March 24, 1942. K. C. McKIERNAN 2,277,405

REGISTER METHOD AND APPARATUS

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Fig. 1.

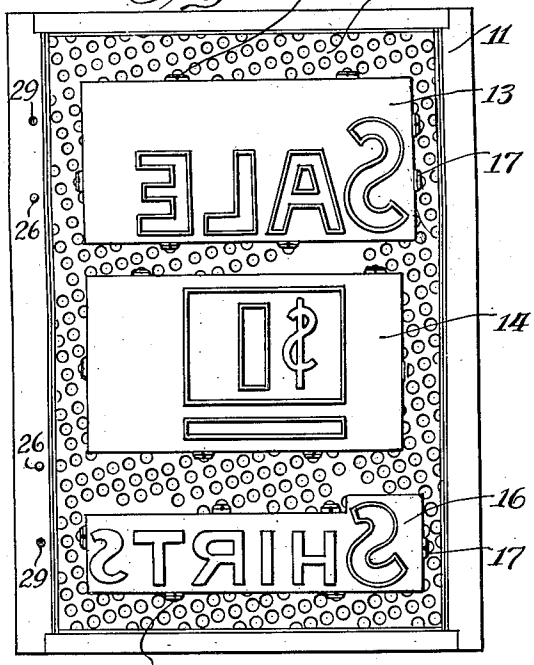


Fig. 2.



Fig. 3.

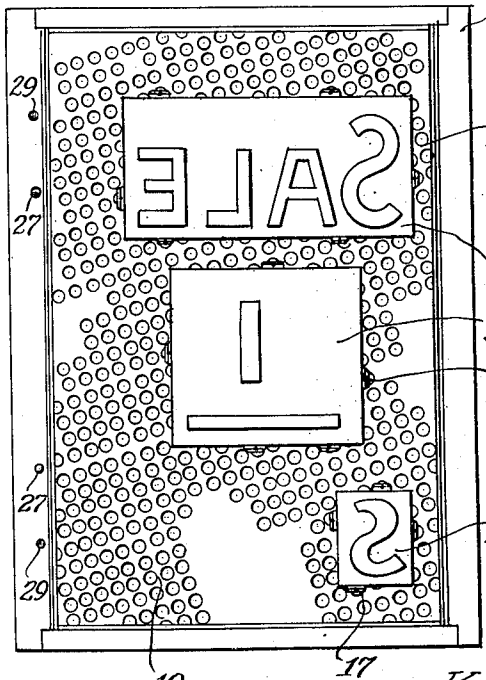
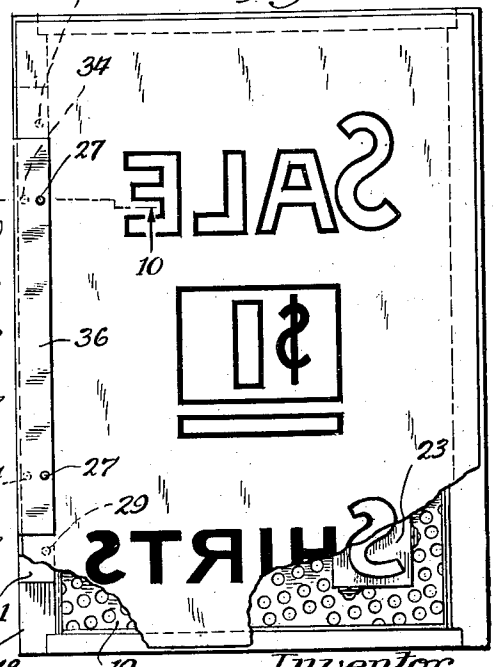


Fig. 4.



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Fig. 5.



Fig. 9.

