Nov. 12, 1968 A. F. WIKE ETAL 3,410,205

DOCUMENT REGISTERING MEANS IN TRANSFER PRINTING MACHINE

Filed Feb. 16, 1967 2 Sheets-Sheet 1

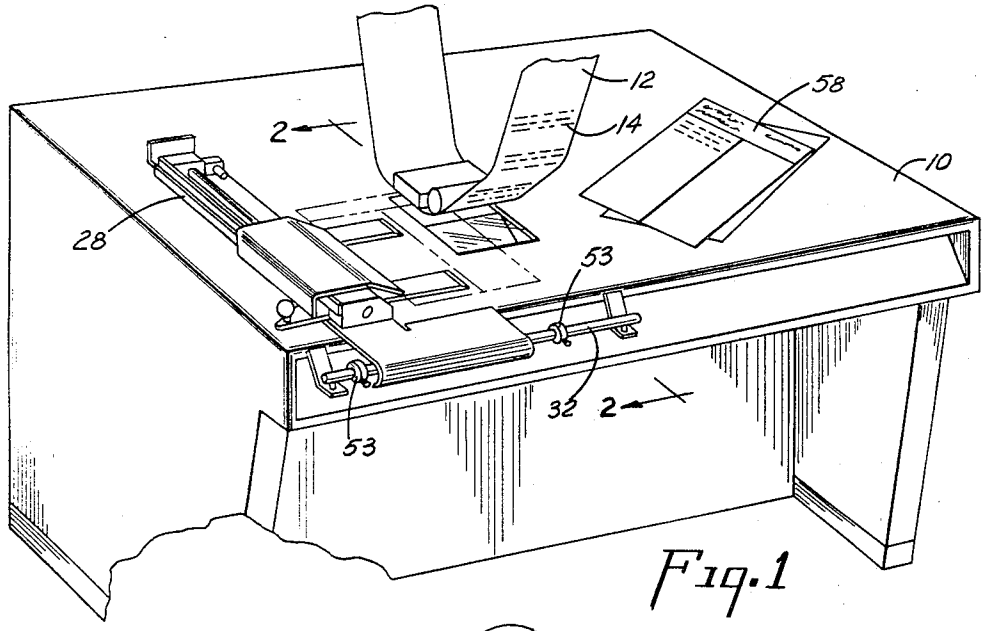


Fig. 1

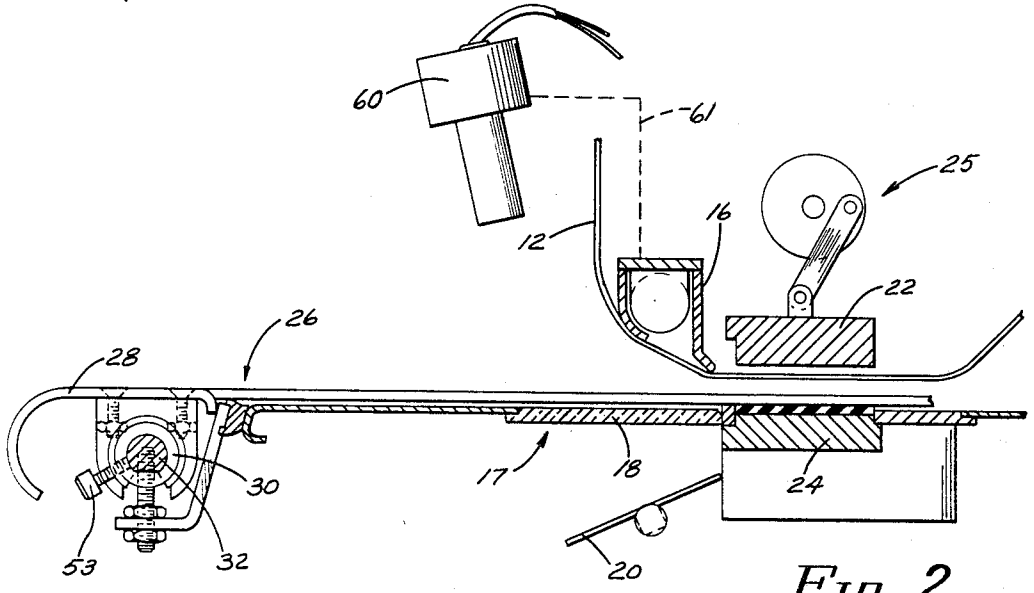


Fig. 2

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2 Sheets-Sheet 2

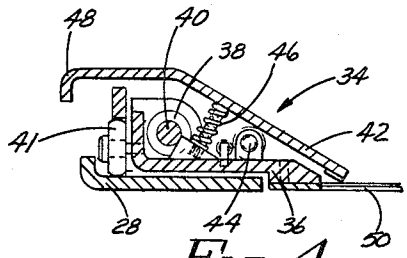


Fig. 4

Fig. 3

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ABSTRACT OF THE DISCLOSURE

The drawings are not of a complete machine. The superstructure which drives the upper platen is eliminated for clarity of illustration. It is shown symbolically in FIGURE 2. A cross slide carriage provides transport for carrying a print-out document from a convenient location into a printing station of the transfer printing machine. An indicator at the convenient location away from the printing station is used to establish the loading position of the print-out document on the carriage.

Additionally, an improved viewing system is illustrated wherein a mirror is placed below the work table surface and a lamp house is used to back-light the web of material in order to enable positive reading of an image of the indicia without shadows and without requiring the operator to assume an unnatural working position.

Background of the invention

Transfer printing is a well-developed art in which continuous lengths of paper are imprinted with a release printing substance. Wax base thermal material, and spirit softened material are examples. This continuous form is stepped through a platen press in increments. Envelopes or ledger sheets, or whatever other unit or continuous long document is desired to be imprinted, is passed through the platen area and imprinted from the paper by contact.

The process is direct printing and therefore a master web is generally provided in mirror image. Then, the print receiving sheet is a reverse image of the material on the original web and is right reading for human recognition. Often the information is obtained from a computer, punched card source, accounting or similar machines. The web with the resultant pressure and temperature release master printing material can be multi-release in that more than one impression may be taken from the web. The original source of the information, such as a computer, is not required again for each imprinting that is to be made. One output or carbon copy from the original source will serve to make impressions on many different documents.

