Oct. 24, 1967 A. R. TANGUAY ETAL 3,348,288

DRUM CLAMP

Filed Oct. 1, 1965 5 Sheets-Sheet 1

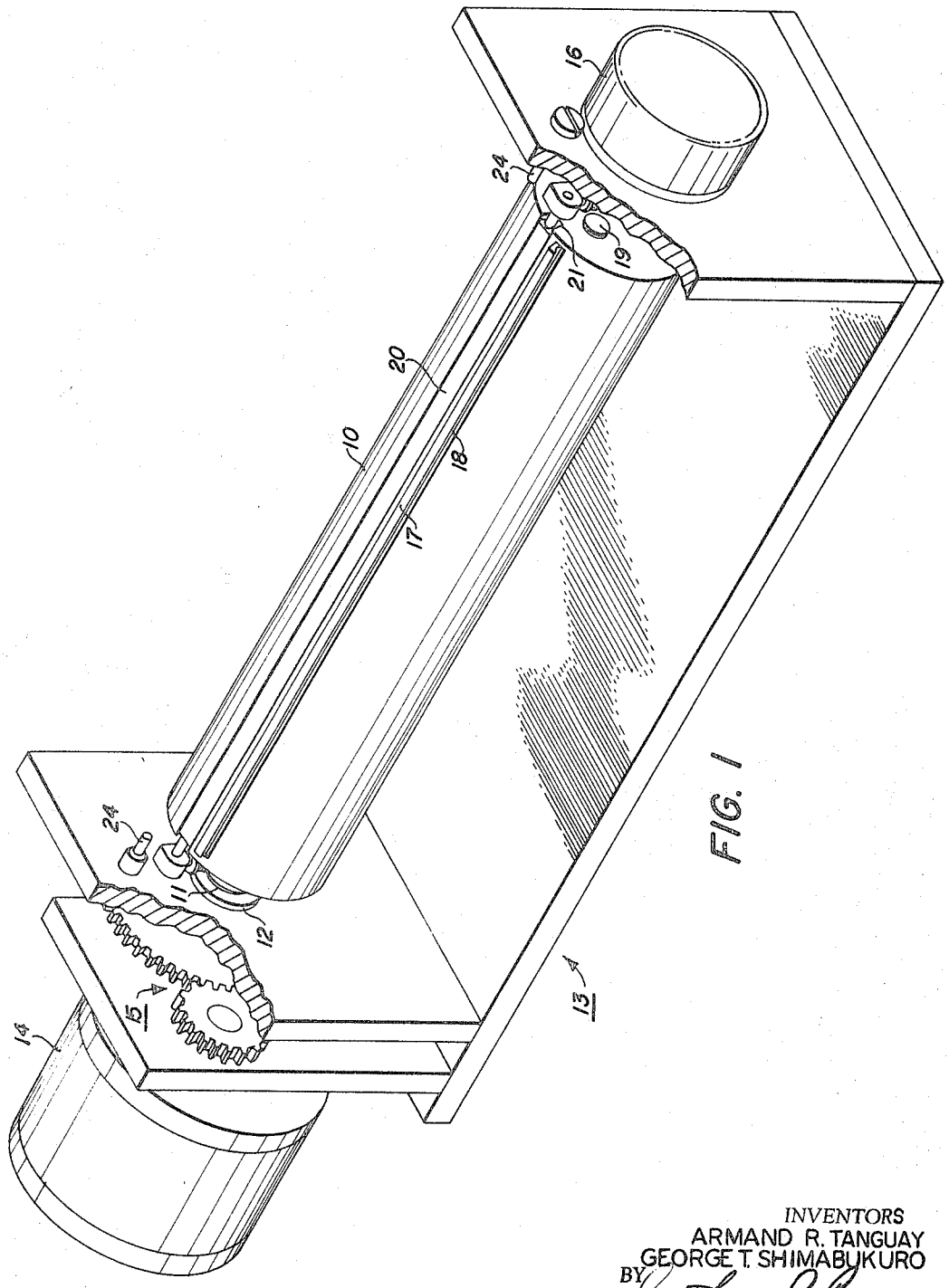


FIG. 1

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