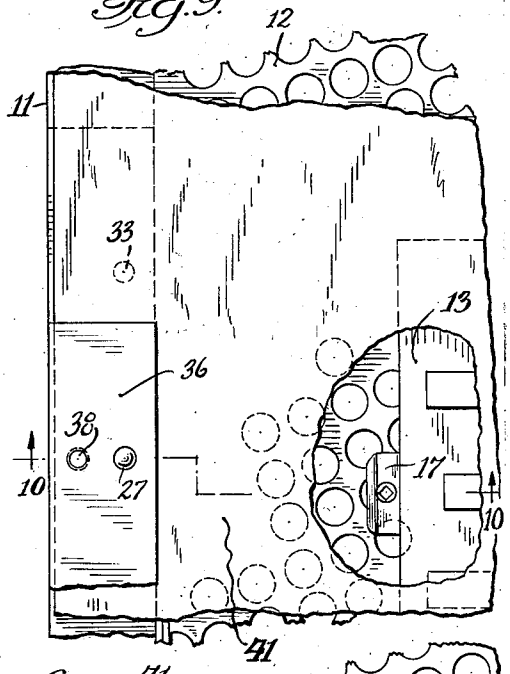


Fig. 6.

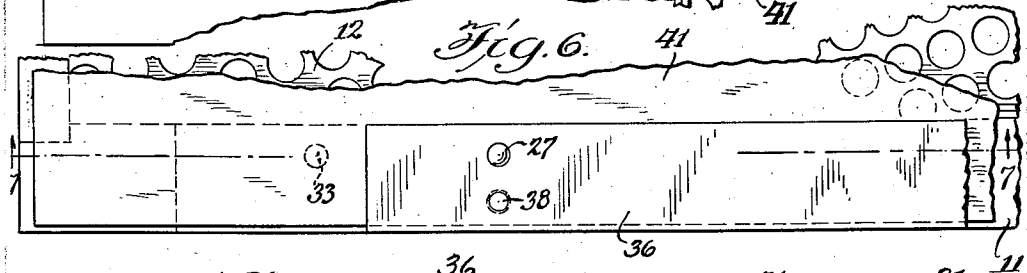


Fig. 7.

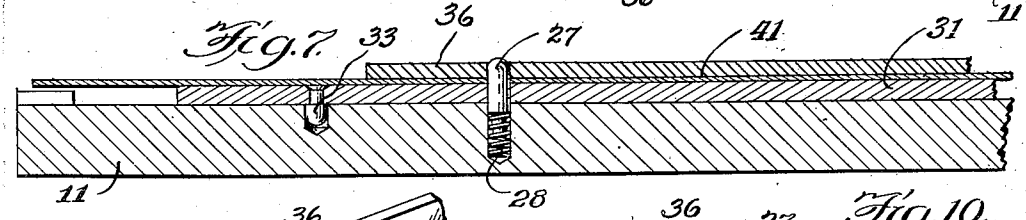


Fig. 8.

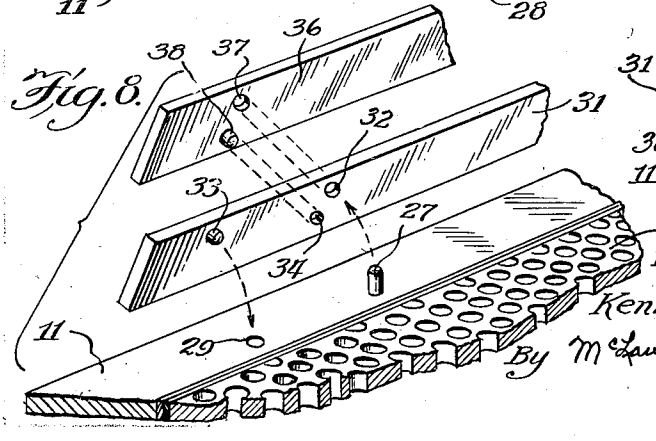
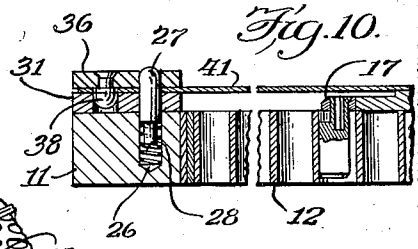


Fig. 10.



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UNITED STATES PATENT OFFICE

2,277,405

REGISTER METHOD AND APPARATUS

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Application September 9, 1938, Serial No. 229,097

6 Claims. (Cl. 101—171)

My invention relates to printing registering methods and apparatus for use therewith.

