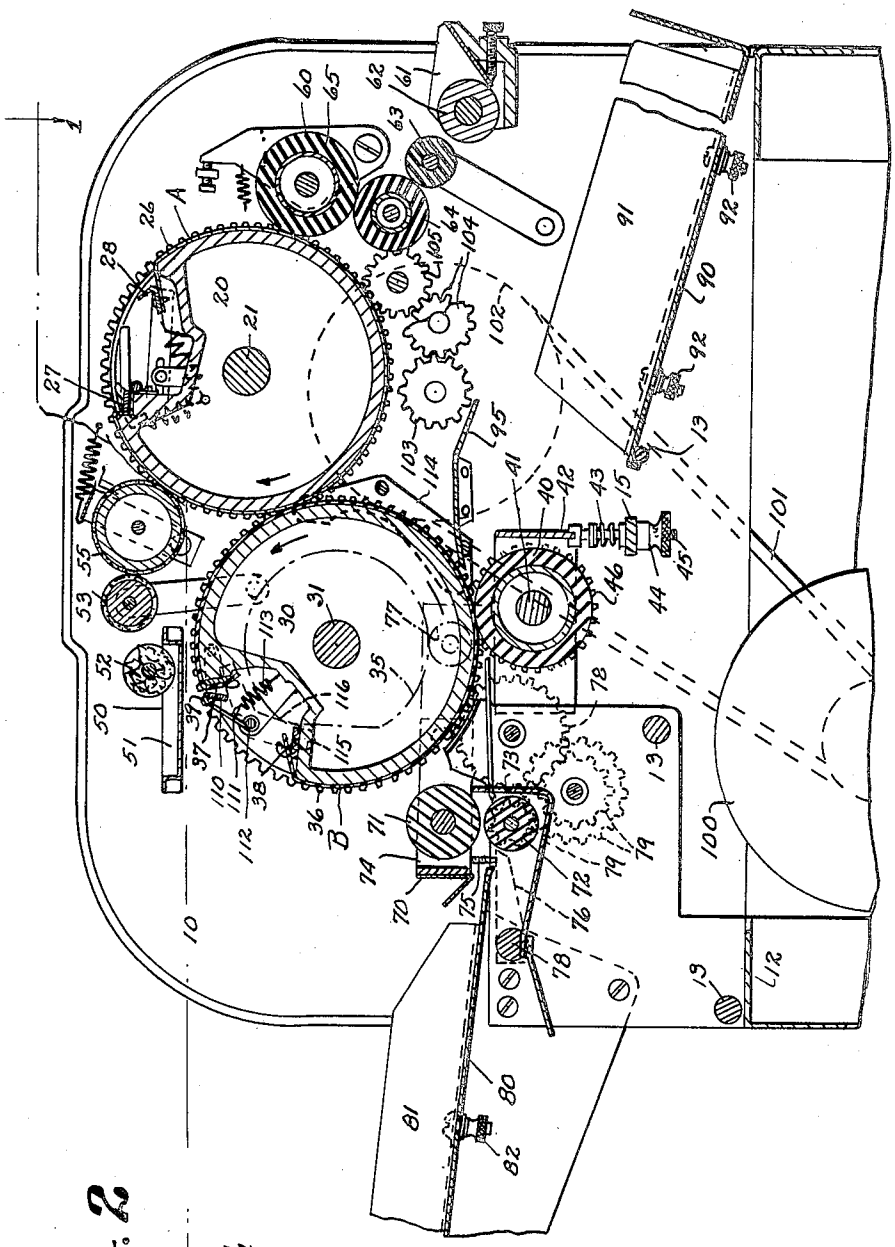

FIG. 2

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SYSTEM OF SETTING PAPER POSITIONING PARTS ON A PRINTING MACHINE

Filed Oct. 22, 1945 6 Sheets-Sheet 3

FIG. 3

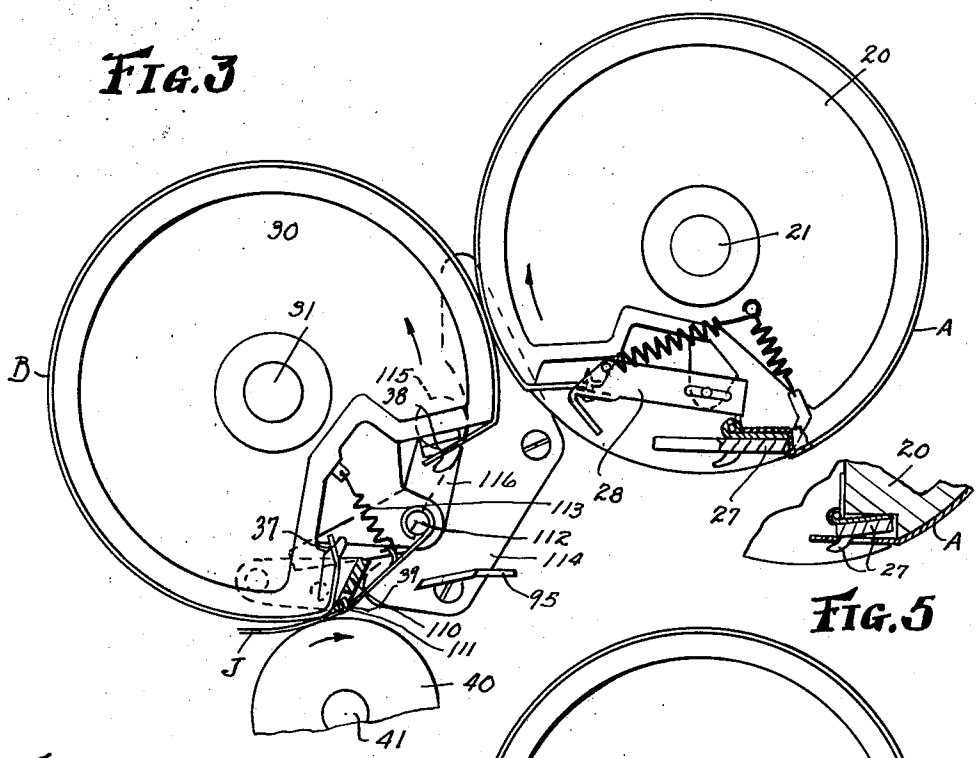
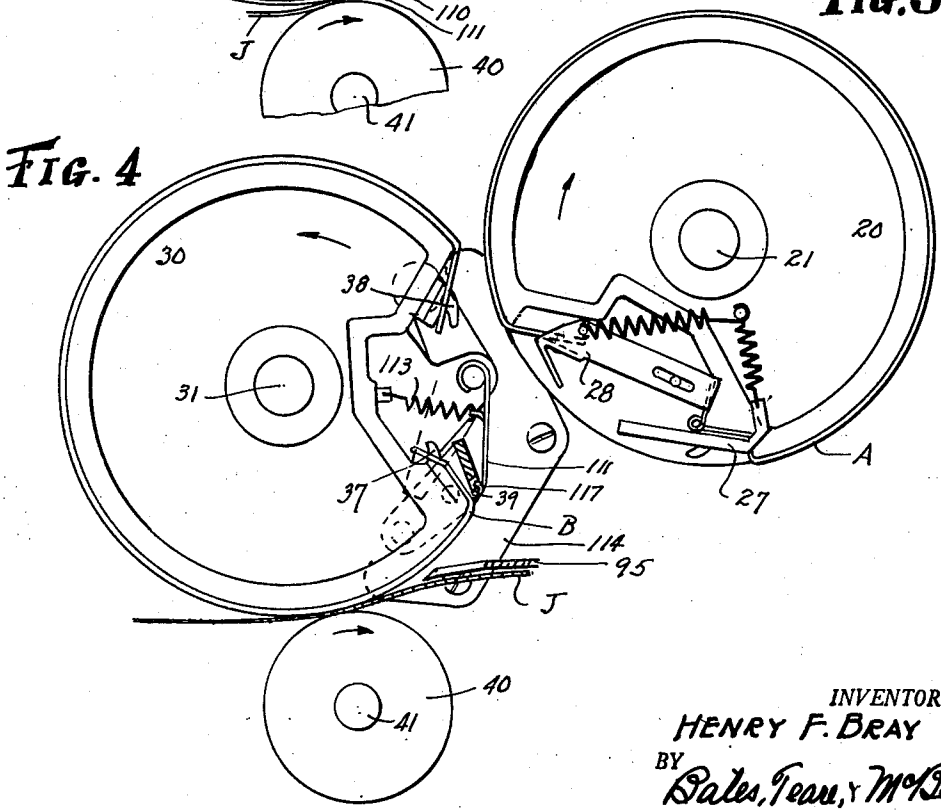


