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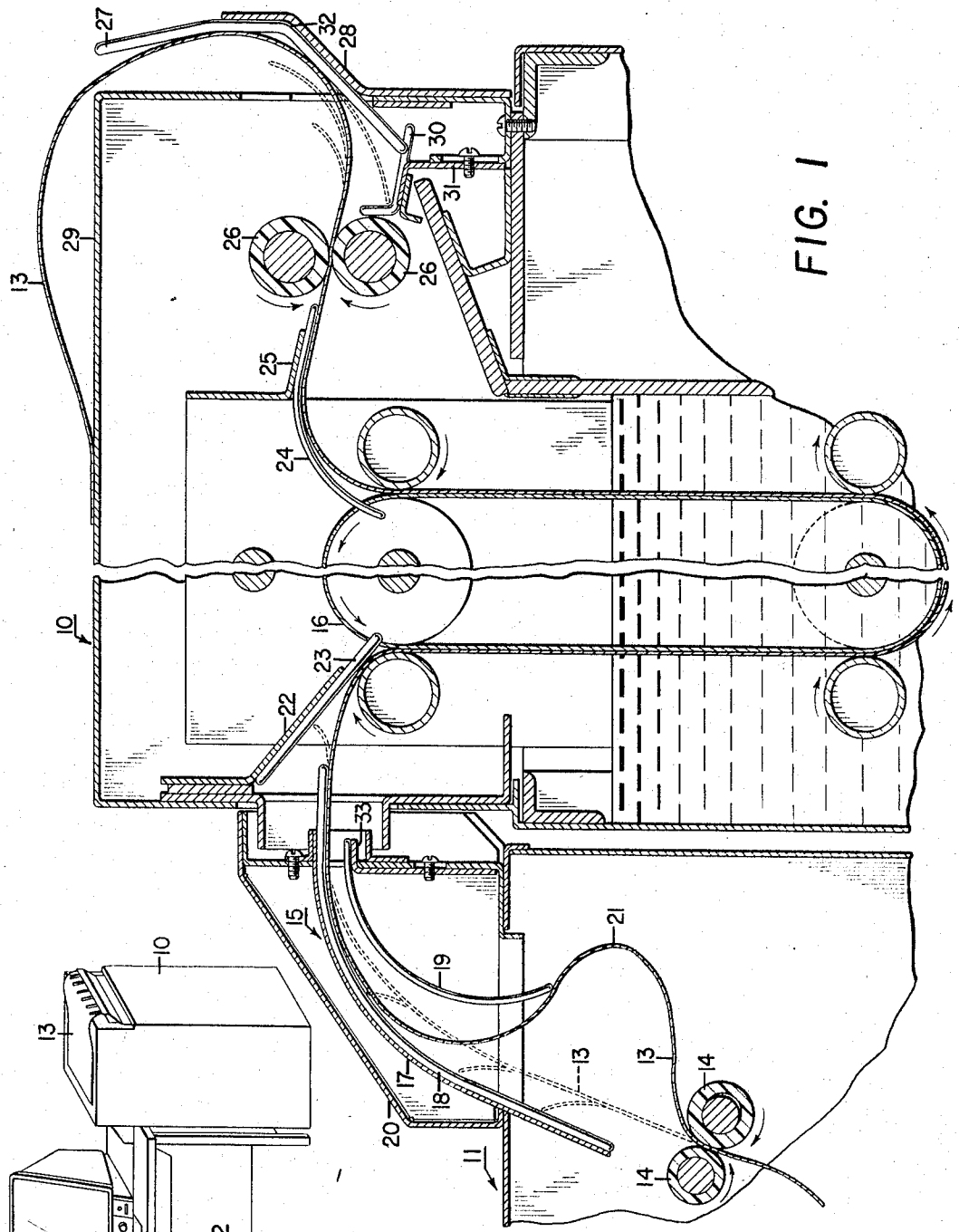


FIG. 1

FIG. 2

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PROJECTION OFFSET PROCESSOR AND THE LIKE

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This invention relates to improved guide means for apparatus adapted to feed sheets of material through processing solutions, and more particularly to improved guide means for processors that are adapted to transport offset master sheets through processing solutions and that are often used in cooperation with associated equipment such as a projection printer.

Prior art sensitized sheet material processors have been found to be unsatisfactory for processing projection offset plate or master sheet material such as the material marketed by the assignee under the trademark "Project-A-Lith."

This material is characterized by a paper sheet that is plastic coated on both surfaces and has a sensitized emulsion on top of one of the plastic coatings. The overall thickness of this sheet is in the order of .007", and it is inherently stiff in contrast to typical sensitized paper. This stiffness increases the difficulty of transporting the sheets into, through, and out of processors. The problems of transportation are further increased by the emulsion surface becoming extremely soft as it is exposed to the developing agents. The soft emulsion ordinarily has a tendency to mar or become embossed during transportation, and any physical damage to the emulsion affects the quality of the final printed copy. Also, these offset master sheets have a tendency to curl, and as the emulsion is softened by its exposure to the developing agents, such tendency to curl is increased. Such curl must be carefully controlled and compensated for so that the sheets are fed accurately through the proper paths without jamming or binding.

An object of the invention is improved feeding of offset master sheets into and out of processing equipment.

Another object of the invention is to compensate for the stiffness and tendency to curl of offset master sheets in feeding such sheets into and out of processing equipment.

