

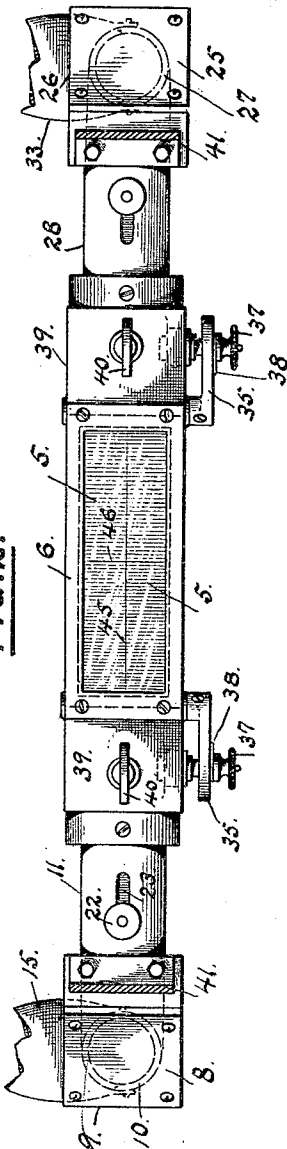
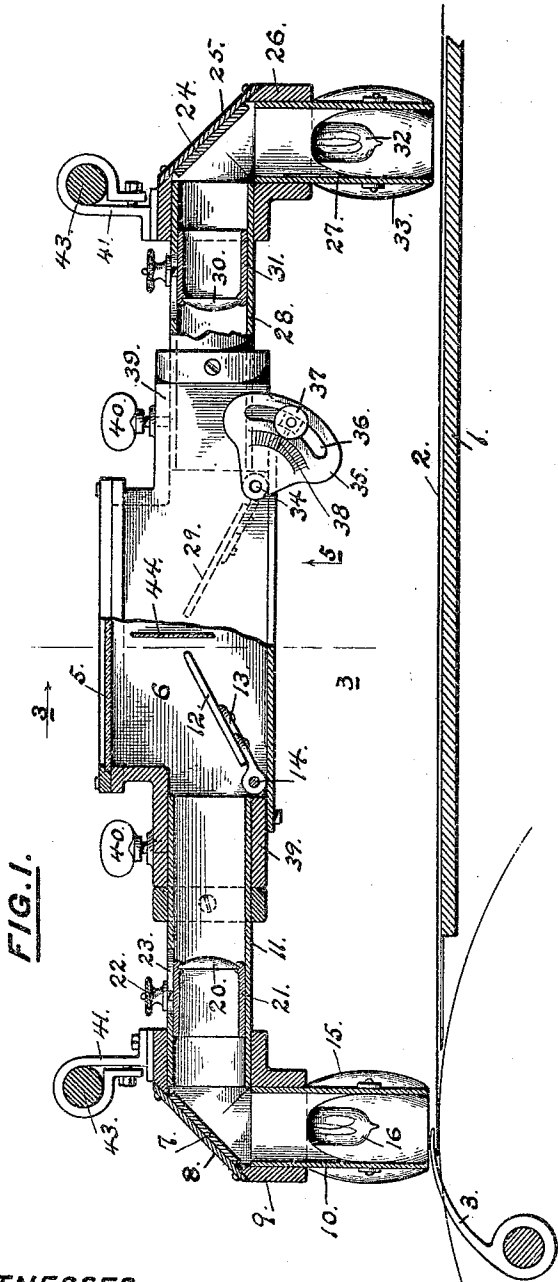
DRAFTSMAN.

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W. J. MAIN.
APPARATUS FOR REGISTERING SHEETS.
APPLICATION FILED JAN. 26, 1909.

985,425.

Patented Feb. 28, 1911.
2 SHEETS-SHEET 1.



WITNESSES.

W. R. Smith
A. White

INVENTOR.

William J. Main
by Philip P. Sawyer, Rice & Kennedy

ATT'YS.

