United States Patent

[11] **3,634,010**

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[54] **ENTRY DEVICE FOR REPRODUCTION MACHINE**
10 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **355/97,** 271/3, 355/104, 355/108
[51] **Int. Cl.** **G03b 27/02**
[50] **Field of Search** 355/97, 104, 108; 271/3

[56] **References Cited**

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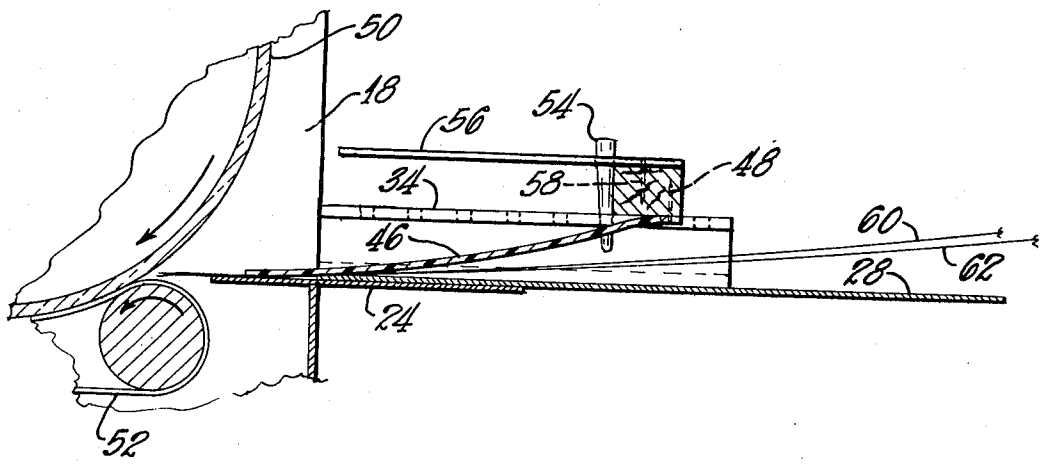
ABSTRACT: An entry device is provided for a reproduction or copying machine, particularly of the type capable of copying large sheets of material. The entry device is mounted on a feed table adjacent an entry opening into the machine. The device includes a pair of supports located adjacent the ends of the entry opening with a bar supported at its ends by the supports and located above the table surface. An entry strip having an edge affixed to the bar has a forward edge extending near or into the opening. The strip flattens and smooths sheet material being fed into the machine and also supports material coming out of the machine above the feed table so that new sheet material can be fed into the machine as other material is emerging.