FIG. 5

FIG. 4



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SYSTEM OF SETTING PAPER POSITIONING PARTS ON A PRINTING MACHINE

Filed Oct. 22, 1945 6 Sheets-Sheet 4

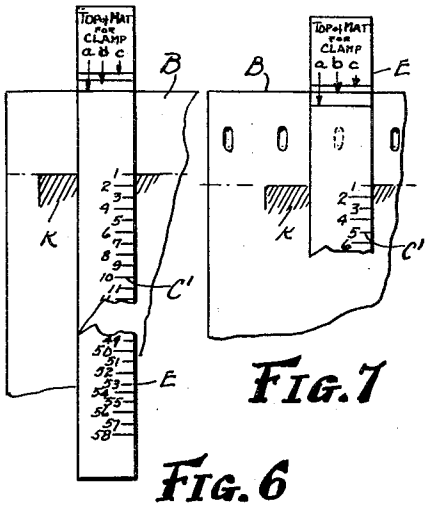

FIG. 7

FIG. 6

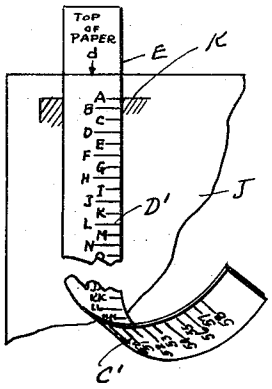

FIG. 8

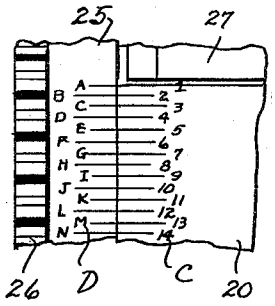

FIG. 9

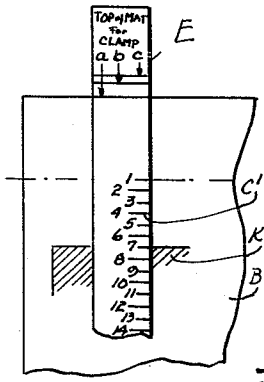

FIG. 11

FIG. 10

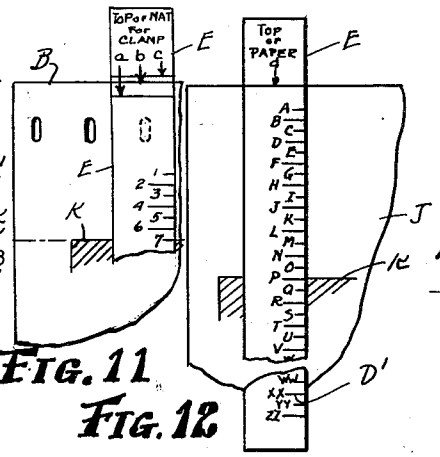

FIG. 12

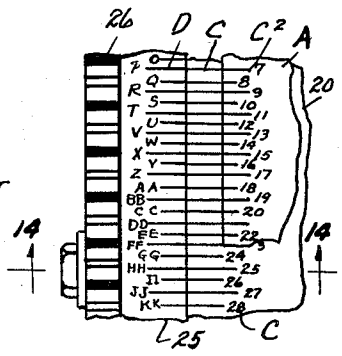

FIG. 13

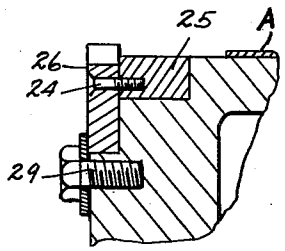

FIG. 14

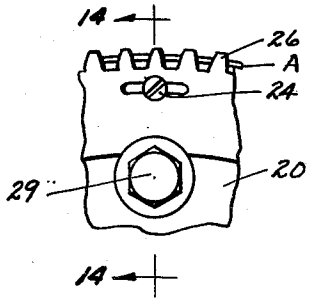

FIG. 15

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SYSTEM OF SETTING PAPER POSITIONING PARTS ON A PRINTING MACHINE

Filed Oct. 22, 1945 6 Sheets-Sheet 5

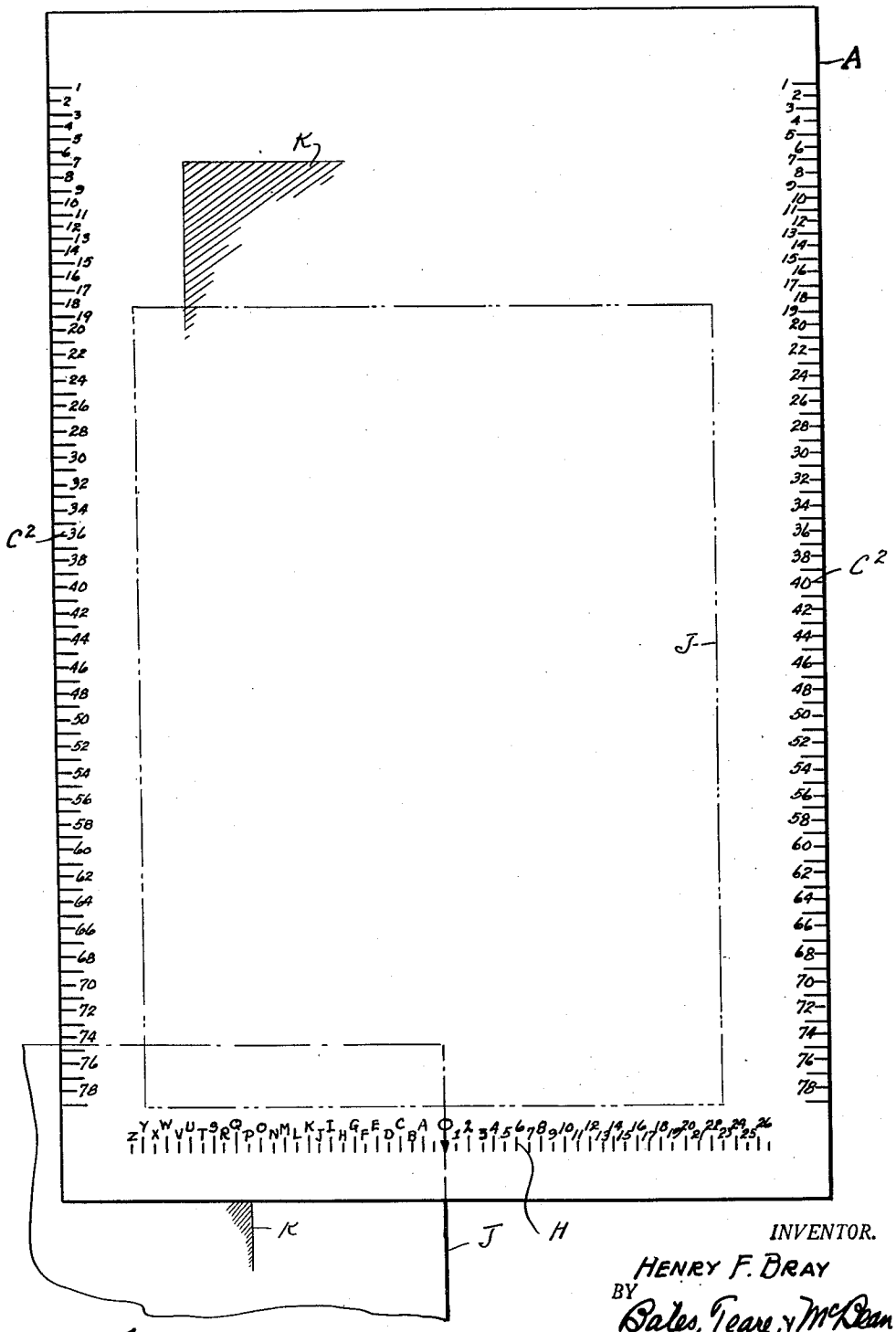

FIG. 16

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SYSTEM OF SETTING PAPER POSITIONING PARTS ON A PRINTING MACHINE

Filed Oct. 22, 1945 6 Sheets-Sheet 6

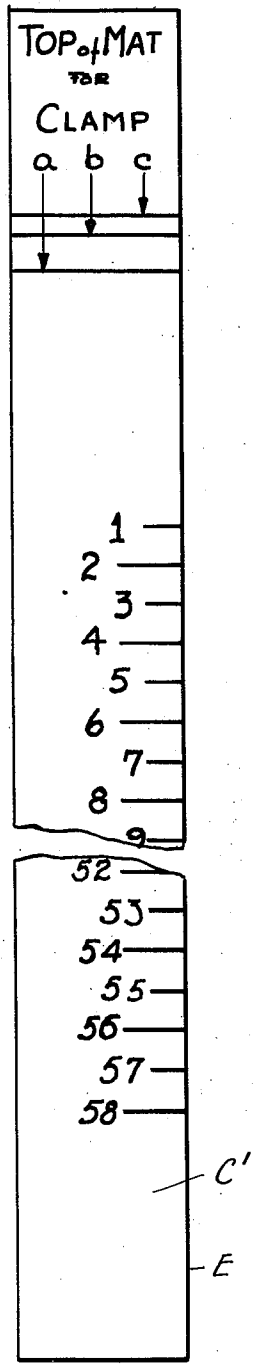

FIG. 17

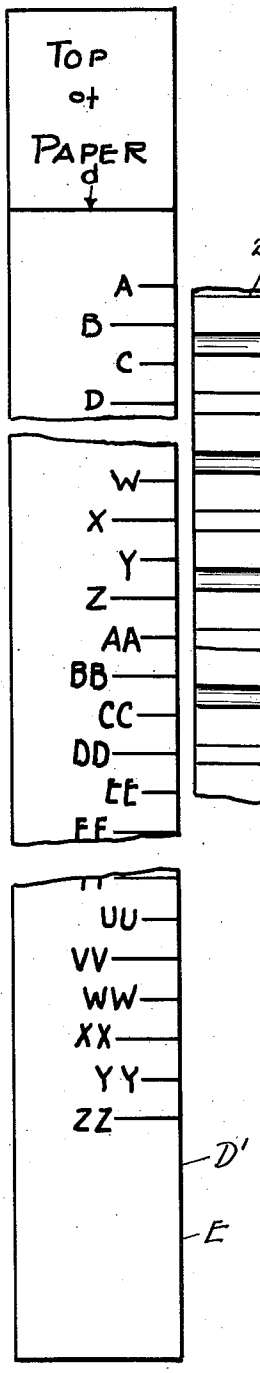

FIG. 18

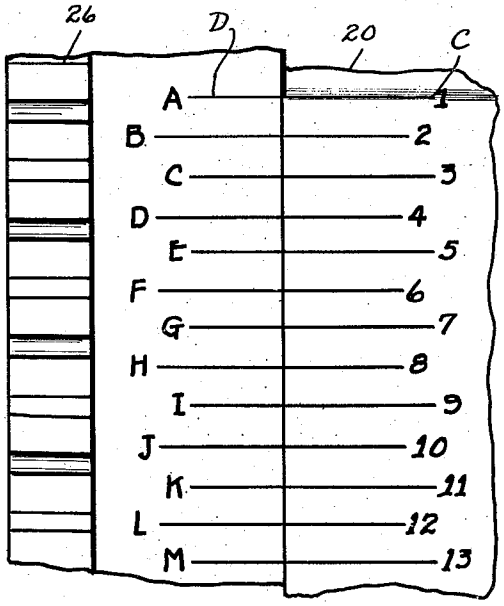

FIG. 19

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Patented July 25, 1950 2,516,613

UNITED STATES PATENT OFFICE

2,516,613

SYSTEM OF SETTING PAPER POSITIONING PARTS ON A PRINTING MACHINE

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Application October 22, 1945, Serial No. 623,765

6 Claims. (Cl. 101—217)

1

This invention relates to rotary planographic printing machines and its primary object is to provide simple means for enabling the quick and accurate setting of those parts of such machines which control the position of the paper, to cause the image to be printed in the desired location on the paper sheet.

