May 4, 1926. 1,583,355

E. E. KOTTENBACH

MICROMETER SCALE, OPERATOR'S CARD, AND LAYOUT SHEET FOR PRINTING AND OTHER WORK

Filed March 19, 1920 2 Sheets-Sheet 1

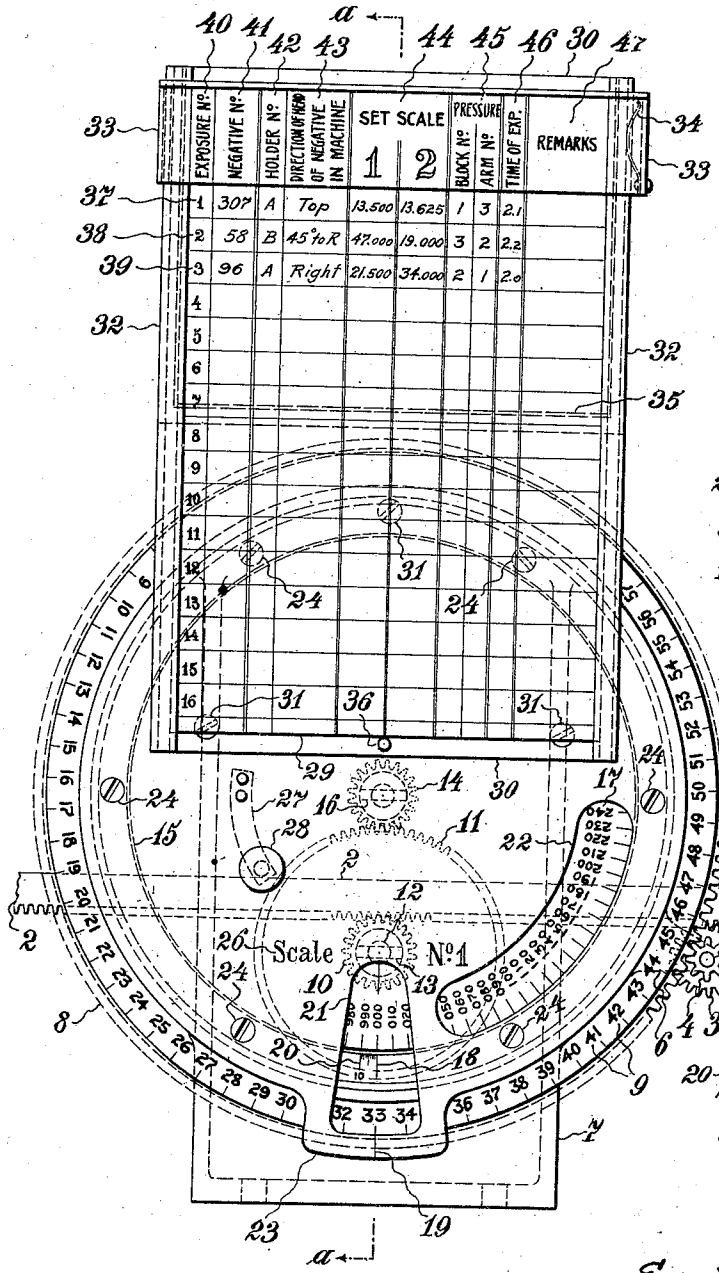


Fig. 1.

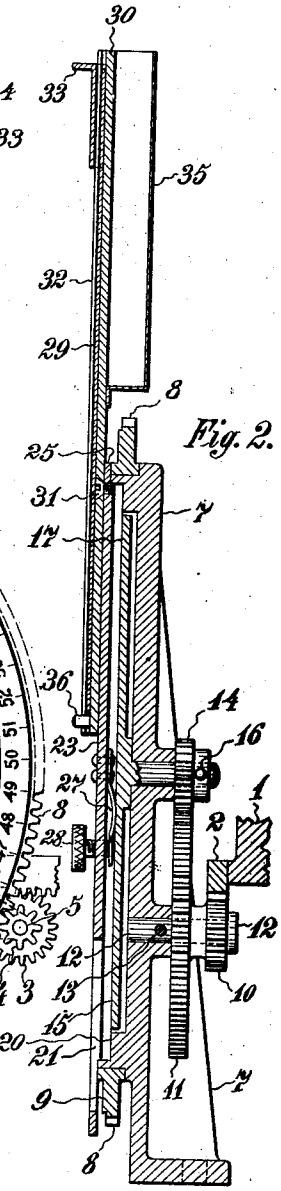


Fig. 2.