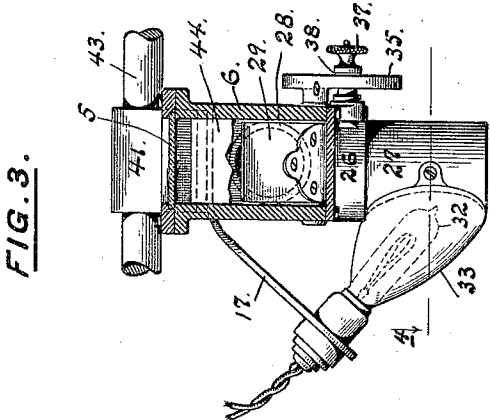
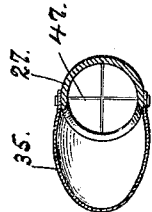
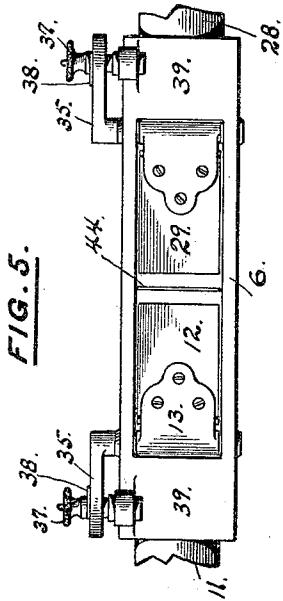
88. OPTIC
Drawing Instruments.

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

WILLIAM J. MAIN, OF WESTPORT, CONNECTICUT, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO R. HOE AND CO., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

APPARATUS FOR REGISTERING SHEETS.

985,425.

Specification of Letters Patent.

Patented Feb. 28, 1911.

Application filed January 26, 1909. Serial No. 474,298.

To all whom it may concern:

Be it known that I, WILLIAM J. MAIN, a citizen of the United States, residing at Westport, county of Fairfield, and State of Connecticut, have invented certain new and useful Improvements in Apparatus for Registering Sheets, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in apparatus for registering sheets.

In registering sheets, in order to enable subsequent operations, such as printing, folding, etc., to be performed upon them, it is customary, in certain classes of work, to register the sheet by gages which operate on the front or side edge of the sheet or both edges. In certain other classes of work, the register is effected by means of register marks on the sheets, these marks being brought into register with registering devices mounted on the sheet support. The register obtained by the use of registering devices and marks upon the sheet is, as a rule, much more accurate than that which can be obtained from what may be termed "edge register", but it is much slower and requires careful and accurate placing of the sheets in position by the operator. As a rule, the register marks on the sheet are as widely separated as possible, being usually located on opposite edges or ends of the sheet. Where the sheets are large this requires the operator, in registering, to look at two points in succession which requires time and reduces the speed of the feeding operation. In some cases, also, where very large sheets are to be fed, two operators, one for each register mark, are required.

The object of the invention is to produce an improved registering apparatus which enables the registration of sheets to be effected by observing the position of the image of a sheet, the image being reflected upon a suitable receiver.

With this and other objects not specifically referred to in view, the invention consists in certain constructions and in certain parts, improvements and combinations, as will be hereinafter fully described and then specifically pointed out.

In the accompanying drawings—Figure 1 is a side elevation, partly in section, of a construction embodying the invention. Fig. 2 is a plan view. Fig. 3 is a section on the line 3—3 of Fig. 1. Fig. 4 is a detail showing a modified form of part of the apparatus. Fig. 5 is a plan view of the receiver box.

Referring to the drawings which illustrate one embodiment of the invention, 1 indicates a sheet support which may be of any suitable character, such, for instance, as a table.

The sheet to be registered is indicated at 2, the sheet, after the registration is effected, being taken by any suitable agency, such, for instance, as grippers 3, diagrammatically indicated as being mounted on a cylinder 4, also diagrammatically indicated.

Constructions embodying the invention will include a receiver upon which the image of the sheet, or certain parts of it, is thrown. This receiver may be of any suitable construction, and may be mounted in varying ways. In the particular construction shown, this receiver comprises a ground glass plate 5 mounted in a receiver box 6. Constructions embodying the invention will also include suitable image reflecting means, and, in the best constructions, these reflecting means will be such as to throw upon the receiver independent images of different parts of the sheet. The image reflecting means illustrated reflects the images of parts of the ends of the sheet, that for one end including an angularly disposed mirror, as 7, mounted upon a backing plate 8, this plate being mounted on a casting 9. This casting, in the particular construction illustrated, affords a bearing for a tube consisting of two sections, 10, 11.