Machines for utilizing such printing procedures are of various types, many of which are machine fed. For example, an envelope addressing system employs a continuous feeder which coordinates one envelope with each advance of a name impression area on the web. This type of machine is also used extensively for posting information selected from a general grouping with respect to one specific person, object, or job, on one sheet of paper. This procedure is known as the making of historical documents which are added to from time to time. Students' grades are often posted in this manner. The grade records are required in many different locations throughout a university, and also are given to the students. Thus, the original output of the data source may be employed to print the collection of grades for a given quarter or semester on a continuous web, and this web used to print on many different documents. If the material is to be posted onto a sheet ledger, for example, it may have to be placed in a selected location at one side or the other, or in a particular block area, in order to make the person's complete record.

In order to post correctly, the operator must be able to view the web as it enters the printing station of the machine and then select the proper ledger card. Then, the card must be properly located in order that overprinting or printing in a wrong location is avoided. Because the platens are not widely spaced, and are not readily observable by the operator, it is impractical to view the ledger in the station. Guides and stop devices have been employed heretofore, but often these devices are less than satisfactory and furthermore operators could inadvertently place their fingers into the printing area with consequent serious injury.

Summary of the invention

A carriage for carrying a document to be imprinted from a convenient location into a printing head of a transfer printing machine, wherein an indicator at the convenient location is used to establish the position of the print-out document on the carriage, the indicator bearing a relationship to the carriage in the convenient location that the printing members bear to the carriage in the printing relationship to permit selecting any desired print position on the document.

Description of the drawing

FIGURE 1 is a perspective view of the table portion of a transfer printing device with the printing superstructure eliminated except for the top pressure platen, and the cross slide carriage clamp of this invention installed in operative position.