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2 Sheets-Sheet 2

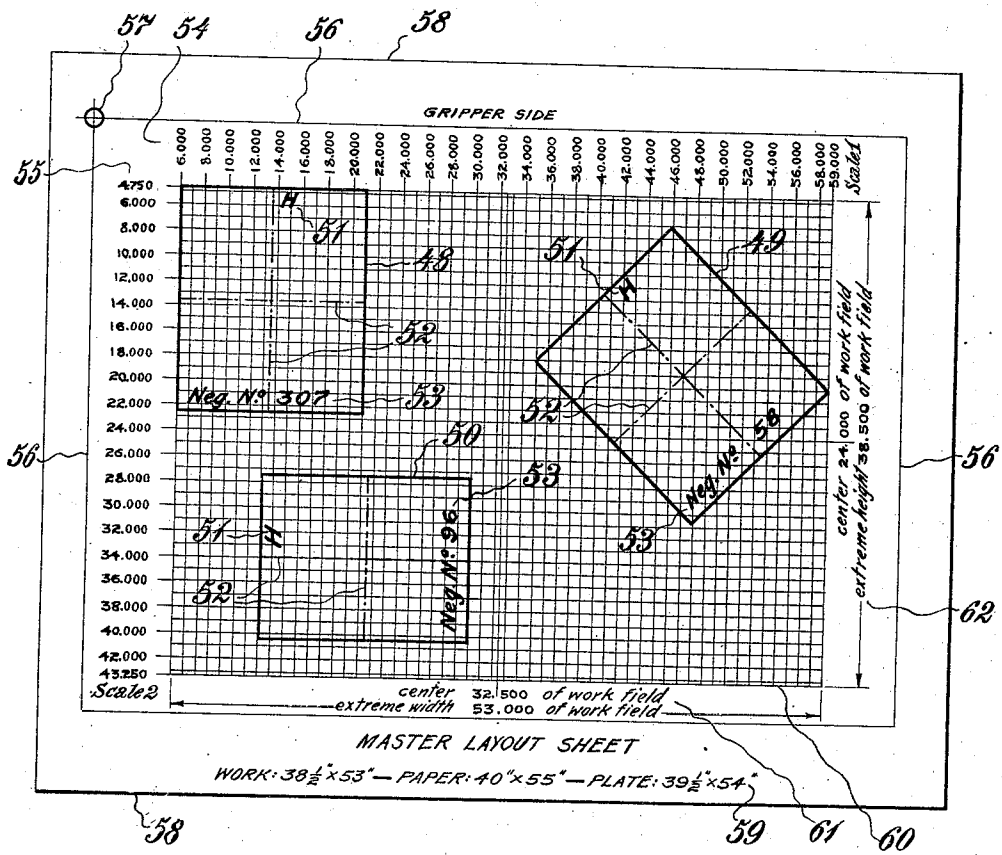


Fig. 3.

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UNITED STATES PATENT OFFICE.

ERNEST E. KOTTENBACH, OF NEW YORK, N. Y.

MICROMETER SCALE, OPERATOR'S CARD, AND LAYOUT SHEET FOR PRINTING AND OTHER WORK.

Application filed March 19, 1920. Serial No. 367,168.

To all whom it may concern:

Be it known that I, ERNEST E. KOTTENBACH, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Micrometer Scales, Operators' Cards, and Layout Sheets for Printing and Other Work, of which the following is a specification.

This invention relates to micrometer scales, operators' cards and layout sheets for printing and other works and while adapted for general application, is found to be of particular utility in the printing arts and especially when used in conjunction with a photo composing machine.