When matter is printed requiring the separate use of a number of impressions, as, for example, successive applications of different colors to the same substrate, it is essential that the printing surfaces on the successively employed printing media, such as plates, halftones, type material and the like, be placed in register in the base plates so that the successive impressions will appear in proper place on the substrate. Various registering means have been suggested, but, in general, all registering systems heretofore employed require the employment of a so-called make-up press and involve, in essence, the adjustment of plates in the chase, the pulling of a proof, further adjustment of the plates, then taking another proof, and continuing these alternate procedures until register is obtained. As a result, so-called make-up, where it involves registering of successive forms, takes a relatively long period of time and adds to the expense of printed matter of the type requiring more than one impression.

The principal object of my present invention is the provision of a simplified and improved method for registering printing forms.

Another object is the provision of improved but relatively simple equipment to facilitate carrying out the method.

In general, my invention can be carried out when using any of the usual base plates and any of the usual forms of printing plates common to the industry. As an example, I may utilize the usual chase and so-called patent base, and the general features of the invention will be described in connection therewith.

I first make a proof from the primary form, usually black, and provide means for securing the proof sheet in a definite position on another form which is to be used with the black, preferably first oiling the sheet so as to render it substantially transparent. The plates which will be employed in the second impression are placed in approximately the correct position on the base plate, and, by comparing the position of the black proof to the position of the plates on the base plate, I am enabled to adjust their position by means of the usual registering hooks until true register seems to have been obtained. Now, taking another sheet of paper which has been given the first printing impression, I hold it, by the same fastening means referred to hereinabove, over the second form which has already been inked and pull a proof thereof. This proof is usually found to be substantially in register, but, if further adjustment is required, it is accomplished readily, if necessary, by the utilization of the same oiled sheet with which preliminary register was arranged. During this entire time, it is not necessary to employ the proofing press except where impressions are to be made, and, even then, the use of the proofing press is not, strictly speaking, necessary because a competent workman may readily use a planer and mallet to make the impressions sufficiently for registering purposes.

To hold the paper in proper position during the registering operation, I provide means affording a substantially type-high surface on the chase, the paper extending over this type-high surface being perforated accurately and engaged by pins accurately positioned in the chase, fastening means being employed to hold the paper down along the margin of the chase overlying the type-high surface. The details of the method and the equipment employed therewith will be brought out in the following description taken with the accompanying drawings, wherein

Fig. 1 is a plan view of a complete form showing simplified forms of plates supported thereon and adapted for printing with black ink;

Fig. 2 illustrates the black proof before color has been applied thereto;

Fig. 3 shows a form similar to Fig. 1 but with plates adapted to print in color and in register with the black shown in Fig. 2;

Fig. 4 illustrates the position of the black proof of Fig. 2 as it is held in position over the form of Fig. 3 during the registering operation, part of the black proof sheet being broken away to facilitate illustrating the relative position of the color plates and the black proof;

Fig. 5 shows the completed proof in two colors;

Fig. 6 is an enlarged fragmentary plan view showing the paper fastening means employed during the proofing operation;

Fig. 7 is an enlarged vertical sectional view taken on the line 7—7 of Fig. 6;

Fig. 8 is a fragmentary, exploded perspective view showing features of the paper fastening means;

Fig. 9 is an enlarged fragmentary plan view, also showing the paper securing means; and

Fig. 10 is an enlarged, fragmentary, irregular, vertical section taken on the line 10—10 of Fig. 9, looking in the direction of the arrows.

Referring now to the drawings, I show, in Fig. 1, a chase 11 carrying a base plate 12 to which unmounted plates 13, 14 and 16 are secured by

means of register hooks 17. The base plate 12 illustrated is of the so-called patent base type and may be any of the usual patent base materials, such, for example, as Blatchford, Latham, Rouse, or Wessel patent base. The register hooks may be any usual type of register hooks employable with the types of bases referred to.

In Fig. 3, I show a separate chase 18 with a base 19 carrying plates 21, 22 and 23 secured in proper position by the method to be described by means of the usual register hooks 17. The chases 11 and 18 represent two or what may be a series of two or several chases of substantially identical size adapted to be secured on a press in the usual manner.