DRUM CLAMP

Filed Oct. 1, 1965 5 Sheets-Sheet 2

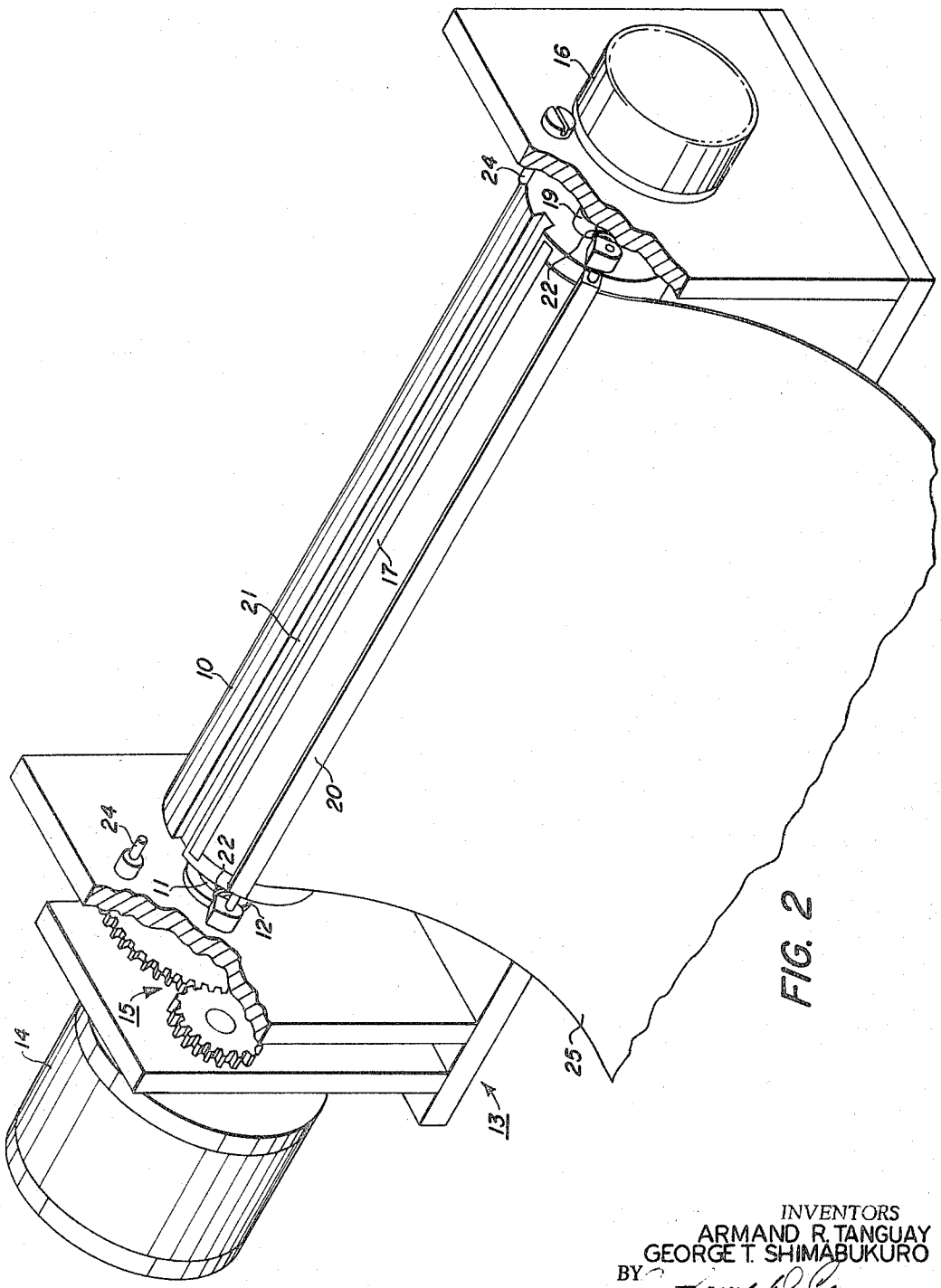


FIG. 2

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DRUM CLAMP