As images on planographic master sheets are frequently in a different relative location from that desired on the sheet to be printed, the customary method has been to give an approximate setting to the portions of the machine which control the position of the paper; then print one or more sheets to test the location of the image printed; then readjust the positioning means to change the location of the image on the paper from the trial sheet more nearly to the position desired; take another imprint and again readjust the machine, until finally the proper position is obtained. Thus, it has usually resulted that at least three sheets of paper and frequently more are wasted and considerable time consumed before the machine is ready to start the real printing operation.

The loss of paper is increased in a machine having an automatic paper feed because the operator in feeding a test sheet through a machine under power is very likely to feed two or three sheets before he can stop the machine.

In addition to the loss of paper there is the loss in the life of the master sheet from successive application of ink and repellent and making the imprints on the test sheets. When the machine is used with an inexpensive plate which has a limited life, such as are very popular for short runs, the percentage of loss in the life of the master sheet, by reason of the unnecessary printing of test sheets, is a considerable amount.

The trial and error method have outlined results also in a considerable loss of time of the operator in making the necessary readjustments and tests. This loss is increased in an offset printing machine where the position of the offset cylinder is changed with each readjustment of the paper control, making it necessary to clean the image from the offset blanket every time a shift is made to change the position of the image on the paper, and there is a time loss while the machine makes the necessary preliminary revolutions to build up the successively changed images on the blanket.