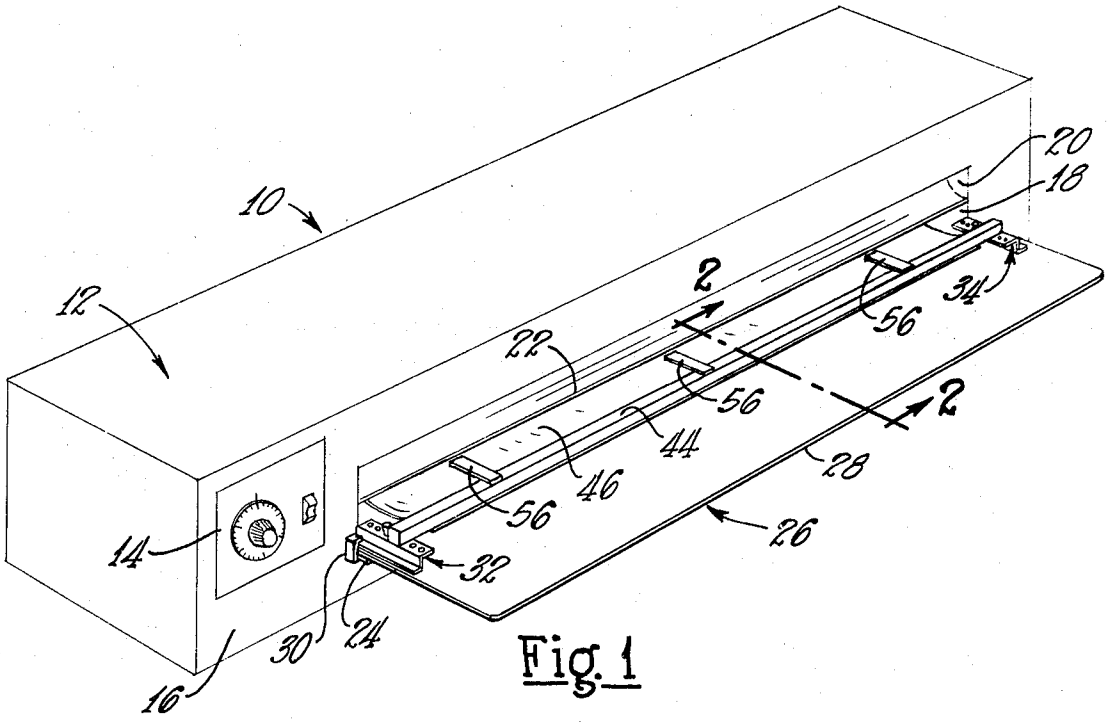


Fig. 1

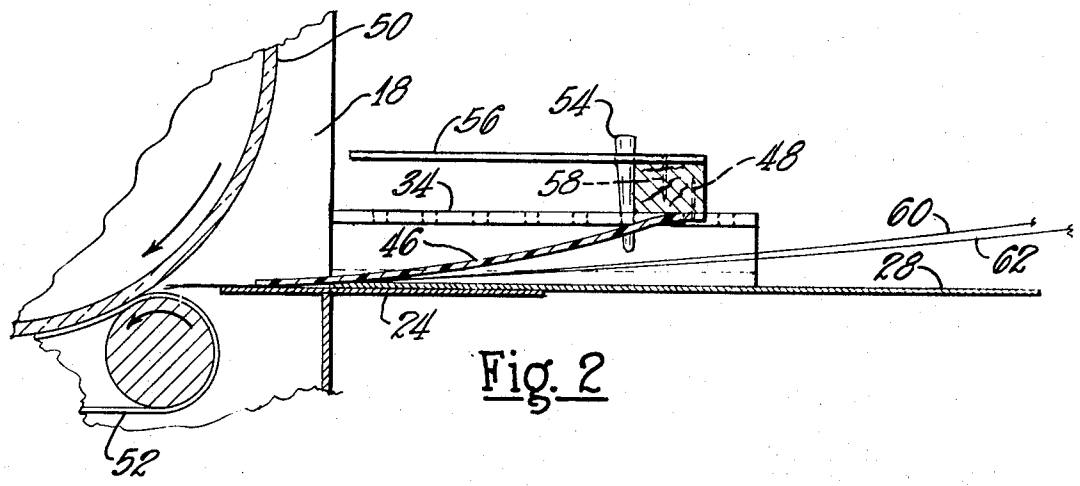


Fig. 2

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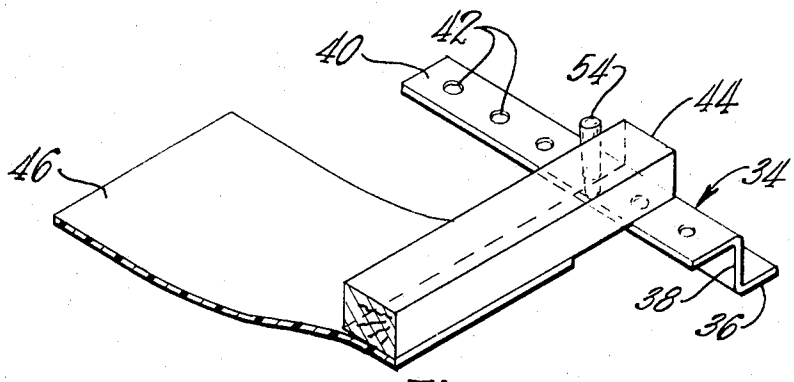