FIG. 2 is a schematic structural view, taken as if a section along line **2**—**2** of FIGURE 1, with an illumination projector system of the superstructure added.

FIGURE 3 is a top plan view of the carriage shown in FIGURE 1.

FIG. 4 is a section of the clamp device taken along the line **4**—**4** of FIGURE 3.

Transfer printing is old and well-known, wherein indicia printed on a continuous web in multiple impression media is releasable, for example, by pressure and temperature. The type of printing media is multiple copy producing in nature. One printing does not exhaust its potential. This process is used for posting and addressing and similar operations. Because such machines are well-known, the drawings do not illustrate a complete machine, but rather the upper portion of the conventional machine which produces the pressure is eliminated. This elimination of the superstructure is for the purpose of enabling a clear illustration of the area in which the invention is embodied.

In FIGURE 1, table **10** provides a work surface as well as a housing for some of the mechanical apparatus of the transfer printing device not necessary for an understanding of this invention. A web **12** carries reverse image multiple release printing data as indicated in a random information area **14**. Generally the web **12** is a continuous fanfold or roll business machine form which is printed out from tape or other source by a computer or other office machine. By printing out the addresses, grades for students, shipping data, accounting data, or whatever other information is of interest to the particular business establishment, the continuous output web may be used in other different applications and need not be put into service again for this particular data.

The information area **14** is reverse image and hence when placed in direct contact with a record, such as a ledger form, will print out in correct readable form. A reverse mirror image is generally referred to as "wrong reading" in the art, whereas the printed copy on the receiving form is "right reading." As the web **12** proceeds through the machine, it is necessary for the operator to

know what information will print upon the next cycle of the machine. It has been the practice in the prior art to use a mirror as part of the top of table **10** to reflect the image area **14** adjacent the printing station of the machine. However, such a high angle of incidence requires the operator to strain for a view of the reflected surface. According to this invention, a lamp house **16** has been placed directly over an opening **17**. For convenience, the opening **17** is closed by a glass cover **18**. Below the opening **17** is a mirror **20** positioned at a convenient angle of incidence to provide a view of the opening into the lamp house **16** from a comfortable working position in front of the table **10**. The position is readily adjustable to fit any operator.

By passing the web **12** over the opening of lamp house **16**, light is directed through the web and hence reflections and inconvenience of lighting from an exterior source such as a gooseneck lamp, as formerly employed, is eliminated. The back illumination of the web has been found to be vastly superior in quality of lighting and affords positive recognition of copy area **14**. A hot wire source is not used in order to avoid preheating of the copy before it enters the press.

The web **12** proceeds through the printing device by predetermined increments, fed by a device not illustrated in these drawings, through a power printing means which is illustrated as being composed of a movable top platen **22** and a stationary lower heated platen **24**. Power apparatus, which is a conventional part of the equipment not illustrated in the drawing, serves to drive the platen **22** through an operating cycle into contact with the heated platen **24** and back to a rest position as illustrated in FIGURE 2. The drive apparatus is symbolized by the structure **25** located directly above the platen **22**.

The structure thus far described is an improvement over the prior art apparatus in that the light from the lamp house **16** is very favorable for correct recognition of the indicia, and the recessed poition of the mirror provides superior observation of the web as it proceeds to the printing station between the platens **22** and **24**.

Into the environment of the machine thus far described, this invention provides a system for placing a selected area of a print receiving sheet, such as a ledger, in accurate register in the printing station. These sheets are referred to in the art as historical records. A carriage **26** is constructed upon a bed plate **28** which is supported by bearings **30** upon a rod **32** extending horizontally across the front of table **10**.

A clamp **34**, carried by bed plate **28**, is composed generally of a base member **36** as best seen in FIGURE 4. Base **36** is carried by bearings **38** on rod **40** and stabilized by wheels **41** running on plate **28**.