Filed Oct. 1, 1965 5 Sheets-Sheet 3

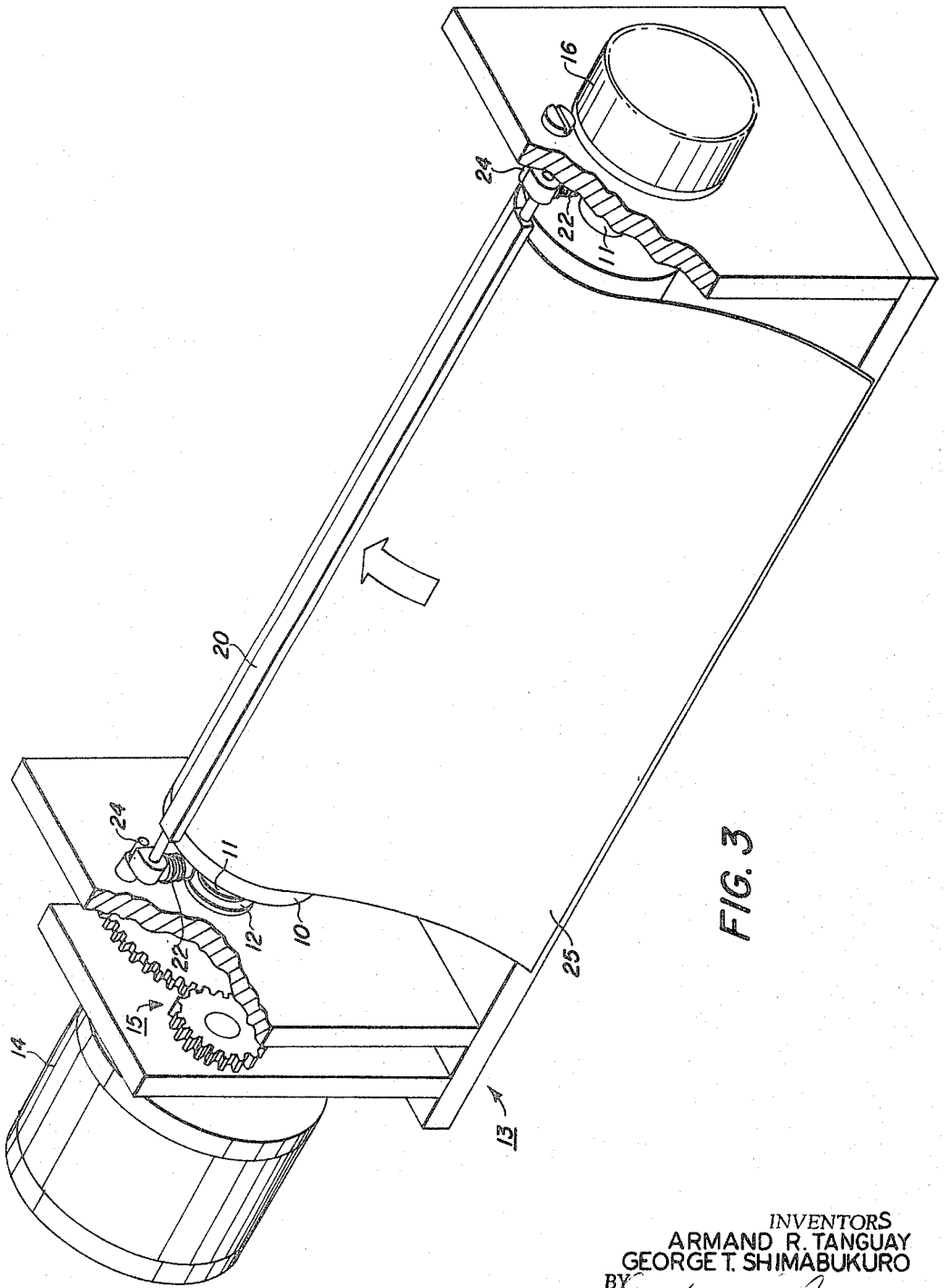


FIG. 3

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DRUM CLAMP