Coöperating with the mirror 7 is another mirror 12, this mirror being shown as supported on a bracket 13 mounted on a shaft 14 journaled in bearings in the receiver box. In the best constructions, and as shown, this mirror 12, when employed, will be adjustable so as to properly throw the image reflected upon it by the mirror 7 on the receiver. The part 10 of the tube, when employed, should be so arranged as to be directly over that part of the sheet the image

of which is to be reflected on the receiver. The part of the sheet the image of which is thus reflected may bear register marks, or, under some circumstances, a portion of a design upon the sheet reflected may be utilized for registering purposes. In the best constructions, means will be employed for strongly lighting that part of the sheet the image of which is to be thus reflected.

As shown, one side of the part 10 of the tube is cut away and there is secured to it a reflector 15 which contains an electric lamp 16, this lamp being supported in a holder 17.

The apparatus may include devices for magnifying the reflected image. While the particular construction of these devices, when employed, may vary, as shown they comprise a magnifying lens, as 20, mounted in a lens tube 21 adjustably secured in the part 11 of the tube 10, 11, by means of a nut and clamp screw 22, the part 11 being provided with a slot 23 to enable the adjustment to be effected. The means employed for reflecting the other image is a duplicate of that already described, that is to say, it includes an angularly disposed mirror 24 mounted upon a backing plate 25 supported in a bearing 26 which also supports a tube comprising two parts 27, 28. The mirror co-operating with the mirror 24 is shown in dotted lines 29 in Fig. 1, and a magnifying lens 30 is shown mounted in an adjustable lens tube 31 located in the part 28 of the tube. A lighting apparatus comprising a light 32 and a reflector 33 is also employed. The mirror 29 is shown as mounted on a shaft 34 mounted in the receiver box.

In the best constructions and as shown, the mirrors 12 and 29 will be made adjustable to properly position images upon the receiver. While this may be accomplished in various ways, in the construction illustrated, each of the shafts 14 and 34 is provided with a graduated adjusting plate 35 slotted at 36 and held in place by a thumb screw 37. A suitable pointer, as 38, may be provided which coöperates with the graduation marks on the plate.

In the best constructions, and as shown, the apparatus will be adjustable for use with sheets of different lengths, and, furthermore, the construction will be such that the position of the receiver may be adjusted to suit the position of the operator. As illustrated, the receiver box is provided with bearings 39 which receive the tubes 11 and 28, these bearings being provided with holding screws 40. The bearings 39 can be elongated so as to permit the tubes to be moved therein, thereby increasing the length of the apparatus.

The apparatus may be supported in any suitable way. As shown, the bearings 9 and 26 have strap hangers 41 connected thereto,

these hangers being in turn supported by rods 43 located over the sheet support and mounted in any suitable way on the machine frame. If desired, a screen, as 44, may be mounted in the receiver box to prevent the light reflected through either the tube 11 or 28 from interfering with the light reflected through the other tube. It will of course be understood that the reflecting means employed should, to obtain the best results, be so arranged as to bring into relatively close relation independent reflected images of relatively widely separated parts of the sheet. Further while excellent results may be obtained in most cases by reflecting independent images of two widely separated parts of the sheet, the apparatus may be constructed to reflect more than two parts, if desired.

The registration of the sheet may be determined in various ways. For instance, the receiver may be provided with gage marks, as 45, 46, the apparatus being so adjusted that when the reflection of the gage marks on the sheet, or parts of the design on the sheet, are in proper relation with the marks 45, 46, the operator will know that the sheet is in register. Another way for determining the registration of the sheet is to provide the tubes 10 and 27 with crossed-wires, as 47, as shown in the detail, Fig. 4, the sheet being registered by so positioning it that the reflection of the registry marks thereon will fall in proper relation to the reflection of the crossed wires. Various other ways which will suggest themselves to those skilled in the art may be employed to determine when the sheets are in register.

The operation of the apparatus will be obvious from the description heretofore given. By properly locating the receiver with respect to the line of vision of the operator, the position of the sheets can be readily determined by him at a single glance, as the registry marks should be reflected close together upon the receiver.

Changes and variations may be made in the specific construction by which the invention is carried into effect. The invention is not, therefore, to be confined to the particular construction herein shown and described.

What is claimed is;—

1. In a registering apparatus, the combination with a sheet support, of a receiver, and image reflecting means arranged to throw on the receiver the image of a sheet upon the support, said receiver and reflecting means being located over the support.

2. In a registering apparatus, the combination with a sheet support, of a receiver having a gage mark, and image reflecting means arranged to throw on the receiver the image of a sheet upon the support.