Clamp **34** is composed principally of a pressure plate **42** supported by two opposed pivots **44** carried by the base **36**, and urged closed by spring device **46**, as shown best in FIGURE 4. A heel area **48** on the plate **42** enables the operator to open the clamp with respect to the base **36** by downward pressure in order to accept a document for holding and transport. The base has forks **50** extending laterally therefrom to assist in the support of larger documents, but the forks do not at any time enter into the area of the platens **22** and **24**.

End stop **52** provides a limit of movement of the clamp **34** along an abscissa coordinate and two stops **53** are carried on the rod **32** to provide limits of lateral ordinate movement of bed plate **28**. The rod **32** and the rod **40** are arranged in perpendicular relationship in order to provide a precise ordinate-abscissa coordinate movement.

In order to further assure correct print-out registration, on any document carried by the clamp **34**, a switch **54** is positioned adjacent stop **52** and is operated by a contactor **56** which is adjustably carried on the clamp **34**. The switch **54** is a master control to cause initiation of a cycle of the appartus symbolized by drive **25**. Hence, the location of the switch **54** assures a complete movement of the clamp **34** along the abscissa coordinate to a given top **52** before platen operation can begin. In this manner, a definite reference is established for the operation of the printing apparatus with respect to location of the clamp **34**. Further, switch **54** cannot cause a repeat operation until fully released by clamp **34**. From the fact that the clamp **34** must reach a definite abscissa coordinate relationship before the operation of the drive apparatus **25** can begin, a novel and exceptionally desirable feature of the invention is provided.

Ledgers **58** are illustrated as lying on the table top in FIGURE 1. As the operator reads in the reflected image the material which is next to be printed from the web **12**, the correct ledger **58** is selected from a cabinet or other storage area. The operator determines where on the ledger **58**, with respect to data that is printed or previously entered, the new information is to be posted. The illustrated ledger **58** has two vertical columns. This is by way of illustration only. Such print receiving sheets may be in any form and will find accommodation by the present invention.

After the operator has determined where the information is to be placed on the correctly selected ledger, than the ledger **58** is placed in the clamp **34** located at a document loading position remote from the printing station. Such remote loading position is a safe distance from the physical danger of the printing apparatus, as well as being in an open area where it is easily seen. In this remote location, the operator can load the document with ease and without peril.

However, it is necessary to know where that document will locate in the printing apparatus in order to assure that the information in the area **14** will be correctly placed upon the ledger **58**. This invention provides means for indicating a reference relationship to the document carriage **26** in the document loading position corresponding to the relationship of the printing platen structures **22** and **24** to the carriage **26** in the printing position station.

In order to accomplish this end to a degree, a pointer **59** is carried by the clamp as one means for indicating the line or lines of the ledger corresponding to a printing position. The pointer **59** is shiftable in the abscissa coordinate with respect to the pressure plate **42**, and therefore the distance from the stop **52** may be accurately ascertained in advance. Thus, the movement of a particular location on a document clamped by the clamp **34**, when the document reaches the end of the abscissa coordinate movement, can be definitely ascertained in advance.

The size of the platens **22** and **24** may be selected to print from one to a plurality of individual lines, and the distance of the selected printing lines with respect to the location of the stop **52** is accurately ascertainable. Accordingly, placement of the pointer **59** with respect to the stop **52** is tantamount to placing pointer **59** a known distance with respect to the print-out line in the printing station. Hence, this pointer is a means for indicating a position relative to the carriage in the document loading position corresponding to the relationship of the printing platen structure to said carriage in the print position.

It has been found, however, that a pointer **59** carried on the clamp **34** has definite limitations, particularly whenever posting is done in a remote area of a document, such as the illustrated two column ledger **58**. In FIGURE 3 the ledger **58** is shown in phantom outline in order not to hide the physical structure of the apparatus being illustrated. Here it is seen that there has been some printing on the right hand column of the ledger **58**, and it is now desired to print the new information directly below the previously printed information.