Fig. 3

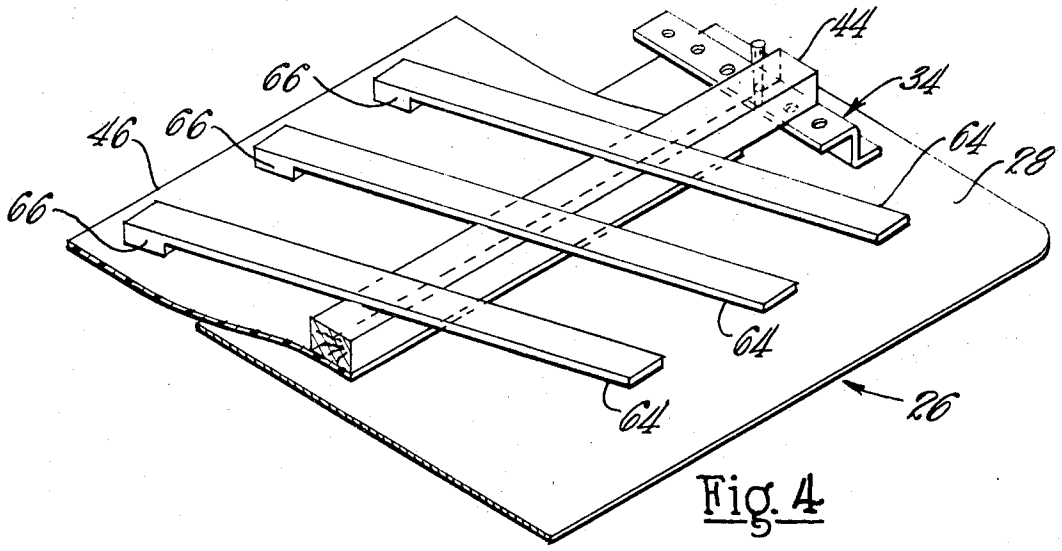

Fig. 4

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ENTRY DEVICE FOR REPRODUCTION MACHINE

This invention relates to a device for facilitating feeding of sheet material into a reproduction or copying machine.

Commercially available reproduction machines particularly for copying sizable sheet material such as engineering drawings are in common use today. When feeding large sheets of material, it is not uncommon for portions, and particularly corner portions, to kink or fold back on themselves when being fed into the entry opening of the machine. Further, atmospheric conditions, especially excess moisture, often cause the sheet material to tend to curl and the resulting undulations must be smoothed before the sheet material reaches the feeding rolls or belts of the machine, or otherwise sharp creases result and the copy made also is unsatisfactory. With many, if not most, reproduction machines, the copy, the original, or both, come out of the machine at a location above the entry opening into which the material is fed. The exiting material thereby tends to interfere with material being fed into the machine, with the result that it is usually necessary to wait for all material in the machine to emerge before new material is fed there into.

The invention provides an entry device for a reproduction machine which overcomes the above disadvantages. The entry device preferably includes a feed table which is affixed to and extends outwardly from a smaller lip of the machine located adjacent the lower edge of the entry opening. For some machines having wide lips, the additional feed table can be dispensed with. A pair of supporting brackets are affixed to the feed table or the lip adjacent ends of the elongate entry opening. A stiffening bar with ends supported on the brackets is spaced above the surface of the feed table throughout its length. An entry strip preferably of a transparent plastic material has an edge portion affixed to the bar and extends forwardly near to or even slightly through the entry opening where it rests on the feed table or lip. Means are provided on the brackets for limiting the extent to which the bar can move toward the entry opening and thereby also limit movement of the strip in the same direction. However, the bar and the entry strip can readily be picked up by the operator. This enables the operator to manipulate the strip to smooth or iron any existing folds or creases in the sheet material as the material is fed into the entry opening. Any shallow or partial folds and any curl in the sheet material are usually automatically flattened and smoothed by the entry strip without any further manipulation by the operator.

The material issuing from the machine after copying is deflected by the entry strip and held above the feed table so that additional sheet material can be supplied to the machine while other material is emerging. This greatly speeds up the operation and enables considerably more material to be copied in a period of time than when it is necessary to wait for copied material to emerge completely from the machine prior to supplying more material. This is particularly important for commercial operations undertaking a substantial amount of copying work.

Particularly for some longer sheet material, deflector strips or arms can be mounted above the bar and entry strip and extend rearwardly therefrom, to further aid in deflecting upwardly material issuing from the machine.

It is, therefore, a principal object of the invention to provide an entry device for a reproduction machine which facilitates copying of large sheet material.

Another object of the invention is to provide an entry device for a reproduction machine which enables a larger number of sheets to be copied in a given period of time.

Still another object of the invention is to provide an entry strip for a reproduction machine which aids in flattening the sheet material entering the machine.

Yet another object of the invention is to provide an entry device for a reproduction machine which can be picked up and manipulated by the operator as material is being fed into the machine.

Other objects and advantages of the invention will be apparent from the following detailed description of preferred embodiments thereof, reference being made to the accompanying drawings, in which:

FIG. 1 is a view in perspective of a reproduction or copying machine in combination with an entry device according to the invention;

FIG. 2 is an enlarged, fragmentary view in transverse cross section taken along the line 2—2 of FIG. 1;

FIG. 3 is an enlarged, fragmentary view in perspective of part of an end of the device of FIG. 1; and

FIG. 4 is a somewhat schematic view in perspective of an entry device embodying the invention, utilizing modified deflectors.