Finally, it is desirable in planographic offset printing, when the application of ink and repellent to the master sheet once starts, to make the

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operation as continuous as possible, especially in the case of a comparatively thin paper plate, as uniformity of the operation insures a longer life to the plate and a better impression than where the operation is periodically interrupted to change the position of the image on the offset blanket.

I avoid the above mentioned losses in paper sheets, master-life, and operator's time, and cause the production of more uniform imprints by providing a system of scales related to the master sheet, to the sheets of paper and to the printing machine, enabling the setting of the proper parts at once to cause the image to appear in the desired location on the sheet.

It is also an object of my invention to prevent confusion in the mind of the operator between the scale correlated with the master sheet and that with the paper sheet, or between the scale relating to the drum of the machine which carries the master sheet and the scale relating to the mechanism which controls the position of the paper. I avoid this confusion by providing different characters of scales, the scales for the master sheet and drum being of one character and that for the paper and the adjusting mechanism of another character. For instance, one scale may be numerical and the other scale alphabetical.

The set of two scales of different character relating to the master sheet and paper may if desired be provided on a device independent of each of them, but as it is also an object of my invention to simplify the matter of these scales as much as possible, and to that end I may form the set of scales of different character for the master sheet and paper on a marginal portion of the master sheet itself beyond the printing region, the scales thus being always readily available for use.