Filed Oct. 1, 1965 5 Sheets-Sheet 4

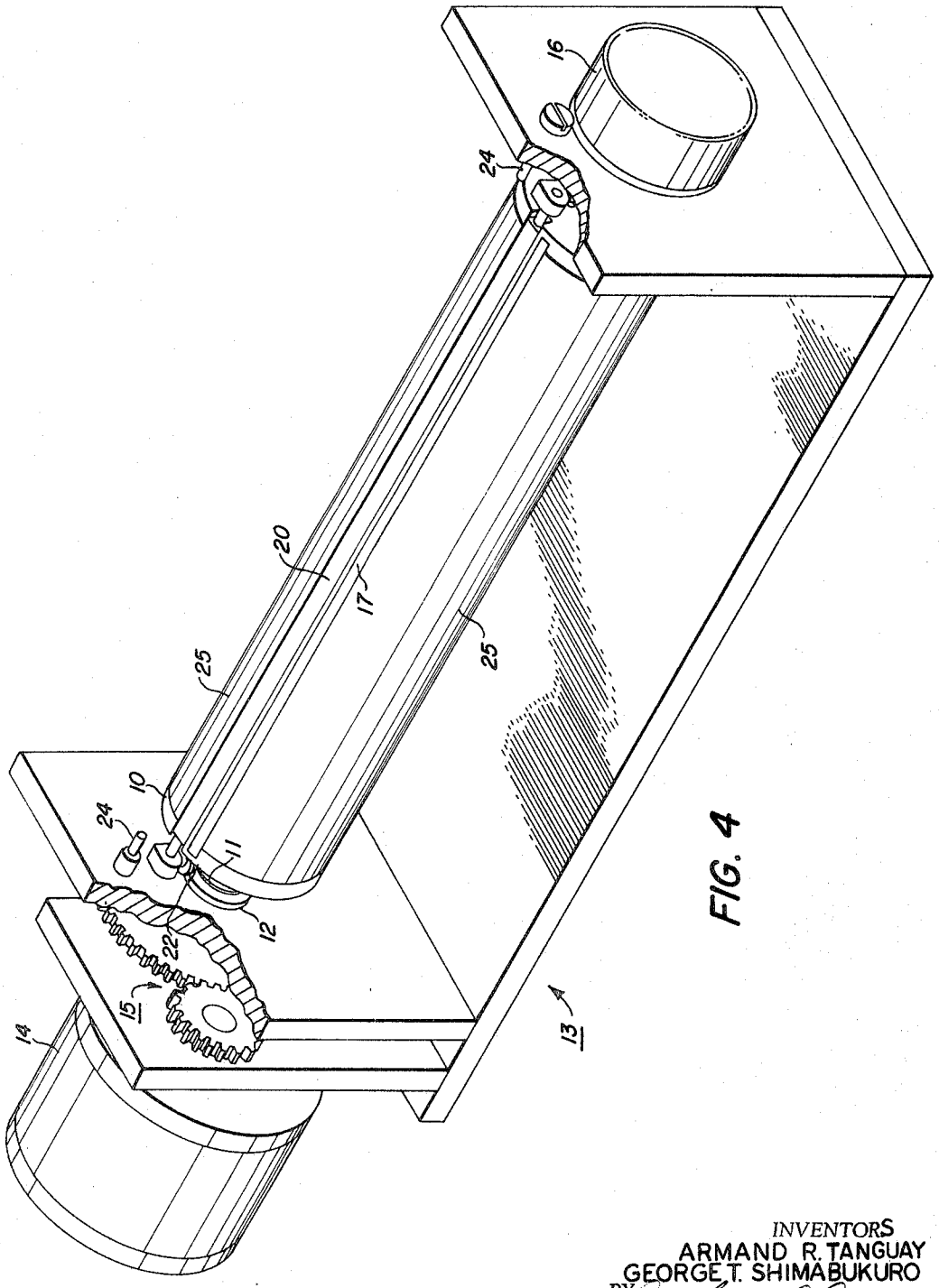


FIG. 4

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Filed Oct. 1, 1965 5 Sheets-Sheet 5