Referring to the drawings, and particularly to FIG. 1, a reproduction or copying machine suitable for use with the invention is indicated at **10**. This machine is representative of a number of commercially available reproduction machines including, by way of example, those known under the names Whiteprint, Blueprint, or Diazo. The machine shown is of the tabletop type but the invention is equally suitable for larger floor machines. The machine **10** includes a housing **12** having suitable controls **14** and a front wall **16** forming an elongate entry opening **18** extending a substantial distance along the wall, from 48 to 60 inches, for example. An exit slot **20** in the front wall is separated from the entry opening by a divider **22**. A lip **24** extends outwardly from the front wall **16** immediately below the entry opening **18**.

With larger reproduction machines of the type **10** employing wide sheet material, the original to be copied often has a tendency to have corners fold either before or as the sheet is being fed into the entry opening. This is particularly true for certain types of sheet material such as engineering drawings made on tracing paper. The sheet material on which the copy is made also has a tendency to fold at the corners or crease to some extent. Further, certain atmospheric conditions will cause either sheet material to tend to curl, rendering it difficult to feed the material smoothly into the machine. This is particularly true where excess moisture exists, which often comes from the machine itself. Additionally, with the machine **10**, either the original sheet material, the copy, or both, issue from the machine through the exit slot **20**, and, due to gravity, tend to fall downwardly in front of the entry opening **18**. Consequently, it is usually necessary for the operator to refrain from feeding new sheet material into the machine until the last has emerged. This decreases the potential output of the machine considerably.

In accordance with the invention, an entry device **26** is provided adjacent the entry opening **18**. The device **26** includes a feed table **28** having a length preferably at least equal to the length of the lip **24** and having a width substantially wider than the lip **24**. This provides a large operating surface which greatly facilitates lining up and feeding the original material and the copy sheet into the machine. In some instances, the machine may have a sufficiently wide lip that the feed table **28** can be dispensed with and the other components of the entry device mounted directly on the lip. Where used, the feed table **28** can be affixed to the lip by clips **30** or other suitable fasteners.

A pair of supports or brackets **32** and **34** are on the feed table **28** near opposite ends of the entry opening **18**. Each of the brackets, as shown in FIG. **3**, has a base **36**, an upstanding web **38**, and an upper supporting flange **40**. The base **36** can be suitably affixed to the feed table **28**, as by spot welding or by fasteners. The upstanding web **38** is of a sufficient height to prevent the entry device from interfering with sheet material fed along the table **28**. The supporting flange **40** has a plurality of spaced openings **42** therein, the purpose of which will be subsequently discussed. An elongate, rigid stiffening member or bar **44** is long enough to extend between the supporting flanges **40** of the brackets **32** and **34** and is sufficiently rigid that it will be substantially an equal distance above the feed table **28** for all portions thereof. Shims of any thickness can be

placed on top of the supporting flanges **40**, if desired, to increase the spacing between the stiffening bar **44** and the surface of the table **28**.

A substantially planar entry member or strip **46** has a rear longitudinally extending edge affixed to a lower surface of the bar **44** by staples **48** (FIG. **2**) or other suitable fasteners. The strip **46** extends forwardly from the bar toward and even into the entry opening, if desired, with the forward edge portion of the strip supported lightly on the surface of the feed table. The length of the strip **46** is substantially equal to that of the bar **44** but will be slightly shorter so as not to interfere with the supporting flanges **40** of the brackets **32** and **34**. The width of the strip **46**, however, and the thickness or weight thereof can vary widely, depending upon the specific reproduction machine **10** with which the device **26** is to be employed. Entry strips having widths from one inch to ten inches have been found to be satisfactory under particular conditions with a 7-inch wide strip being the most satisfactory for the widest number of applications. Entry strips varying in thickness from 5 mils to one-eighth inch have also been used satisfactorily, although the thicker strips tend to be of sufficient weight that they tend to resist movement of the sheet materials into the machine and are also harder to manipulate. Plastic sheets of 10-mil thickness have been found to be most satisfactory for most applications. Regardless of the thickness of the strip **46**, it preferably is of plastic and of a transparent type of plastic to enable the operator to watch for folds, creases, crimps, etc.

As shown, the entry strip **46** and the stiffening bar **44** are positioned so that the forward edge of the strip extends through the entry opening **18** and to a point close to the feeding members of the machine, the feeding members in this instance being shown as an upper drive roll **50** and a plurality of adjacent lower belts **52**. The best position of the strip **46**, however, will vary from machine to machine and will also depend upon the weight of the original and copy material employed. The position of the strip **46** can be easily changed by moving the bar **44** forwardly or rearwardly on the supporting flanges **40**. When in a desired position, stop members or pegs **54** are placed in the appropriate ones of the openings **42** in front of the bar **44**, thereby limiting the extent to which the strip and bar can move toward or through the entry opening **18**. This prevents the possibility of the strip being engaged by the drive members **50** and **52** and being pulled into the machine.