Finally, I propose in some installations to utilize the scale down one longitudinal margin of the master sheet as the drum-scale as soon as the master sheet is mounted on the drum, thus avoiding the necessity of placing a special marking on the drum. In such instance while there are two sets of scales each comprising a pair of scales, one scale of each set would be the same scale; that is to say, that subdivisions along the longitudinal edge of the master sheet when mounted on the drum in proximity to its cooperating scale on the machine is both the scale for the master sheet and the scale for the drum.

To illustrate the application of my system of scales to a rotary planographic printing machine, I have chosen as an example the offset machine shown in Patent No. 2,165,231 of F. E. Curtis,

issued July 11, 1939, to my assignee, Addressograph-Multigraph Corporation. Reference is made to that patent for a complete description of that machine, but I will describe briefly its general characteristics so far as is shown in the accompanying drawings.

In the drawings, I have illustrated also the cooperating pair of scales in a form of a separate strip adapted to be laid temporarily over the master sheet and over the sheet of paper, and also in the form of indicia along the margins of the master sheet. My invention and its method of operation will be fully explained in connection with the following description of the disclosure in these drawings.

In the drawings, Fig. 1 is a plan partly broken away of an illustrative offset printing machine embodying my invention; Fig. 2 is a vertical section of such machine in a plane indicated by the line 2—2 on Fig. 1 and disclosing various parts adjusted by means of my scales, the scales, however, not appearing in this figure; Figs. 3 and 4 are enlarged cross sections through the three drums of the offset printing machine showing the parts in two different positions; Fig. 5 is a detail illustrating the use of the clamp on the master drum for holding a different master from that shown in Fig. 3; Figs. 6 to 13 inclusive are diagrams, Fig. 6 showing the application of a scale for a master sheet adapted for mounting in one type of clamp; Fig. 7 indicating the same scale for a master sheet intended for a different type of clamp; Fig. 8 showing the application of another scale to the paper; Fig. 9 showing the scales on the drum and gear without any special relative setting; Fig. 10 showing the scale for the master sheet having one style of clamp and locating the image in a certain region; Fig. 11 is similar to Fig. 10 but for a different master sheet; Fig. 12 showing the scale for the paper locating in another region the desired position for the image; Fig. 13 showing the setting of the drum and gear corresponding to the respective image locations of Figs. 11 and 12; Figs. 14 and 15 are details illustrating the adjustment of the gear on the master drum which controls the position of the offset drum, Fig. 14 being a cross section of line 14—14 of Fig. 15; Fig. 16 is a plan of a master sheet equipped with my sets of scales for positioning the image both longitudinally and laterally; Figs. 17 and 18 are enlarged views partly broken away of opposite faces of a strip which may carry two scales of different character, one for the master sheet and the other for the paper; Fig. 19 is a diagrammatic illustration of indicia on the master drum corresponding to the scale of Fig. 17 and indicia on the paper controlling gear corresponding to the scale of Fig. 18.

Referring first to Figs. 1 to 5 inclusive, and 14 and 15, the frame of the machine shown includes a pair of upright plates 10 and 11 spaced parallel with each other by a suitable base indicated at 12 and various cross rods, some of which are shown at 13. Mounted between the plates are the three main cylinders of the offset printing machine, namely, the master drum 20, the offset drum 30 and the platen drum 40.

The master drum 20 is mounted on a supporting shaft 21, which is mounted in eccentric bearings carried by the frame plates 10 and 11 so that the turning of the shaft bearings may align the master drum 20 with the offset drum 30. The offset drum may be tight or loose on its shaft 31 mounted in the frame plates.

The master drum 20 is provided with a pair of clamps 27 and 28 mounted in the gap in the drum and adapted to engage the leading end and trailing end of the master sheet A. The offset drum is provided with claims 37 and 38 to engage and hold the ends of an offset blanket B, and a paper gripper 39.

The paper gripper 39, as illustrated, is substantially the same as that shown and described in Patent No. 2,165,231. Briefly, this gripper comprises an anvil 110 in the form of a yoke pivoted to the offset drum 20, and a series of gripper fingers 111 which are secured to a rod 112 carried by the offset drum and normally drawn into engagement with the anvil by springs 113. The gripper fingers are moved away from the anvil under control of a cam 114 mounted on the frame plate 10 and which engages a roller 115 carried by a lever 116 secured to one end of the rod 112. When the gripper fingers are open, abutments 117, integral therewith, act as stops to position the forward edge of the sheet fed by the feed rolls 71 and 72.

The platen drum is mounted on a shaft 41 which may be eccentrically mounted in a pivoted yoke 42 supported by springs 43 tending to push the yoke toward the offset drum. These springs 43 encircle rods 45 which extend through a cross bar 15. Suitable adjusting nuts are threaded on rods 45 and act to limit the pressure of the platen toward the offset drum. The three drums 10, 20 and 30 are provided with gears 26, 36 and 46 respectively. These gears mesh with each other in succession, and each gear has a pitch circle corresponding to that of the surface of the drum as equipped for printing. That is to say, the diameter of the pitch circle of a gear 26 is the same as the diameter of the periphery of the master sheet A on the master drum. The pitch circle of the gear 36 is the same as that of the blanket B mounted on the offset drum and the pitch circle of the gear 46 is the same as that of the platen 40. The gears 36 and 46 may be fixed to their respective drums.

The gear 26 is rigid in operation with the drum 20 but is adjustably clamped thereto to change the relation of the offset drum to the master drum. In the embodiment shown it is the relation of this gear 26 with reference to the drum which is indicated by my special system of scales so that the relation of a sheet of paper to be gripped by the offset drum, as shown, or by the platen drum in other forms of the machine with reference to an image carried by the master sheet on the master drum may be made known prior to the feeding of such paper to the machine.

