Nov. 25, 1969 R. C. GOODMAN ET AL 3,480,222

PHOTOCOPY APPARATUS HAVING ROLL SHEET MATERIAL SUPPORT MEANS

Filed Nov. 14, 1966 2 Sheets-Sheet 1

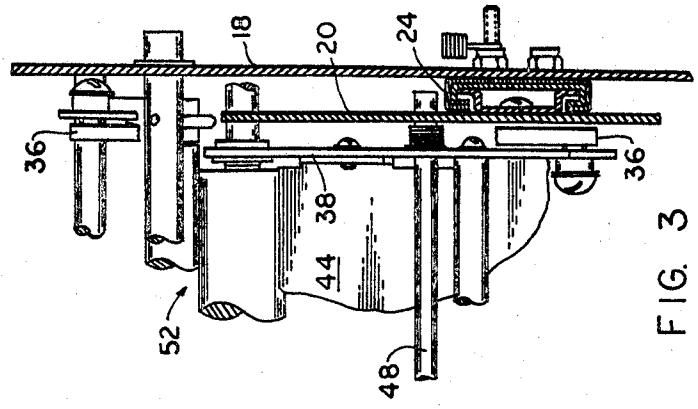


FIG. 3

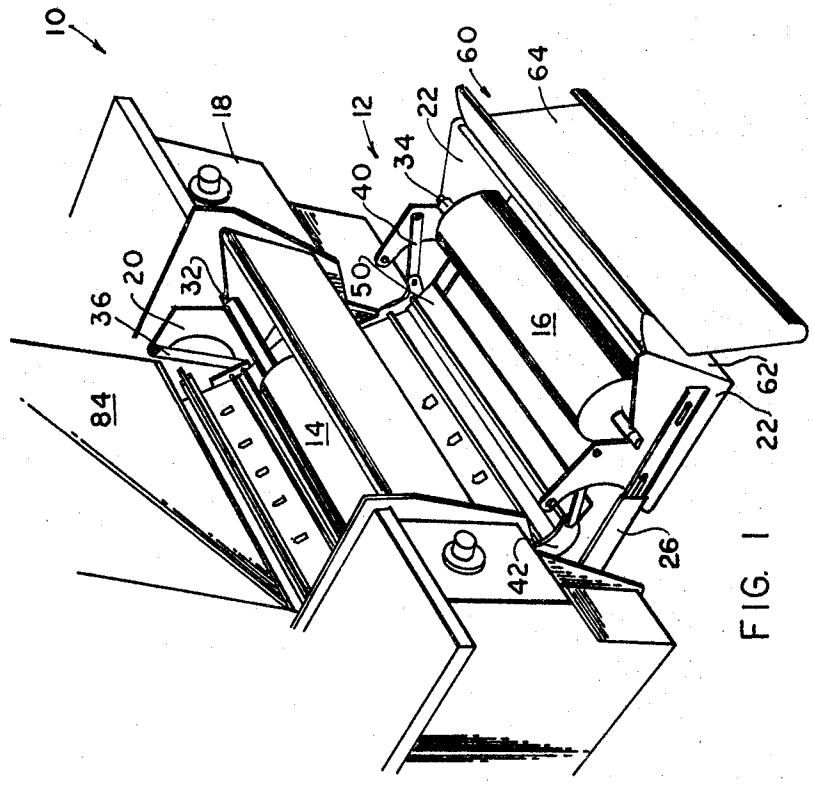


FIG. 1

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PHOTOCOPY APPARATUS HAVING ROLL SHEET MATERIAL SUPPORT MEANS

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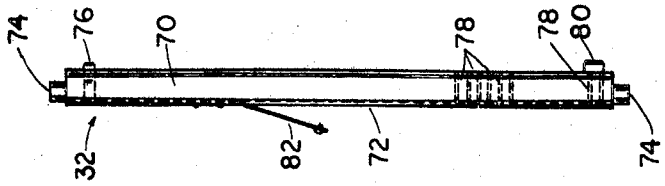