At one side of each chase I provide a pair of accurately positioned openings 26 adapted to receive register pins 27 held in their extreme upward position by springs 28 (see Figs. 7 and 10). Generally contiguous to the openings 26 are additional openings 29 which conveniently may be identical in cross section with the openings 26. Cooperating with the register pins 27 I provide a paper stock leveling bar 31 with openings 32 of such size as to snugly receive the register pins 27. The bar 31 is so proportioned that its upper surface, when it rests on the chase, is type-high, thus, in effect, affording, when it is in position, a type-high surface on one margin of the chase. The stock leveling bar 31 also carries a dowel pin 33 for each opening 29 in the chase, and is also provided with openings 34 which may be in any suitable position but which, for reasons which will appear hereafter, are conveniently and preferably placed adjacent the openings 32 through which the register pins extend. Cooperating with the stock leveling bar is a paper holding bar 36 with openings 37 into which the register pins 27 extend, and dowel pins 38 extending into openings 34. For convenience, the structure illustrated has been described in the exact manner shown, but, as will be brought out following a description of the method employed, modification in structure may be employed if desired depending upon conditions encountered with particular equipment in use in a particular shop.

In the showing of the invention, the subject-matter being printed from the plates illustrated has been greatly simplified, it being apparent at once to any printer that one would not, except in a very unusual case, expect to utilize a large form for the purpose of producing the relatively simple printed matter illustrated. The simplicity of the form, therefore, is not to be taken as an indication of the character of work that can be registered by my method, since the method may be utilized for substantially any registering job encountered in the shop.

In the simplified printing job suggested by the drawings, the plates 13, 14 and 16 are presumed to be utilized for printing in black, and the first step of the method is to set these plates up in the chase 11 in the position which they will occupy during the actual printing process. A sheet 41, which has previously been punched with holes 42 and 43 occupying the identical positions of the holes 32 and 34 in the stock leveling bar 31 and into which register pins 27 and dowel pins 38 extend, is printed in the manner shown in Fig. 2 to form a black proof. Adequate means is provided to afford a transparent sheet 41 for register purposes, such as by printing directly on transparent or substantially transparent stock, but preferably in most cases by utilizing ordinary opaque paper stock, and oiling it after printing the proof thereon to make it sufficiently transparent so that a plate underlying it may be readily seen.

The plates 21, 22 and 23 in the simplified arrangement shown are utilized for printing in red within the area of printed matter shown in white in the proof 41, that is, within all of the letters in the word "Sale," within the figure 1, and the bar appearing underneath it, and within the first letter "S" in the word "Shirts." The object is to place the plates 21, 22 and 23 in such a position on the form comprising the chase 18 that, when the chase is placed on the printing press and successive impressions are made with the black and red plates, the applied color will be in the exact position desired without any undue overlapping.

The registering pins are first inserted in the chase, the stock leveling bar 31 is then placed in position, and the proof 41 placed over the form with the printed side down and with the pin detents 27 extending through the holes 42 in the proof. The paper holding bar 36 is then placed in position on top of the stock leveling bar 31 with the dowel pins 38 extending through the holes 43 in the paper of the proof and into the openings 34 in the stock leveling bar. By this means, the paper is held in a truly horizontal and fixed position throughout, as illustrated in Fig. 10, it being noted that there will be little or no buckle such as might result in error because at the point where the paper is held by the bars 31 and 36, it is of the same height as in the place where it rests on the plates 21, 22 and 23, that is, it is held type-high.