3. In a registering apparatus, the combi-

nation with a sheet support, of a receiver, image reflecting means arranged to throw on the receiver the image of a sheet upon the support, and means for magnifying the image.

4. In a registering apparatus, the combination with a sheet support, of a tube comprising angularly disposed sections, the mouth of one of the sections overlying the sheet support, mirrors in the tube, and a receiver on which the mirrors throw the image.

5. In a registering apparatus, the combination with a sheet support, of a tube comprising angularly disposed sections, the mouth of one of the sections overlying the sheet support, mirrors in the tube, a magnifying means between the mirrors, and a receiver on which the mirrors throw the image.

6. In a registering apparatus, the combination with a sheet support, of a receiver, image reflecting means arranged to throw on the receiver the image of a sheet upon the support, and means for illuminating that part of the sheet the image of which is to be reflected.

7. In a registering apparatus, the combination with a sheet support, of a receiver, image reflecting means arranged to throw on the receiver the image of a sheet upon the support, means for illuminating that part of the sheet the image of which is to be reflected, and means for magnifying the image.

8. In a registering apparatus, the combination with a sheet support, of a tube comprising angularly disposed sections the mouth of one of the sections being located over the support, means for illuminating that part of the sheet beneath the mouth of the tube, an angularly disposed mirror arranged between the sections, a second angularly disposed mirror receiving the reflection from the first mirror, and a receiver on which the second mirror throws the image.

9. In a registering apparatus, the combination with a sheet support, of a tube comprising angularly disposed sections the mouth of one of the sections being located over the support, means for illuminating that part of the sheet beneath the mouth of the tube, an angularly disposed mirror arranged between the sections, a second angularly disposed mirror receiving the reflection from the first mirror, a magnifying lens between the mirrors, and a receiver on which the second mirror throws the image.

10. In a registering apparatus, the combination with a sheet support, of a receiver, and means for throwing on the receiver in relatively close relation independent images of relatively widely separated parts of the sheet upon the support.

11. In a registering apparatus, the combi-

nation with a sheet support, of a receiver having gage marks, and means for throwing on the receiver independent images of different parts of the sheet upon the support.

12. In a registering apparatus, the combination with a sheet support, of a receiver, means for throwing on the receiver independent images of different parts of the sheet upon the support, and means for magnifying the images.

13. In a registering apparatus, the combination with a sheet support, of a receiver, means for illuminating different parts of the sheet upon the support; and means for throwing on the receiver images of the parts thus illuminated.

14. In a registering apparatus, the combination with a sheet support, of a receiver, means for illuminating different parts of the sheet upon the support, means for throwing the images of the parts thus illuminated on the receiver, and means for magnifying the images.

15. In a registering apparatus, the combination with a sheet support, of a plurality of tubes, each having angularly disposed parts, the mouth of each tube overlying a part of the sheet upon the support, a mirror between the angularly disposed parts of each tube, a receiver box with which the tubes connect, and mirrors in the box arranged to receive images of the sheet from the tube mirrors and reflect them on the receiver.

16. In a registering apparatus, the combination with a sheet support, of a plurality of tubes, each having angularly disposed parts, the mouth of each tube overlying a part of the sheet upon the support, a mirror between the angularly disposed parts of each tube, a receiver box with which the tubes connect, mirrors in the box arranged to receive images of the sheet from the tube mirrors and reflect them on the receiver, and means for adjusting the position of the receiver box.

17. In a registering apparatus, the combination with a sheet support, of a plurality of tubes, each having angularly disposed parts, the mouth of each tube overlying a part of the sheet upon the support, a mirror between the angularly disposed parts of each tube, a receiver box with which the tubes connect, and adjustable mirrors in the box arranged to receive images of the sheet from the tube mirrors and reflect them on the receiver.

18. In a registering apparatus, the combination with a sheet support, of a plurality of tubes, each having angularly disposed parts, the mouth of each tube overlying a part of the sheet upon the support, a mirror between the angularly disposed parts of

each tube, a receiver box with which the tubes connect, adjustable mirrors in the box arranged to receive images of the sheet from the tube mirrors and reflect them on the receiver, and means for adjusting the position of the receiver box.

In testimony whereof, I have hereunto set

my hand, in the presence of two subscribing witnesses.

WILLIAM J. MAIN.

Witnesses:

F. W. H. CRANE,
LOUIS ROEHM.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