FIG. 4

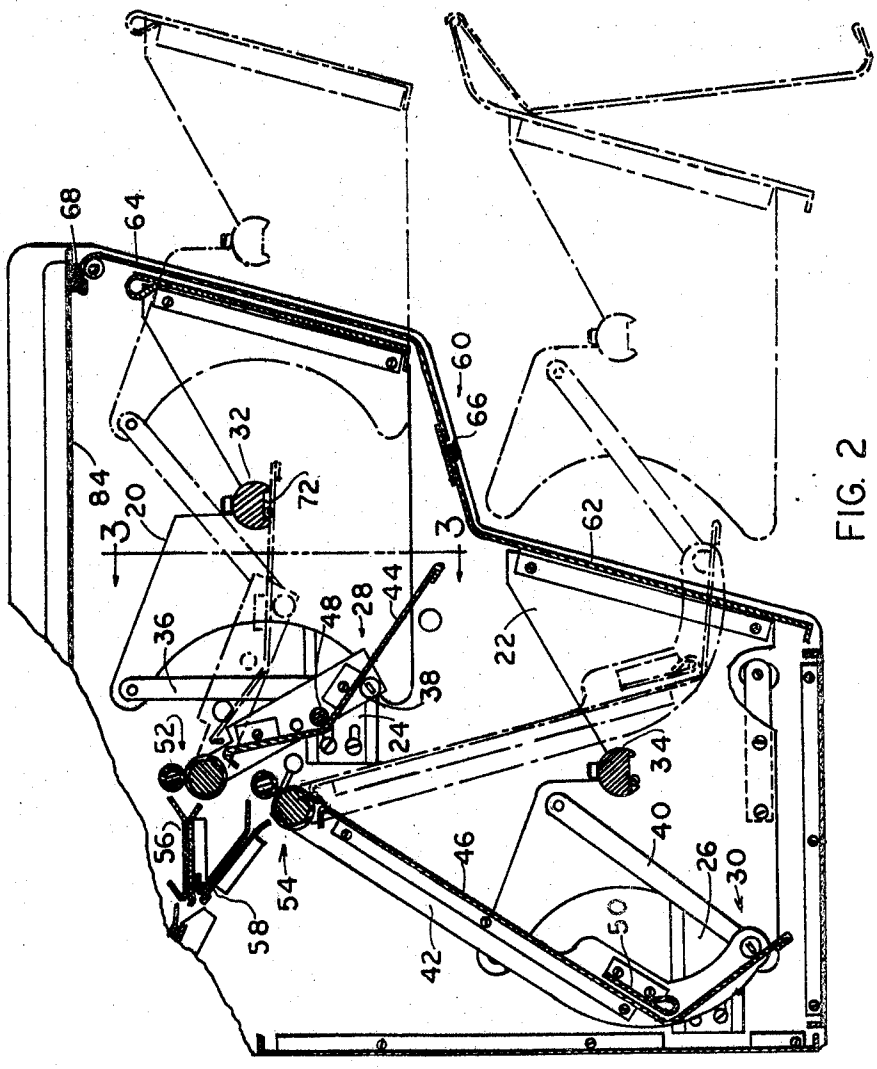


FIG. 2

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3,480,222

PHOTOCOPY APPARATUS HAVING ROLL SHEET MATERIAL SUPPORT MEANS

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Int. Cl. B65h 19/04
U.S. Cl. 242—55.3 3 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus for feeding and dispensing sheet materials from a plurality of rolls thereof for use in photocopy or duplicating apparatus is disclosed. The feeding and dispensing apparatus comprises a plurality of slidably mounted frames for rotatably supporting a plurality of rolls of sheet material on mandrels having drag inducing means carried by the frames and movable guide means associated with the frames for guiding the sheet materials during the unwinding thereof.

This invention relates generally to photocopy or duplicating apparatus and, more particularly, to apparatus for dispensing and feeding continuous roll form sheet materials, such as sensitized sheet materials provided in the form of rolls wound on tubular rolls, for use in photocopy or duplicating apparatus, especially of the diazo type.

In the copying art, various processes are employed for making duplicate copies of an original. Photocopying employs light-sensitive materials which are exposed either in contact with an original or through a lens system in order to obtain a print thereof. In thermo-printing, use is made of heat-sensitive materials which, in contact with an original, are subjected to radiation rich in infrared to obtain a print of the original.