In addition to the paper gripper 39 on the offset drum, the machine is provided with a preliminary sheet control or timing device, designated 70. This control includes upper and lower rotatable feed rolls 71 and 72 and a set of stop fingers 73. The feed roll of 71 is carried in a pivoted yoke 74, while the lower feed roll 72 is continuously rotated. The sheet is fed by hand or automatic mechanism between the separated rolls 71 and 72 until the forward edge of the sheet abuts the stop fingers 73. At the proper time a cam 35 on the offset drum coacts with a roller 77 on the yoke 74, rocking the yoke and causing the upper paper feed roll 71 to come down into engagement with the top of the sheet. This same rocking movement of the yoke causes a pin 75 thereon to engage a rock arm 76 connected with a shaft 78 carrying the stop fingers 73 so that the stop fingers are withdrawn downwardly and thus the gripped sheet is fed into

the open mouth of the gripper 39 on the offset drum.

Associated with the master drum is a repellent applicator system 50 and an inking system 60. As shown the repellent applicator system comprises a trough 51 adapted to hold repellent, a fountain roll 52 therein, a ductor roll 53 shiftably between the fountain roll and a form roll 55 which is spring-pressed against the master sheet. The inking system 60 comprises an ink fountain 61, a fountain roll 62, a ductor roll 63 vibrating between the fountain roll and a distributing roll 64 which coacts with a form roll 65 engaging the master drum.

When the drums are rotated in the printing operation, the master sheet A on the drum 20 received repellent from the repellent form roll 55 and ink from the inking roll 65. The inked image on the master sheet is then delivered in reverse to the blanket B. The reverse image on the blanket then coacts with a sheet of paper passing between the blanket drum and platen roll and is printed as a positive image on the sheet.

The paper may be fed automatically to the gripper on the offset drum, as set out in the patent of F. E. Curtis mentioned, or it may be fed manually to the controlling device 70. For simplicity I have shown herein a manual support for the paper. This consists of a suitable tray or table 80 having side guides 81 adjustable laterally under the control of clamping screws 82 for laterally positioning of the paper as well as to accommodate different widths thereof.

The paper is discharged to pass into a suitable receptacle or receiving tray. This receptacle may include a jogger as shown, for instance in Patent No. 2,341,021 to F. E. Curtis, issued February 8, 1944, to my assignee Addressograph-Multigraph Corporation. However, for simplicity, I have shown a simple receiving tray 90 which has adjustable side guides 91 under the control of clamping screws 92, for laterally positioning sheets or to accommodate different widths of paper.

The paper is forcibly discharged from the offset drum by the gripper mechanism 39. For a complete description of such ejection, reference may be had to Patent No. 2,165,231, heretofore mentioned. The paper is guided from the offset drum or platen (whichever carries the paper grippers) to the receiving tray by any suitable means, such as for instance, the diverting plate 95.

It will be seen that if the lateral guides 81 and 91 on the feeding and receiving trays are adjusted laterally the lateral position of the paper with reference to the image on the master sheet may be altered and thus the lateral position on the image can be located in the desired position on the paper or work sheet. My system of scales, as hereinafter mentioned, provide for positioning the feeding and receiving mechanism laterally.

As indicated in Fig. 2, power is provided by suitable motor 100 connected by a belt 101 to a pulley 102. This pulley operates a pinion 103 which, through compound gears 104, operates a pinion 105 meshing with the drum gear 26. This drum gear delivers motion to the offset drum and platen. The offset drum gear 36 is shown as meshing with a gear 78 which through other gearing 79 drives the lower feed roller 72.

It follows from the above described arrangement of gearing that when the machine is operating, a sheet of paper is placed between the two rollers of a feed roll, such sheet under the control of the cam on the offset drum is gripped between the feed rollers and presented to the cam controlled gripper on the offset drum and is then drawn through the region of printing contact by such gripper and delivered to the receiving tray. Accordingly, the time in each cycle of operation, when the printing takes effect is determined by the position of the offset drum and when that drum is rotated relative to the master drum the location of the image on the sheet being printed is changed with reference to its location on the master sheet. This relative rotation between the master and offset drums is effected by changing the position of the gear 26 with reference to the master drum. As indicated in Figs. 14 and 15 the gear 26 is held in position on the master drum by an overhanging washer locked by a cap screw 29. The loosening of this cap screw allows the shifting of the gear as desired to change the position of the offset drum and paper control with reference to the master drum. This change in position, which has heretofore been effected by guess-work or at best by trial and error, is under my system effected accurately in advance of the printing and according to the position of the image on the master drum and the desired position for such image on the printed sheet. This system I will now describe.

Secured about the gear 26 is a scale D, Figs. 1, 9 and 13, and secured or mounted on the drum 20 adjacent thereto is a coacting scale C. The gear 26 may be provided with a cylindrical flange 25 (Fig. 14) which occupies a rabbeted edge in the drum 20 and which provides a cylindrical surface for carrying the scale D. As shown in Figs. 14 and 15, this flange is adjustable, by reason of the flange being held by screws 24 passing through the slots in the gear, to enable the scale to be accurately adjusted with reference to the gear.

To prevent confusion, I make the two scales C and D of different type of visual character. It is convenient but not necessary that they be of the same spacing. As shown, the indicia on the scale C are numerical and the indicia on the scale D are alphabetical. I provide corresponding scales for measuring the distance down the master sheet where the image is located and the distance down the sheet where it is desired to print such image. Such scales are indicated at C^1 and D^1 respectively in Figs. 17 and 18. The scale C^1, if applied to the top of the master sheet may show, for instance, that the image on the master sheet or mat begins in the region designated "7." Then if a measurement of the paper or work sheet with the scale D^1 of Fig. 18 discloses that the desired position of the beginning of the image on the sheet is located at the index "D," from the top of the sheet, it is only necessary to change the position of the gear 26 on the drum 20 so that the numerical index "7" on the scale D aligns with the letter "D" on the scale C. This results in a partial rotary movement of the offset drum 30 relative to the master drum 20 and causes the gripper and paper control mechanism to be so positioned and located relative to their operating cams that the image comes in the selected position on the printed sheet.