The make-up man or, as he is usually called in print shops, the stoneman, before or after the proof 41 has been placed in position on the second form, places the plates 21, 22 and 23 in approximately the positions which they will occupy, and by then examining their position through the transparent proof 41 he can determine the adjustments that are to be made in that position to bring about register. At any suitable time, depending somewhat upon the nature of the work, the register hooks 17 are placed in position around the plates in the form and, when he believes that he has the plates accurately positioned, he can tighten the register hooks and mount the plates firmly on the base 19. During the time that he is adjusting the position of the color plates, he can raise the proof 41 in any way that suits his convenience, being sure that when he again places it in position down on the color plates it will occupy the identical position which it occupied when he first started. By this means, particularly on relatively simple work, he can usually establish true register without the necessity of taking a proof at all. When he believes he has the plates in register, however, he takes a second black proof, inks the color plates, and then, holding the proof in position by the use of the register pins 27 and holes 42 in the proof, he makes his color proof, either employing a proofing press or, if he is sufficiently skillful, a planer and mallet. If he should employ a proofing press, he removes the paper holding bar 37 but leaves the stock leveling bar 31 in position as this will not affect the proofing operation in any way. While the register pins 27 normally extend above the type surface, during a printing operation the springs 28 are compressed and the pins 27 are pushed down out of the way. If, after making the color proof, the make-up man finds that there is any little error in the

position of the plates 21, 22 or 23, this error is very simply corrected, utilizing the transparent proof sheet again if necessary and employing the final proof as a guide.

A salient feature of my invention consists in holding the paper on which the proof is made in the identical position on the successive forms on which successive groups of plates, type matter, or the like are employed. The chases are secured on the press in the usual manner and, since the plates are in the same relative positions on the various chases, register, having been established by means other than the position which the chase occupies on the press, will still be accurate when the chases are secured in their proper position on the press. This is a factor to be considered, because, in ordinary proofing operations, a proofing press is employed and is tied up for a considerable time due to the fact that the position of the chase on the proofing press is the known position from which register is established, and even when I employ a proofing press I establish a register without the necessity of giving any consideration to the position which the chase occupies on the press. This alone is a time saver, results in releasing a proofing press at will as the chase may be removed and replaced without affecting the register and, in the hands of skilled operators, renders it possible to register a set of forms for a color printing job in about half the time usually required.

From the structure standpoint, the apparatus shown, more specifically the depressible register pins, is also of importance. Those skilled in the art will appreciate the time-saving value of this arrangement, but, for further understanding, illustrative operations will be considered. Normally, when forms are being made up and proofs taken on a proofing press, it is essential that the forms be secured in accurate position on the press and that the guides on the proofing press also be properly adjusted. When a proof is taken employing my invention, however, the only requirement is that the form be introduced into the press in a suitable manner to make an impression. The register pins determine the position of the paper on each form of a series of forms, and during the actual taking of the proof, the register pins are depressed to the upper level of the stock leveling bar, the paper holding bar 36, of course, being removed during the time that the proof is being drawn. At the time the register pins are depressed, however, the paper is held in position by the cylinder or whatever impression means is provided on the particular press employed.

It is perfectly clear that, when the chases are identical, and occupy the same position on a given press, when successive impressions are made employing the same press, no adjustment at all is necessary to secure proper register on the press if the register has been properly carried out in accordance with my method. At times, however, it is preferable to employ a number of presses, one for each form of a series of forms, and, in this case, the forms will not necessarily occupy identical positions. However, since the forms themselves are in true register, the only adjustment required is to set the guides properly, an operation which is very easily carried out by the operators of the presses. In other words, having registered the forms accurately, it still may be necessary to adjust the presses in register, an operation, however, which is required no matter how register is obtained.

My invention requires for best results the provision of proofing paper especially provided with holes corresponding to the fastening means provided on the chases for use in carrying out the registering method. It is possible, however, to employ unperforated proofing paper when utilizing the specific form of apparatus shown, since the register pins and dowel pins in entering the holes provided for them will serve to perforate the margin of the paper. If, in taking the first proof, the paper be so perforated, and then mounted over successive forms in accurate position by the use of the same holes, fairly good results may be obtained. I prefer, however, to utilize previously perforated proof paper because I find that more consistently accurate results are obtained by its use.

Some considerable modification of my invention is permitted, such as in the number of register pins employed and the arrangement of the dowel pins and the like. I find that, by the use of the dowel pins, the insertion of the register pins through the two bars provided is simplified. I may, if desired, utilize a permanent type-high surface on the chase and secure the depressible register pins in such a manner as to prevent their removal. The type-high surface on the chase, however, in the usual form of presses now employed, would receive ink, and this ink would make an impression upon the paper stock if it should extend to the margin of the chase. Furthermore, if the type-high surface on the chase did not make an impression on the paper stock being printed, ink would gradually accumulate on this surface and this would require frequent cleaning. It is possible to so modify presses as to prevent the inking of a type-high surface on the chase margin, but this would require modifications which are not necessary when the removable stock leveling bar such as I illustrate is employed. In line with this consideration, it may be noted that, even though the type-high surface may make an impression on the proof, such an impression is of no consequence and will not affect that portion of the proof which is used in the registering process.