Whatever the duplicating process may be, in certain industrial or office applications, copies must be made of continuous sheet originals, or, for simplicity and speed of operation, roll form sensitized materials are utilized for substantially continuous copying or duplicating of sheet form originals.

In either instance, where the sensitized materials are supplied in continuous roll form, it is desirable that the copying or duplicating machine be capable of handling sensitized and original materials of differing widths. In sheet feed copying or duplicating machines, the width of the sensitized materials to be utilized with a particular original may usually be simply and conveniently manually chosen or selected at the time of feeding the original and sheet of sensitized material into the machine. Where roll form sensitized materials are utilized, however, the size and the weight of the roll of sensitized material, together with the time and difficulty associated with loading and threading the leading end of the sensitized material make manual changing of the rolls for different width originals time consuming and inefficient. Accordingly, conventionally, the machine operator either selects a group of materials of a single width to be reproduced at a single loading of sensitized material, necessitating manual segregation of materials as to width into different groups, or the operator will reproduce or copy original materials of different widths without regard to their widths on sensitized material of sufficient width to copy or reproduce the widest original materials. This procedure is likewise economically wasteful.

Accordingly, it is a primary object of the present invention to provide photocopy or duplicating apparatus with dispensing apparatus for dispensing and feeding sheet materials selectively from a plurality of rolls of sensitized material.

Another primary object of the present invention is to provide such apparatus capable of dispensing materials from rolls of diverse or differing widths.

A further primary object of the present invention is to provide such apparatus which may be simply and easily reloaded with new rolls of sensitized materials.

Yet another primary object of the present invention is to provide such apparatus for roll form sheet materials wound upon tubular cores and tensioning the rolls without scratching or unnecessarily abrading the sensitized surface of the materials.

Another and yet still further primary object of the present invention is to provide such apparatus wherein one of a plurality of rolls of continuous materials may be replaced without disturbing or replacing any other roll of material.

It is a feature of the present invention that the set, curl or curvature of the roll form sheet materials is removed during the feeding or dispensing thereof.

The present invention will be better understood and important features and objects other than those specifically enumerated above will become apparent when consideration is given to the following details and description, which when taken in conjunction with the annexed drawing describes, discloses, illustrates and shows a preferred embodiment or modification of the present invention and what is presently considered and believed to be the best mode of practicing the principles thereof. Other embodiments or modifications may be suggested to those having the benefit of the teaching herein, and such other embodiments or modifications are intended to be specifically reserved, especially as they fall within the scope and spirit of the subjoined claims.

SUMMARY OF THE INVENTION

The invention resides in the combination, construction, arrangement and disposition of the various component parts and elements incorporated in improved photocopy or duplicating apparatus, especially of the diazo type. More particularly, the invention resides in the combination therewith of an improvement for dispensing continuous sheet materials and feeding the same from rolls wound upon tubular cores comprising a plurality of frames slidably movably associated with the photocopy or duplicating apparatus, each of the frames being provided with a drag inducing mandrel adapted to rotatably support the tubular cores of the rolls of sheet material, anti-curl means structurally associated with each of said frames adapted to engage the respective sheet materials during feeding and dispensing thereof, feed means for feeding and dispensing the sheet materials and cabinet closure means having portions structurally and hingedly associated with one of said structures for selective movement therewith and relative thereto for enabling selective movement of the frames relative to the photocopy or duplicating apparatus for loading and reloading.

In the drawing: FIG. 1 is a pictorial illustration of a portion of a photocopy or duplicating machine incorporating the improved apparatus for feeding and dispensing continuous sheet materials from a plurality of rolls wound upon tubular cores constructed in accordance with the present invention;

FIG. 2 is a side elevational partial sectional view of the machine illustrated in FIG. 1;

FIG. 3 is an end elevational partial sectional view taken along line 3—3 of FIG. 2; and

FIG. 4 is a side elevational view of the mandrel utilized in the present invention.

With reference now to the drawing, and particularly FIG. 1 thereof, there is shown an illustrated improved

photocopy or duplicating apparatus, such as a diazo type duplicating or photocopy machine constructed in accordance with the present invention, designated generally by the reference character **10**. Only such portions thereof are shown which have a material bearing on the present invention.