The two scales C^1 and D^1 may, if desired, be opposite faces of a single measuring strip. A

certain blank space is provided at the top of each scale to take care of the non-printing regions. In the case of the master sheet this is the area of the sheet held by the leading end clamp **27**, and in the case of paper or work sheet it is the area held by the gripper **39**, which engages its forward edge. On the paper scale D^1 I have shown this starting point as a line *d*. On the scale for the master sheet (commonly called the mat) I have provided three different starting points as lines *a*, *b* and *c*, designated on the scale by corresponding indicia "*a*," "*b*," and "*c*," to accommodate three different styles of clamps which may be employed on the master drum.

Both scales C^1 and D^1 may be placed on the same rule or strip E. The scale C^1 for measuring the mat is just the same as the same spacing and designations as the corresponding scale C on the drum **20**. The alphabetical scale D^1 on the other face of the strip E for measuring the paper is the same as the scale D on the flange **25** of the gear **26**.

If the mat is measured down from its top edge to the top of the image by the scale C^1 and a measurement is made by the scale D^1 from the top of the sheet of paper to the desired location for the beginning of an image, then when indicia on the drum and gear scales, corresponding to the two measured designations, are in registration, the image will come in the selected position on the paper or work sheet.

The lines on the two scales are conveniently equidistantly spaced and each scale might have any desired designation or indicia. However, to prevent confusion it is very desirable to have the indicia on the two scales of different character. One may naturally be Arabic notation of figures, the other could be Roman notation, but that is complex in the higher numbers, so I prefer alphabetical notation especially as twenty-six characters cover the range ordinarily employed. However, I have indicated additional characters provided by double letters.

The feeding tray **80** is provided with a transverse scale F and the receiving tray **90** with a transverse scale G which scales are available to indicate the position of the corresponding paper guides **81** and **91** on such trays. The position of the image laterally on the sheet is most conveniently selected by placing a sheet of paper over the master sheet and holding the sheets up to the light and shifting the paper in one direction or the other, as, for instance, by the thumbs of the operator's two hands, until the image is properly positioned laterally. To locate that position in a most convenient way I provide a transverse scale H across the bottom of each master sheet beyond the printing region. This scale corresponds in spacing and designations to each of the scales F and G. I make each of these scales start from a zero point in the transverse central region of the master sheet and read in one direction by numerals and in another direction by letters. Now when the sheet of paper held over the image is laterally adjusted until the image is in the proper place, it is a simple matter to read on the scale H on one side the letter corresponding to one vertical edge of the sheet and then on the other side the numeral corresponding to the opposite edge. In Fig. 16 the sheet of paper J happens to have its edges come at designations Y—23 hence it is only necessary to adjust one of the paper guides **81** or **91** to be positioned at Y and the other at **23**

and the result will be that the paper is fed properly positioned laterally to bring the image in the desired lateral location. Likewise the adjustment of the receiving tray enables it to receive such positioned sheet or if such tray is of the jogger type it enables the jogger plates to be adjusted in a manner similar to the guides **91** to true up the received sheets into a proper pile.

As one ordinarily observes the scales F and G, when looking at them from opposite directions, they are located in reversed position at the opposite ends of the machine. Thus, in Fig. 1, the numerals read from the center to the right and the letters from the center to the left, but at the opposite end of the machine the numerals read from the center to the left and the letters from the center to the right. Accordingly, while each scale is readily observed from a person facing it at the end of the machine, the two letter scales longitudinally align with each other and the two numeral scales similarly align with each other.

It will be seen, therefore, that the transverse scales F and G enable the ready positioning of the sheet laterally to bring the image in the proper lateral location, and that the measurement of the top of the image on the mat and the measurement of the desired location for such copy on the printed sheet by the scale C^1 and D^1 and the corresponding adjustment of the gear with reference to the drum **20** enables the proper location of the printed image vertically on the sheet. I can accordingly set the machine in advance to properly position the image and thus avoid the waste of paper and time and deterioration to the master caused by the old "cut and try" method.

As a further simplification of my operation, in place of the scales C^1 and D^1 on the separate strip of paper, I may conveniently print such scales on the master sheet in a region beyond the normal printing area. Thus, as shown in Fig. 16, I have provided a numerical scale C^2 down the vertical edges of the master sheet. This vertical scale takes the place of a separate scale C1 for measuring the image on the master sheet as its location may readily be read directly on the master sheet. For instance, as shown in Fig. 16, the top of the image on the master sheet comes at the numerical "7" on the two scales C^2. To measure the distance of paper I may turn the master sheet crosswise and use the alphabetical portion of the scale H which extends across the bottom thereof to measure the space down from the top of the paper sheet where the image is to start.

To facilitate the use of the scale H to measure the distance from the top of the work sheet to the desired position of the top of the image, I make the distance from the zero mark to the first letter "A" of the alphabetical scale H equal to the distance which must be provided to care for that portion of the work sheet which is held by the paper gripper **39**. For convenience the distance between the lines of the alphabetical scales D, D^1 and H, may be equal to a multiple or fraction of such distance.

It is convenient to have the numerical scale which is located down the vertical edge of the master sheet spaced according to the usual typewriter spacing so that if desired the operator may use it also for purposes of aligning the matter being typed on the master sheet. Such typewriter spacing of one-third of an inch is too large an increment for the desired accurate set-

ting of the gear, hence, I prefer to use a space of one-sixth of an inch which is sufficiently exact for all practical purposes, especially as the operator may readily make a mental calculation of intervening designations, for instance, reading the position as half way between 6 and 7 or in other words 6½ on the master and thus the selected gear to come between 6 and 7 on the drum. The spacing of the transverse scale may be the same as that of the longitudinal scales or different, as desired, of the spacing, though the letter half and numeral half of the transverse scale are preferably equally sub-divided.