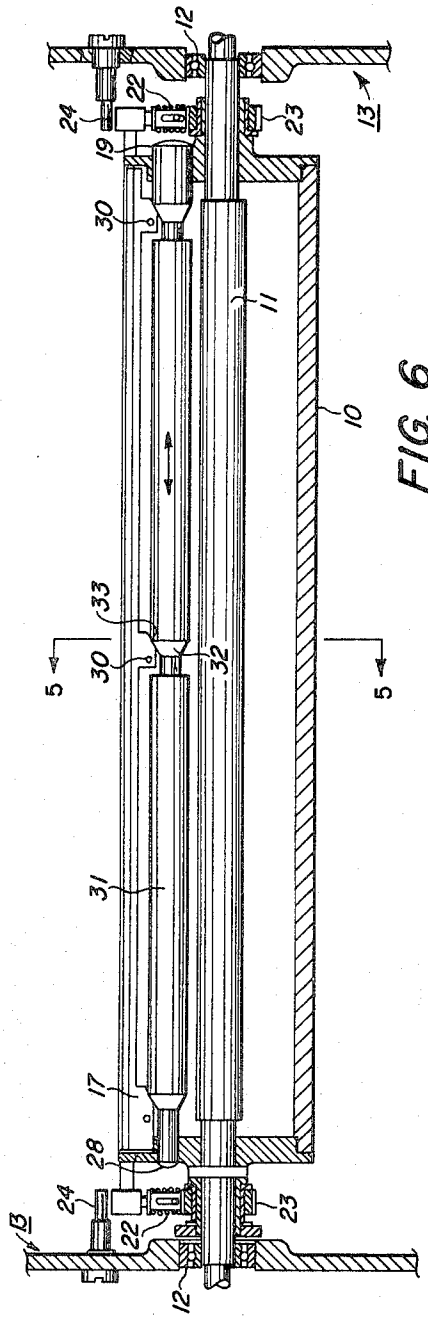


FIG. 6

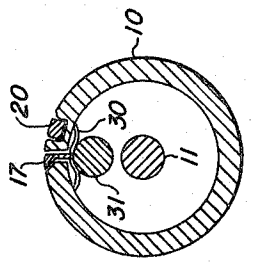


FIG. 5

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United States Patent Office 3,348,288 Patented Oct. 24, 1967

3,348,288

DRUM CLAMP

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Filed Oct. 1, 1965, Ser. No. 492,223
3 Claims. (Cl. 29—118)

ABSTRACT OF THE DISCLOSURE

Apparatus for securing a sheet of flexible material to a drum including a clamp bar supported within the drum actuatable by means of an axially movable cam for securing a leading edge of sheet material and a wiper bar supported externally of the drum to provide a tension on the sheet as it is wrapped thereabout and to secure the trailing edge.

This application relates to improved means for clamping a sheet of flexible material to a drum.

There are many arts in which it is desired to firmly apply and easily remove a sheet of paper, plastic, thin metal or other reasonably flexible material to a drum, particularly a rotatable drum. These fields include facsimile recording, seismographic recording, spirit duplicating, lithographic printing and many others.

It is accordingly an object of the invention to provide improved means for clamping a sheet of flexible material to a drum.

It is a further object to provide an improved means for clamping a sheet of flexible material to a drum in which the material need not be prepunched or otherwise specially prepared.

It is still a further object of the invention to provide means for clamping a sheet of flexible material to a drum in which the length of the sheet of the material is not critical.

It is still a further object of the invention to provide means for clamping a sheet of flexible material to a drum which is operable by untrained clerical personnel and which holds the sheet firmly to the surface of the drum.

The invention and its objects will be more fully explained with reference to the drawings.

FIG. 1 is an isometric view of a drum ready to receive a sheet of material;

FIG. 2 is an isometric view of a drum holding one edge of the sheet of material;

FIG. 3 is an isometric view of the drum around which a sheet of material is being wrapped;

FIG. 4 is an isometric view of the drum with a sheet of material clamped therearound;

FIG. 5 is a cross-sectional view of the apparatus of FIGS. 1 through 4; and

FIG. 6 is a longitudinal section through the apparatus of FIGS. 1 through 4.

Referring to FIG. 1 there is shown a drum **10**, preferably but not necessarily circular in section, which is mounted on a shaft **11** which in turn is journaled in bearings **12** for rotation with respect to a frame **13**. It would be equally possible to employ a fixed shaft and journal the drum for rotation about the shaft. A drive motor **14** rotates drum **10** through gears **15** at a speed appropriate for the intended use of the drum, i.e., a duplicating machine drum, facsimile recorder drum, or the like. A second clock type motor **16** usable only when applying a sheet to the drum for clamping is mounted so as to drive the drum **10** at a very low speed on the order of a few

revolutions per minute. Motor **16** will normally include an internal clutch as is commercially available in motors of this type. A clamp bar **17** is mounted in a slot **18**, these elements being more clearly shown in FIGS. 5 and 6. At least one edge of this slot is preferably inclined from a radius and bar **17** includes a corresponding lip and is shaped to conform to slot **18**. By depressing a button **19** projecting axially from the visible end of drum **10**, clamp bar **17** may be raised above the surface of drum **10** to the position shown. A further button **28** not visible in this figure, is on the opposite end of drum **10**, and may be depressed to retract clamp bar **17** into slot **18** so that it lies approximately flush with the surface of drum **10**.