In the photo composing art, it is the practice when preparing for the printing of multicolored pictures to prepare a plurality of plates, each of which is adapted for the printing of one particular color. These plates are usually prepared by a photographic process, generally through contact printing through negatives. It is the practice to mount a plate for movement before a projecting apparatus in which a photographic negative is adapted to be supported in an accurately determined position. When the negative and plate are in readiness, light is projected through the negative and serves to protect the printing on the sensitized face of the plate. Under the usual practice, a plurality of negatives are commonly mounted on a revolving turret so that after the first exposure is made, the turret is revolved so as to bring the second negative into position, whereupon the plate is shifted so as to place the unexposed portion of the plate before the newly positioned negative, whereupon, this unexposed portion of the plate is exposed. These operations are repeated for a plurality of negatives, say, for four different pictures, and until the entire surface of the plate has been exposed through the negatives corresponding to one particular color of the four pictures to be printed. The four negatives under consideration are now removed from the turret and four corresponding negatives are positioned therein, which latter four negatives are for the printing of a different color than the color of the first four negatives.

The essential consideration of these two printing operations is that the second four exposures be accurately positioned on a second plate by which the first plate has been replaced. In other words, in a plurality of these consecutive operations of exposing a plurality of plates for several colors, it is essential that the several exposures on the several plates be in absolutely the same relation to one another. In order to accomplish this result the movements of all the plates with reference to the several negatives to which they are to be exposed must be identical, otherwise proper registration in subsequent printing can not be secured.

The difficulty in practically obtaining the correct registration has confronted the photo composing art from the start, and various expedients have been resorted to to bring about this result. One of the most practical solutions of the problem is embodied in the well known micrometer registration scale used in conjunction with the Huebner-Blistein photo composing machines, wherein a series of dials and scales are employed for gauging the various movements of the several plates to the end that each plate may in turn be subjected to identically the same movements. In the prior art device referred to the scale is intended to calcuate from a zero point at the centre of the plate in an upwardly and downwardly direction, and to the right and to the left. Two series of scales are employed which are colored differently in accordance with the particular direction of movement, either to the right or to the left, upwardly or downwardly.

The Huebner-Blistein registering micrometer has done much toward obtaining proper registration, and if operated with considerable care, will produce excellent results. However, as the scales read back and forth and up and down and are colored in different colors in accordance with the particular direction of movement, the operator will, unless he is very careful, effect incorrect readings as to direction, so that he may read an up direction where a down direction should have been read, or read to the right, instead of to the left.

The object of the present invention is primarily to improve upon the prior art scale in such manner that false readings cannot occur, and this I accomplish by basing the operations of the scale on calculation from a zero point at one corner of the plate instead of at the exact centre thereof. By this arrangement the scale reads in one direction

horizontally, and a second scale of the same proportion, registers vertically. This gives a very simple construction and one on which the operator cannot go wrong.

Another feature of the invention resides in the association with the device of an operator's instruction card adapted to be filled out by a proper authority or authorities and containing definite instructions as to the operation of the scales, so that an operator need only to follow the definite instructions given to obtain absolutely accurate results.

A further feature of the invention is a novel form of layout sheet whereby perfect accuracy in the subsequent operations of obtaining registration may be had.

The accompanying drawings illustrate one practical embodiment of the invention, but the construction therein shown, is to be understood as illustrative, only, and not as defining the limits of the invention.

Figure 1 is a front elevation of a scale embodying the present invention.

Figure 2 is a vertical section on the line 2—2 of Figure 1; and,

Figure 3 illustrates a layout sheet which I have found to give excellent results.

In the accompanying drawings, 1 designates a movable part of a photo printing machine. In practice, this part may conveniently be a part of the plate holder or may be some adjacent part associated and movable therewith, so that as the plate holder is moved the part 1 moves in conjunction with it, whereby the movements of the plate holder are imparted to the part 1. To the part 1, I secure a rack 2, which through longitudinal movement, imparts a rotary movement to a pinion 3 and also simultaneously imparts movement to a pinion 10, the pinion 3 is compounded with a pinion 4 on stud 5 which rotates in a lug 6 forming a part of the housing. The pinion 4 meshes with a gear 8 mounted for rotary movement on the housing or standard 7, on the face of which gear occurs a scale 9. The gears 3, 4, and 8 are so proportioned that the movements of the rack 2 may be read on the scale 9, with reference to a fixed graduation or reading line 19, and in practice, I find it convenient to so lay out the scale 9 that its graduations will correspond to inches of movement on the rack 2. As a result of this construction, the movement of the plate holder may be accurately read in inches on the scale 9.