The substrate or stock on which the proof is made may, in its simplest form, as described, comprise ordinary opaque paper stock which may be oiled after the first proof is taken to render it transparent. However, various transparent materials may be employed, including permanent or semi-permanent sheets formed of such materials as those going into photographic films, etc., and, by proper selection of such material and the use of suitable cleaning fluids, the ink may be removed, and the proofing sheet used several times. The cost involved in using a new sheet for each proof is so relatively small, however, that the simple expedient of discarding used sheets will be found preferable to most printers.

I have described my invention in detail for the benefit of those skilled in the art, but its scope is defined in the appended claims.

What I claim as new and desire to protect by Letters Patent of the United States is:

1. Registering apparatus of the character described, comprising a chase adapted to support type-high printing units, means providing a type-high surface on the margin of said chase, a plurality of registering pins and spring means yieldingly supporting said registering pins to project above said surface, said pins adapted to be depressed to the level of said surface when pressure is applied thereto.

2. Apparatus as defined in claim 1, including a separate paper holding bar having openings into which said registering pins are adapted to project, whereby a proof taken from a first form may be held firmly over a second form during adjustment for register of plates and the like forming a part of said second form.

3. The registering method for the purpose described, comprising supporting a plurality of register pins in accurate positions in a chase comprising part of a form, forming opens corresponding to the positions of said pins in a proof sheet, printing a proof of said first form while holding said proof sheet in position with said pins projecting through said openings, supporting said pins in an identical position on a second form, securing said proof sheet on the second form with the said register pins projecting through said openings in the proof sheet, and adjusting the position of plates and the like on said second form in accordance with the position of the printed proof on said proof sheet.

4. The method defined in claim 3, wherein said proof sheet is rendered transparent to facilitate matching printed matter thereon with plates and the like on the second form.

5. The method of registering plates on a plurality of forms, each comprising a chase and base plate lower than type height, wherein the plates on said plurality of forms are to be printed successively on the same stock as in color printing, which comprises first securing the plates on one form in positions which they will occupy during printing, supporting a plurality of register pins on said form in predetermined positions, inking said form, placing a sheet of paper print stock over said form with the pins projecting through apertures therein, whereby to hold said paper in fixed position, taking an impression on said paper sheet, treating said sheet to render it transparent, inserting register pins in a second form at positions identical with the positions occupied by the pins in the first-mentioned form, supporting the said paper over said second form with the register pins extending through the apertures in said paper, whereby the paper occupies the identical position on the second form which it occupied on the first-mentioned form, and adjusting the position of plates on the second form, utilizing the proof on the transparentized sheet of paper as a guide.

6. The method of registering plates on a plurality of forms, each comprising a chase and base plate lower than type height, wherein the plates on said plurality of forms are to be printed successively on the same stock as in color printing, which comprises first securing the plates on one form in positions which they will occupy during printing, supporting a plurality of register pins on said form in predetermined positions, inking said form, placing a sheet of paper print stock over said form with the pins projecting through apertures therein, whereby to hold said paper in fixed position, taking an impression on said paper sheet, treating said sheet to render it transparent, inserting register pins in a second form at positions identical with the positions occupied by the pins in the first-mentioned form, supporting the said paper over said second form with the register pins extending through the apertures in said paper, whereby the paper occupies the identical position on the second form which it occupied on the first-mentioned form, adjusting the position of plates on the second form, utilizing the proof on the transparentized sheet of paper as a guide, and printing on a fresh sheet of paper with the two forms to form a proof, supporting the sheet of paper by means of the registering pins while supporting the registering pins so that they do not permanently project above the type-high surface of the plates.

KENNETH G. McKIERNAN.