As a first step in loading a sheet of flexible material onto the drum, one edge of the material **25** is inserted under and against clamp bar **17** which is then lowered, wedging the paper firmly between clamp bar **17** and one side of slot **18**.

FIG. 2 shows a sheet of material **25** clamped in this manner.

Drum **10** also includes a wiper bar **20** and a corresponding slot **21**, positioned near slot **18**. Wiper bar **20** is held at each end by spring means **22** which are attached to bearings **23** for rotation about shaft **11**. Wiper bar **20** is shown in slot **21** in FIG. 1, while in FIG. 2 wiper bar **20** has been lifted out of slot **21**.

FIG. 3 illustrates what happens as drum **10** is rotated away from the viewer either manually or preferably by motor **16**. Stops **24** mounted on frame **13** prevent wiper bar **20** from rotating with drum **10** when the bar is out of slot **21** as shown in FIG. 3. Bar **20** is then held against the surface of drum **10** by spring means **22** and as drum **10** slowly turns under wiper bar **20**, the sheet of material **25** is drawn firmly under a windup tension against the surface of drum **10** by the smooth underside of the bar.

FIG. 4 shows the completion of this process. When slot **21** has rotated beneath clamp bar **20**, the bar will be drawn into the slot, clamping thereunder the end of the sheet of material **25** opposite to that which is clamped under clamp bar **17**.

As clamp bar **20** falls into slot **21**, it is no longer prevented from rotating by stops **24** and the drum **10** is now entirely ready for its normal operation, in which both clamp bars rotate together with the drum as it is driven by motor **14**. It is apparent that no hand operations are required once sheet **25** has been clamped beneath clamp bar **17**. To remove sheet **25**, it is only necessary to raise clamp bar **17**, remove the edge of the sheet held thereunder, lift clamp bar **20** out of its slot and rest it on an uncovered portion of drum **10**.

The length of sheet **25** is not extremely critical. The sheet must be long enough for one end to lie under bar **20**, but the size of slot **21** will accommodate a certain excess length. A further excess will extend outside slot **21** and may be manually trimmed off.

FIG. 5 is a cross-sectional view of drum **10** more clearly illustrating the configuration of the clamp bars and corresponding slots. In particular, it can be seen that clamp bar **20** is smoothly contoured on its lower surface.

FIG. 6 is a longitudinal sectional view through the apparatus shown in the preceding figures. It can be seen that button **19** is actually one end of the clamp bar operating shaft **31** which has three ramps **32** formed thereon. These ramps cooperate with corresponding ramps **33** on clamp bar **17** to raise the bar out of drum **10**. Wire springs **30** are provided to draw clamp bar **17** back into drum **10**. It will be understood that either or both of motors **14** and **16** may be replaced by hand cranks or the like and that various equivalent structures can be provided for those shown in the figures without departing from the concept of the invention. Furthermore, the in-

vention can be satisfactorily employed without stops 24.

What is claimed is:

1. Sheet to drum clamping means comprising:

(a) a drum journaled for rotation about an axis in a frame;

(b) a first longitudinal slot in the drum;

(c) a clamp bar supported within said drum normally biased to lie within said first slot and having a plurality of ramp portions thereon;

(d) an axially extending cam supported for movement within said drum and having ramp portions operatively connected to said clamp bar ramp portions to move said bar outward from said slot to receive a first edge of a sheet of flexible material and to move said bar inward into said slot to secure said first edge to said drum;

(e) a second longitudinal slot in the surface of said drum adjacent to said first slot; and

(f) a wiper bar normally biased to lie within said second slot and removable therefrom supported externally of said drum to provide a windup tension to the sheet and to secure a second edge of said sheet in said second slot.

2. Apparatus according to claim 1 in which there is included drive means connected to said drum and operative to rotate said drum at a first rate to wrap a sheet thereon and at a second rate for utilization of the sheet clamped thereon.

3. Apparatus according to claim 1 including stop means mounted with respect to said frame to prevent said wiper bar from rotating with said drum when out of said second slot and to permit it to rotate with said drum when lying in said second slot.

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