The photocopy or duplicating apparatus or machine **10** comprises feeding and dispensing apparatus **12** for feeding and dispensing roll form sensitized materials **14** and **16** to printing and developing apparatus (not shown) contained within a cabinet **18**. The printing and developing apparatus is of conventional construction and is not illustrated herein, inasmuch as the operation thereof has no connection with the present invention. Suffice it to say a pellucid original or master (not shown) is superimposed with one of the sensitized materials **14** and **16**, the superimposed original and sensitized material exposed to a source of radiant energy to produce a latent image on the sensitized material. The original and sensitized material are then separated, the original being returned from the machine **10** and the sensitized material is developed in a conventional manner, either by gaseous or moist development and then returned from the machine or apparatus **10**.

The feeding and dispensing apparatus **12** (see FIGS. 1–3) comprises an upper frame **20**, a lower frame **22**, upper slide means **24** structurally associated with the upper frame **20** and the cabinet **18**, lower slide means **26** structurally associated with the lower frame **22** and the cabinet **18**, upper linkage means **28** associated with the upper frame **20** and the cabinet **18**, lower linkage means **30** associated with the lower frame **22** and the cabinet **18**, an upper mandrel **32** carried by the upper frame **20** for rotatably supporting the roll of sheet material **14** and applying a tension or drag thereto and a lower mandrel **34** carried by the lower frame **22** for rotatably supporting the roll of sheet material **16** and applying a tension or drag thereto.

The upper linkage means **28** comprises a forward link member **36** of generally elongate configuration, the upper end of which is pivotally associated with the frame **20** and a rear link member **38**, the upper end portion of which is pivotally associated with the cabinet **18**. The lower end portions of the link members **36** and **38** are pivotally interconnected.

Similarly, the lower linkage means **30** comprises a forward link member **40**, the upper end portion of which is pivotally associated with the upper frame **22** and a rear link member **42**, the upper end portion of which is pivotally associated with the cabinet **18**. The lower end portions of the link members **40** and **42** are pivotally interconnected.

Accordingly, the upper and lower frames **20** and **22**, respectively, are slidably supported on the slide means **24** and **26**, respectively, for movement between forward and rear positions, or outward and inward positions, indicated by phantom and solid lines, respectively in FIG. 2 of the drawing.

Upper and lower sheet guide means **44** and **46**, respectively, are structurally associated with the rear upper and lower links **38** and **42**, respectively. Upper and lower anti-curl means, such as an anti-curl bar **48** and an anti-curl member **50**, respectively, are also structurally associated with the rear links **38** and **42** for movement therewith. Upon movement of the frames **20** or **22**, the respective linkage means **28** or **30** causes the associated sheet guide **44** or **46** and the associated anti-curl means **48** or **50** to move therewith to enable simple loading, unloading or reloading of the rolls of sheet material **14** and **16** and simple threading of the sheet materials **14** and **16** between the respective sheet guides **44** and **46** and the associated anti-curl means **48** and **50**.

Upper feed rolls **52** and lower feed rolls **54** are also provided, as are upper and lower outlet guides **56** and **58**, respectively, to feed and guide the respective sheet materials into the exposing section of the machine or apparatus **10**.

As shown, particularly in FIGS. 1 and 2 of the drawing, the lower frame **22** is structurally associated with cabinet closure means, designated generally by the reference character **60**. The closure means **60** comprises a lower panel member **62** fixedly associated with the lower frame **22** and an upper panel member **64** movably associated with the lower frame **22**. The upper and lower panel members **64** and **62** are hingedly interconnected, as by hinge means **66**.

The upper and lower frames **20** and **22**, respectively, may therefore be separately and independently moved relative to the cabinet **18**. For example, if only the upper frame **20** is to be moved, to enable loading, unloading or reloading of the roll of sheet material **14**, the upper panel member **64** may be hingedly swung outwardly and downwardly, without moving the lower panel member **62** and the lower frame **22**. With the upper panel member **64** positioning shown, that is, open, the upper frame **20** may be readily slid outwardly of the cabinet **18** for loading, unloading or reloading of the roll of sheet material **14**. Likewise, if only the lower frame **22** is to be moved, then this can also be readily accomplished with the upper panel member **64** swung outwardly and downwardly, as seen in FIG. 1. If both the upper and lower frames **20** and **22** are to be moved, this may also be accomplished, as shown in phantom in FIG. 2. The upper panel member **64** may be latched or retained in the closed position thereof, as shown in solid lines in FIG. 2, as by friction retaining means **68** associated with the cabinet **18**.