As a final simplification of my method, I may arrange to omit the numeral scale C on the drum and use the scale C^2 down the margin of the master sheet as the drum scale. This requires the mounting of the master before other adjustment of the gear is made and preferably locating the edge of the master as near as practicable to the gear.

If the numeral scale is already on the drum the master sheet may be mounted on top of it and its scale take precedence over the scale formed on the drum. However, the spacing being the same, there is no liability of confusion if both markings are visible. It will be observed that if the numeral scale down the vertical edge of the master sheet acts as, or takes the place of the numeral scale on the drum, then while one has two pairs of scales, one for the drum and its gear and the other for the master and the paper sheet, one scale of each pair (in this case the numeral scale) would be the same number. Thus in any case there is in effect two sets of scales, one for the machine and the other for the master and paper, each set comprises two scales of respectively different character.

I claim:

1. In a printing machine having a printing drum, means to secure a master sheet thereon, and a member adjacent to and adjustable relative to the drum to control the up and down position of the text on a sheet to be printed, the combination of a pair of subdivided scales having identical indicia to measure the distance from the top of the master sheet to the top of the text thereon, one scale of said pair being affixed to the drum and extending annularly thereon adjacent said adjustable member, and the other being detached from the machine, and a second pair of subdivided scales having identical indicia differing visibly in character from the indicia of the first named pair of scales to measure the desired distance from the top of the sheet to be printed to the top of the text to be printed thereon, one scale of said last named pair being affixed to said adjustable member and extending annularly relative to the drum parallel with and adjacent to the scale of the first named pair which is attached to the drum, the other scale of said last named pair being detached from the machine, whereby the detached scales of each pair may be used to measure the position of the top of the text relative to the top of the master sheet and the top of the sheet to be printed respectively and said member adjusted relative to said drum in accord with such measurements to thereby control the up and down position of the text on the sheet to be printed.

2. The combination according to claim 1 in which the indicia on one pair of scales is numerical and the indicia on the other pair of scales is alphabetical.

3. In a printing machine having a printing drum having means to secure a master sheet thereon, and a gear adjustable about the axis of the drum to control the up and down position of the text on a sheet to be printed, and means to fix the gear to the drum in an adjusted position, the combination of an annular flange on said gear abutting one end of the drum and forming a continuation of the drum circumference, a pair of identical subdivided scales having identical indicia to measure the distance from the top of the master sheet to the top of the text thereon, one scale of said pair being affixed to the drum and extending circumferentially thereabout adjacent the flange, and the other of said scales being detached from the machine, a second pair of identical subdivided scales having identical indicia differing visibly in character from the indicia of the first named pair of scales to measure the desired distance from the top of the sheet to be printed thereon, one scale of said last named pair being affixed to said flange parallel with and adjacent to the scale of the first named pair which is attached to the drum, the other scale of said last named pair being detached from the machine, whereby the detached scales of each pair may be used to measure the position of the top of the text relative to the top of the master sheet and to the top of the sheet to be printed respectively, and said gear adjusted relative to said drum in accord with such measurements to thereby control the up and down position of the text on the sheet to be printed.

4. In a printing machine having a printing drum having means to secure different types of master sheets thereon, and including an annular member adjacent to and adjustable about the axis of the drum to control the up and down position of the text on a sheet to be printed, the combination of a pair of identically subdivided scales having identical indicia to measure the distance from the top of the master sheet to the top of the text thereon, one scale of said pair being affixed to the drum and extending circumferentially thereabout adjacent said annular member, and the other of said scales being detached from the machine and having differing points of beginning for different types of master sheets, and a second pair of identically subdivided scales having identical indicia differing visibly in character from the indicia of the first named pair of scales to measure the desired distance from the top of the sheet to be printed to the top of the text to be printed thereon, one scale of said last named pair being affixed to said annular member and extending annularly relative to the drum parallel with and adjacent to the scale of the first named pair which is attached to the drum, the other scale of said last named pair being detached from the machine, whereby the detached scales of each pair may be used to measure the position of the top of the text relative to the top of the master sheet and the top of the sheet to be printed respectively and said annular member adjusted relative to said drum in accord with such measurements to thereby control the up and down position of the text on the sheet to be printed.

5. In a printing machine having a master cylinder, means thereon to secure a master sheet on the cylinder with the top thereof in a predetermined position, an offset drum, a platen drum, paper gripping means on one of said drums, a positive geared connection between said cylinder and gripper-carrying drum, said connection in-

cluding an annular member adjacent to and adjustable about the axis of said cylinder to permit the cylinder to be rotated relative said last-named drum to adjust the up and down position of the text on the sheet to be printed, the combination of a pair of subdivided scales carried by the printing machine and extending parallel with and adjacent to each other to indicate respectively the distance from the top of the master sheet to the top of the text thereon and the distance from the top of the text to the top of the sheet to be printed, the former extending circumferentially about and movable with said cylinder adjacent said annular member and the latter scale extending circumferentially about and movable with the said annular member adjacent to and parallel with the former scale, each of said scales having indicia, the indicia on one scale differing visibly in character from the indicia on the other scale, and a second pair of scales detached from the machine to measure respectively the distance from the top of the master sheet to the top of the text and the distance from the top of the text to the top of the sheet to be printed while master sheet and sheet to be printed are removed from the machine, the former having subdivisions and indicia identical with the subdivision and indicia of the first named scale of the

first named pair and the latter having subdivisions and indicia identical with those of the second named scale of such first named pair, whereby the adjustment of the first pair of scales relative to each other in accord with the measurements of the detached scales will control the position of the image on the sheet to be printed prior to the positioning of the master sheet or work sheet in the machine.

6. The combination according to claim 1 in which the indicia on one scale of each pair of scales is numerical and the indicia on the other scale of each pair of scales is alphabetical.

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