The pinion 10 which meshes with the rack 2 is compounded with the gear 11 mounted on a spindle 12, secured to housing 7 by a pin 13. Gear 11 meshes with the gear 14 fixed to a disk 15 by a pin 16 and the disk 15 has graduations 17 in tens of thousandths of the unit of the gauge 9. The graduations of the disk 15 may be read with reference to a stationary zero line 18 and stationary graduations 20, which are observable through the window 21, formed in a stationary cover plate 23. Another part of the cover plate is cut away as at 22, to form a second window through which the parts approaching the window 21 may be seen before arriving at the window. The cover plate 23 is suitably fastened to the housing 7 by means of screws 24, and this cover plate also acts to hold the gear 8. For convenience, I preferably position the words "Scale No. 1" on the face of the cover plate 23 for reasons hereinafter manifest.

As the part 1 of the machine is moved, this motion is transmitted through the rack 2 simultaneously to the gear 8, bearing the scale 9 and to the disk 15 bearing the scale 17, so that the inches of movement of the part 1 may be read on the reading line 19, while the decimal parts of the inch may be read from the graduations 17 in conjunction with the scale 20, as a vernier. In this way accurate readings may be had of the movements of the part 1 and said part may be moved into any predetermined position with an accuracy which has heretofore not been obtainable. Thus, if a plate supported in a frame holder carried by the part one has been exposed in several positions, a second plate supported by the same holder may be accurately placed in the same corresponding positions, provided the scale readings of the several positions of the first plate are duplicated for the positioning of the second plate. This duplication of scale readings is facilitated by having only one set of scale readings before the operator. In other words, he reads the scale only in one direction, and is not required to differentiate right or left directions or up or down directions, all on a single scale.

In practice, one of the devices shown in Figs. 1 and 2 is adapted to register movement in a horizontal direction, while another device of the same character is utilized to read vertical movements of the part 1. Thus an operator is simply required to read scale 1 to obtain accurate horizontal placements and to read a similar scale, which may be termed scale 2, for the reading of vertical movement. In order to preclude over travel during the adjusting operations, a leaf spring 27, provided with an adjusting screw 28 is associated with the disk 15, and which is fixedly mounted on the cover plate 23, so as to bear against the disk and frictionally hold the same against over travel.

It is important that in operating the scales to proper position the part 1, the workman should have definite instructions, and to this end, I have provided an operator's instruction card 29, adapted to be contained in the card holder 30 which is suitably fastened on the cover plate 23 by a

screw 31 and on the opposite sides of the card holder are formed guides 32, and when the card 29 is brought into these guides it rests upon the stop pin 36 and is held in position directly before the operator so that he can readily read the same. An index 33 is slidable, vertically, along the guides and is frictionally maintained in any position in which it is placed by a spring 34. On the back of the plate 30 I preferably mount a card holder 35, adapted to contain a plurality of cards to be used for different jobs.

The card 29 is suitably lined and the face of the slide 33 is correspondingly lined and the spaces thereby provided are properly designated, to wit, the first one, 40, is designated "Exposure No."; the second, 41, "Negative No."; the third, 42, "Holder No."; the fourth, 43, "Direction of Head of Negative on Machine"; the fifth, 44, "Set Scale 1 & 2"; the sixth, 45, is designated for the pressures and bears the words, "Block No. and Arm No."; the next, 46, bears the words, "Time of Exposure"; and the line 47 is for "Remarks". On the cards 29 exposures may be numbered consecutively in the first column. Thus for the first exposure reading on line 37, we find that negative number 307 is used with holder number "A", that the head of the negative is at the "top" and that on scale number 1, immediately below the card, the setting is to be 13.500. On the scale for reading the vertical adjustment, namely scale number 2, the setting should be as shown, 13.625, and for the setting of both scales, block number "One" of the arm number "Three" should be employed to give the proper pressures, with the time of exposures 2 minutes and 1 second.