While movement of the strip **46** and the bar **44** toward the machine is limited, they can readily be picked up by the operator and manipulated as desired. Thus, if either the original or the copy material should have a fold or crimp, the operator can hold the sheets in register with one hand, pick up the bar **44** centrally with the other hand, and smooth or level the fold or crimp in the material with the forward edge of the strip **46**.

A plurality of deflector strips **56** can be used with the strip **46**, if desired. These have end portions affixed to the upper surface of the bar **44**, as by staples **58**, with the strips **56** extending forwardly close to the opening **18** and under the exit opening **20**. The strips **56** engage the sheet material emerging from the exit opening **20** and support the leading edge portions of the sheet material as it moves outwardly away from the opening **20**. The device **26** thereby maintains the emerging sheet material out of the way of the access for the entry opening **18** so that additional material can be fed into the machine as other material is emerging. While only three of the deflectors **56** are shown, more can be used, as necessary, to direct the emerging sheets over the bar **44**. Representative material being fed into the machine is shown in FIG. **2** wherein sheet material to be copied is represented by **60** and copy material on which the copy is to be made is represented by **62**.

When longer sheet material is to be copied, the deflector strips **56** may not be sufficient to deflect the material from the feed table and the entry opening. In that instance, separate deflectors **64** (FIG. **4**) can be simply laid on the strip **46** and the bar **44** and extend rearwardly therefrom, being from 7 to 18 inches long. The deflectors **64** can have weights **66** at the forward ends to hold them in proper position with respect to the device. The deflectors **64** slant upwardly so as to minimize interference by the emerging sheet material with the sheet material being fed into the machine.

Various modifications of the above-described embodiments of the invention will be apparent to those skilled in the art and it is to be understood that such modifications can be made without departing from the scope of the invention, if they are within the spirit and the tenor of the accompanying claims.

I claim:

1. Apparatus for facilitating entry of sheet material into a reproduction machine, said apparatus comprising means forming an operating surface to be located adjacent an elongate entry opening of the machine, a pair of spaced bracket members affixed to said surface and positioned to be near opposite ends of the entry opening, each of said bracket members forming a supporting surface spaced above said operating surface, an elongate rigid member extending between said supporting surfaces and spaced above said operating surface at all points, means on each of said bracket members to limit the extent to which said rigid member can be moved toward the entry opening, and an entry strip affixed to said rigid member and having a forward edge generally parallel to the entry opening of the machine when said rigid member is engaged by said limit means on said brackets.

2. Apparatus according to claim **1** characterized by a plurality of elongate deflector members on said strip having ends located near the forward edge of said strip and having opposite ends extending at least substantially to said rigid member.

3. Apparatus according to claim **1** characterized by said bracket members having a plurality of openings in said supporting surfaces in a line located transversely to said rigid member, and said limit means comprising a projection adapted to fit in and extend upwardly from any one of said openings.

4. Apparatus according to claim **1** characterized by clamping means associated with said operating surface means for affixing said surface means to a portion of said machine.

5. Apparatus for making copies of sheet material comprising a reproduction machine including an elongate entry opening into which sheet material is to be fed, and a device for facilitating entry of the sheet material into said machine comprising means forming a large operating surface, means for locating said surface means adjacent and below said elongate entry opening, a pair of spaced bracket members affixed to said surface near opposite ends of said entry opening, each of said supporting bracket members having a supporting surface spaced above said operating surface, an elongate rigid member extending between said supporting surfaces and spaced above said operating surface a predetermined distance, means on each of said bracket members effective to limit the extent to which said rigid member can be moved toward said entry opening, and an entry strip affixed to said rigid member and having a forward edge near said entry opening, said forward edge being generally parallel to said entry opening when said rigid member contacts said limit means on said bracket.

6. Apparatus according to claim **5** characterized by a plurality of elongate deflector members on said entry strip having ends located toward the forward edge of said strip and having opposite ends extending at least substantially to said rigid member.

7. Apparatus according to claim **5** characterized by said bracket members having a plurality of openings in said supporting surfaces located in a line positioned transversely to said rigid member, and said limit means comprising projections adapted to fit in and extend upwardly from said openings.

8. Apparatus according to claim **5** characterized by a plurality of elongate deflector members supported on said strip and extending in directions transversely of said rigid member, ends of said deflector members extending substantially beyond said strip and said rigid member.

9. Apparatus according to claim 8 characterized further by said deflectors having weights at the ends toward said entry opening.

10. Apparatus according to claim 5 characterized by said entry strip being of transparent, plastic material.

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