According to the novel inmprovement of this invention, a projector **60** supported on the superstructure of the apparatus, which superstructure is symbolized for illustration purposes by the support line **61**, provides a projected light line **62**. In FIGURE 3 the elongated black area **62** is provided to symbolize the projection of light which is in this instance made to register with the last line of

the previously printed material. The projector is movable to project the line **62** in any desired location and is movable along both the ordinate and abscissa cordinates to the necessary location. Thus, the light line **62** is placed so that it will intercept a document and indicate the area of the document which should be coordinated with that light for accurate placement of the next information. For example, the light line **62** may be placed in such a position that the next printing will appear exactly one line below the location of the light. Thus, if the printed material is desired to be located without any spacing, this can quickly be accomplished. However, should it be desirable to space the particular material, then the light line **62** may be positioned so that whenever a particular line is registered with the light line, the printing will take place a known number of lines below that indicated spot. Then, upon advancement of the carriage **26** along the abscissa coordinate until the switch **54** is actuated, a printing on the right hand column will be accomplished.

By like token, if the next printing is to be accomplished on the left column, merely operating the carriage along the ordinate and then to the extent of the remaining abscissa coordinate, will produce printing in any desired location on the left column. Hence, the device may be correctly depicted as one for alternate margin and random line posting.

Whereas the present invention has been shown and described herein in what is conceived to be the best mode contemplated, it is recognized that departures may be made therefrom within tthe scope of the invention which is, therefore, not to be limited to the details disclosed herein, but is to be afforded the full scope of the invention as hereinafter claimed.

What is claimed is:

1. A printing machine wherein in operation a series of media having transferable information is transported by increment steps through a printing station, for printing information at each step upon a print receiving sheet inserted into the printing station:

said machine having a system for placing a selected area of the print receiving sheet in register in said printing station, said system comprising:

a closable pair of printing platens selected to correspond to a desired number of data lines to be printed from the media;

a carriage movable between a print position wherein a print receiving sheet carried thereby is held in regsiter with said printing station, and a loading position a distance removed therefrom, said carriage being an ordinate-abscissa coordinate movement device, a clamp carried by said carriage for mounting a print receiving sheet wherever placed along the abscissa cordinate with respect to the carriage while positioned in said document loading position to thereby establish a known zero coordinate beginning location related to an established ordinate-abscissa coordinate goal at said printing station; and

means for indicating a position relative to said carriage in said loading position corresponding to the relationship of said printing station to said carriage in said print position;

whereby, a print receiving sheet may be loaded on said carriage at the loading position and moved by movement of the carriage to the printing station with assurance of placement of the information in desired location with respect to prior data and indicia on the print receiving sheet.

2. A printing machine as defined in claim **1**, further characterized in that:

said means for indicating a position relative to said carriage being a device for projecting a pattern of light which indicates where printing will occur on a document mounted on said carriage in the document loading position which is to be subsequently carried to the printing station.

3. A printing machine as defined in claim **1**, further characterized in that:

said carriage including a pair of slides, said clamp mounted on said slides for shifting of the clamp through ordinate-abscissa coordinates;

said clamp shiftable along one slide between said document loading position and a position coincident with said printing station, and provided with means for urging said clamp to return to said document loading position;

power printing means for operation in said printing station; and

means for initiating printing operation of said power printing means, operable by said clamp upon movement to said coincident position.

4. In the carriage structure defined in claim **3**, said means for initiating printing operation being conditioned to operate but once only until said carriage is removed from said printing station and subsequently returned, to thereby prevent over-printing.

5. In a system for a printing machine, as defined in claim **1**, the provision of:

mirror means for making visible from a position in front of said machine, that portion of the media series next to enter said printing station,

whereby the receiving sheet may be positioned in said clamp on an operator choice basis, and the carriage guided to deliver the print receiving sheet into position where the particular printed information is to appear.

6. A printing machine as defined in claim **5** further characterized by the provision of a light source extending transverse of said web on the side thereof opposite said mirror means and serving to illuminate through the web from the rear, said light source positioned along the path of the web ahead of the printing station one advancement position to thereby illuminate that portion of the web next to be printed.

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