If it be assumed that this first exposure has been made, the slide 33 is brought down to the second exposure 2, and the line 38 of the instruction card will give instructions for the making of the second exposure. In like manner, the line 39 will give instructions for the third exposure, etc., while the several exposures for one particular color are made on a particular plate. Another plate having been associated with the part 1, the operator again starts at the top of the card and duplicates the operations for this plate, and after this plate is finished for a second color, a third plate is produced in the same manner, etc., until the plates for the several colors have all been exposed.

It will be apparent that since all of the plates have been exposed under the same identical conditions, and have been set with absolute accuracy, from the same chart, that the relative position of the several exposures on all of the plates will be identical and proper registration in the printing must naturally result.

In order that the use of the invention as hereinbefore described may be more clearly understood, I have shown in Figure 3 a novel form of master layout sheet, which may be used to advantage with the apparatus described. This master layout sheet bears section lining and the abscissa and ordinates are numbered consecutively from the upper left hand corner of the sheet and not from the centre of the sheet, as has heretofore always been the case. In laying out the positions of the pictures on this master layout sheet, medial-vertical and medial transverse lines are scratched on the negatives 48, 49, 50, as shown in Figure 3, and they are laid on the master sheet in the positions which the artist desires. By then reading the abcissa and ordinates the exact positioning of the centres of the negatives marked by the crossing of the line 52 can be definitely determined, e. g. negative number 307 as shown in Figure 3 the scale reading for scale 1 would be 13.500, while the scale reading for scale 2 would be about 13.625. All is clearly shown in the instruction card 32 of Figure 1. The top of the negative designated "H" and bearing the reference numeral 51 will show whether the negative is positioned in distending relation or otherwise, and this is designated in column 43 of the instruction card. The negative numbers are designated 53 in Figure 3 and may be read in column 41 of the instruction card.

In laying out the negative 50, the same procedure is followed and such procedure is also followed with reference to the negative designated 49 and unmbered "Negative No. 58" in Figure 3. The reading for the centre of the negative on scale 1 will be 47.000, while the reading for scale 2 will be 19.000 as will be apparent from Figure 3 and from column 44 of the instruction chart. The negative is applied 45° to the right as will be noted in column 43, but naturally shows 45° to the left in the layout sheet.

It will be manifest, from the foregoing, that from the artist's layout sheet or the master layout sheet, shown in Figure 3 and used in conjunction therewith, that the desired positioning of the several negatives may be accurately obtained through following the instructions on the card 32, and if these instructions are followed for all of the plates of the different colors, perfect registration must result.

It will be understood that the specific invention described may be modified in formal respects, such as by the substitution of equivalents, and that parts of the complete mechanism described may be used alone, or in other environments, without departing from the spirit or substance of the broad invention, the scope of which is commensurate with the appended claims.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. A micrometer scale for photo composing machines and the like embodying a rotatable dial graduated in units, a second rotatable dial graduated in decimals of the unit, a fixed reading designation associated with the unit dial, a fixed reading graduated designation associated with the decimal dial, a prime mover adapted to be operated by some movable part of the associated machine and proportioned operating connections between the prime mover of the unit and decimal dials whereby the prime mover may be caused to definitely position the movable member and the machine with which it is associated by watching the dials while said member is manipulating.

2. In a micrometer scale for photo composing machines and the like, a combination of a dial graduated in units a second dial graduated with fractional parts of the unit, a fixed reading designation associated with the unit dial, graduated reading designations associated with the fractional unit dial to permit of a vernier reading, means for operating the unit and fractional unit dials in synchronism, and a cover plate provided with a sight opening, through which the vernier reading may be accomplished, and with a second sight opening adjacent the first, through which the operator may see the numbers approaching the first sight opening.

In testimony whereof I have hereunto signed my name.

ERNEST E. KOTTENBACH.