The mandrels **32** and **34** are identical, and for example the mandrel **32** (see FIGS. 2 and 4) comprises a generally cylindrical central portion **70** provided with a longitudinally extending slot or groove **72** on the bottom surface thereof. Each end portion of the mandrel **32** is provided with a tenon **74** adapted to removably, non-rotatably engage the frame **20**. The mandrel **32** is further provided with a fixed edge guide pin **76** adjacent one end portion thereof for guiding one side edge of the roll of material **14** adjacent thereto and with a plurality of threaded apertures **78** for removably receiving a threaded edge guide pin **80**. As readily seen, the removable edge guide pin **80** may be threadedly associated with a selected one of the threaded apertures **78** to enable the accommodation and edge guidance of different width rolls of sheet materials.

The mandrel **32** also comprises drag inducing or tensioning means, comprising, for example, a spring member **82** structurally associated therewith within the groove **72** and extending generally outwardly thereof, as shown, to frictionally engage the inside surface of the tubular core upon which the roll of sheet material **14** is wound, thereby tensioning the material **14**.

In use, the mandrels **32** and **34** are engaged within the tubular cores of the rolls of sheet material **14** and **16**, and with the frames **20** and **22**. The leading edges of the materials **14** and **16** are threaded between the guides **44** and **46** and the anti-curl means **48** and **50**, respectively, and through the respective feed rolls **52** and **54** and outlet guides **56** and **58** and thence into the machine or apparatus **10**. The original is fed into the machine or apparatus **10**, as along the upper surface of a hinged top panel **84**, which also provides added access to the feeding and dispensing apparatus **12**, as shown in FIG. 1.

It is to be understood that terminology such as "upper," "lower," "front," "rear," "inner" and "outer," as used in the preceding description and in the subjoined claims, along with other similar directional terminology, is to be construed and interpreted in its normal and accepted sense.

While the invention has been described, disclosed, illustrated and shown in terms of a preferred embodiment or modification which it has assumed in practice, the scope

of the invention should not be deemed to be limited by the precise embodiment or modification herein described, disclosed, illustrated or shown.

What is claimed is:

1. In a photocopy or duplicating apparatus, especially of the diazo-type having printing and developing means enclosed within a cabinet, the improvement comprising means for feeding and dispensing sheet materials from a plurality of rolls thereof wound on tubular cores, said feeding and dispensing means comprising a plurality of frames associated with the cabinet and a mandrel adapted to rotatably support the tubular core of a roll of sheet material associated with each frame, slide means movably associating at least one of said plurality of frames with said cabinet for enabling movement of said frame outwardly thereof, linkage means which comprises a forward link member and a rear link member with one end portion of said forward link member being pivotally associated with said frame, and one end portion of said rear link member being pivotally associated with said cabinet and the other end portions of said link member being pivotally interconnected, sheet guide means structurally associated with said rear link member for movement therewith, with feed rolls positioned adjacent said guide means, and anti-curl means structurally associated with said rear link member relative to said guide means.

2. In a photocopy or duplicating apparatus especially of the diazo-type having printing and developing means enclosed within a cabinet, the improvement comprising means for feeding and dispensing sheet materials from a plurality of rolls thereof wound on tubular cores said feeding and dispensing means comprising a plurality of frames associated with the cabinet and a mandrel adapted to rotatably support the tubular core of a roll of sheet material associated with each frame, slide means for enabling independent sliding movement of each of said frames relative to said cabinet and outwardly thereof, and cabinet closure means structurally associated with one of said frames for movement therewith and relating thereto.

3. Apparatus as defined in claim 2 wherein said cabinet closure means comprises first panel means structurally associated with one of said frames and second panel means hingedly associated with said first panel means.

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U.S. Cl. X.R.

242—55.53; 312—39