Another object of the invention is to feed offset master sheets smoothly from a printer or other apparatus into a processor and to guide the processed sheets smoothly from a processor to a location convenient for the processor operator.

Another object of the invention is to feed an offset master sheet from one unit of equipment to another without sticking, binding, jamming, or marring the emulsion surface in spite of differences in the speeds of the sheet feed drive of the two units of equipment.

Another object of the invention is to invert an offset master sheet as it leaves a processor and to deposit such inverted offset master sheet within sight of the operator of the processor and an associated printer so that the operator can quickly and conveniently determine whether such offset master is a suitable one.

To these and other ends the invention resides in certain improvements and combinations, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of this specification.

In the drawings:

FIG. 1 shows a partial cross sectional view of guide means for feeding an offset master sheet into and out of a processor according to the invention; and

FIG. 2 shows an isometric view of an offset master processing unit positioned adjacent a printing unit for receiving offset master sheets from the printing unit, processing such sheets, and delivering them in the view and reach of the operator.

In one preferred arrangement as illustrated in FIG. 2, an offset master sheet processor **10** according to the invention is associated with other equipment such as printer **11**. Chair **12** indicates the position of an operator of these associated units of equipment. An offset master sheet **13** is printed in printer **11**, fed to processor **10** where it is transported through processing solutions, and then delivered into the view of and within the convenient reach of an operator in chair **12**. The processed offset master sheet **13**, as deposited on top of processor **10**, is oriented so that it can be read by an operator in chair **12**.

The details of the operation of a processor according to the invention are best shown in the cross section view of FIG. 1. In this somewhat schematic representation, an offset master sheet **13** is shown as entering and leaving processor **10**. The path of travel of offset master sheet **13** is from rollers **14** near the exit of printer **11**, through an input guide **15** to processor **10**, through processing solutions in processor **10**, and through an output guide **32** and onto the top of processor **10**. Offset master sheet **13** is preferably oriented emulsion side outward as it passes through the transporting means **16** within processor **10**, so that the emulsion is fully and uniformly contacted by processing solutions within processor **10**. The tendency to curl of offset master sheet **13** is such that when oriented emulsion side out in the transporting means of processor **10**, offset master sheet **13** tends to curl back upon its backside and thus bends its leading and trailing edges in against the transporting means. This tendency to curl, along with the inherent stiffness, of offset master sheet **13** is accurately compensated for by the invention as illustrated in processor **10**.

As the leading edge of offset master sheet **13** passes beyond rollers **14** in printer **11**, it is guided through an input guide **15** into processor **10**. Input guide **15** in cross section has generally the shape of a curved horn with the wide end closest to rollers **14** and the narrow end near transporting drive means **16** in processor **10**. The curved guide slot of input guide means **15** extends for substantially the full width of offset master sheet **13**. Input guide means **15** can be conveniently formed of a backing plate **17** to which are secured guide wires **18** spaced along backing plate **17** for substantially the full width of offset master sheet **13**. Opposed to wires **18** are a complementary plurality of guide wires **19** that are secured to support means **33**. A protective hood **20** provides a safe shield enclosing input guide means **15** and completing the connective closure between printer **11** and processor **10**.

The curved horn shape of input guide means **15** is arranged so as to allow a loop to be formed in offset master sheet **13** near rollers **14** and near the open end of input guide means **15**, while at the same time, to control closely the path of offset master sheet **13** near the narrow end of input guide means **15** so as to direct the leading edge of sheet **13** accurately into the nip of drive means **16** in processor **10**. The formation of a loop **21** in offset master sheet **13** allows for differences in driving speed between the sheet feeding means of printer **11** as represented by driven rollers **14** and drive means **16** in processor **10**. Loop **21** is arranged to be near drive rollers **14** and the open end of curved input guide **15** rather than near drive means **16** in processor **10** so that such loop will be confined to a portion of the offset master sheet remote from its leading edge and the driven feed means **16** of processor **10**. Allowing of any loop forma-

tion other than near the wide end of input guide means **15** has been found to cause buckling, folding, binding, jamming, or other malfunction in the feeding of an offset master sheet from printer **11** to processor **10**.

As the leading edge of offset master sheet **13** passes beyond the narrow end of input guide means **15**, it tends to curl upward as shown by broken lines, but is guided downward by guide wires **23** secured to backing plate **22** so as to be fed into the driven nip of feeding means **16** in processor **10**.

After the leading edge of offset master sheet **13** is fed into the nip in feeding means **16** in processor **10**, loop **21** can be allowed to form gradually near the wider end of input guide **15** as a result of the greater driving speed of rollers **14** relative to sheet feeding means **16**. The preferred shape of input guide means **15** is such as to allow formation of loop **21**, but to confine it to the open end of input guide means **15** and to keep it spaced from drive means **16** so that loop **21** will not interfere with smooth and accurate feeding of offset master sheet **13**.

Offset master sheet **13** is then fed through a plurality of processing solutions in processor **10** until the desired processing is completed, whereupon master **13** is fed out of processor **10**. The leading edge of offset master sheet **13** is deflected away from drive means **16** by curved guide wires **24** that are secured to backing plate **25** so that the leading edge of offset master sheet **13** is directed into squeegee rollers **26** which remove excess processing solution.

As preferably oriented in its passage through sheet feeding means **16**, offset master sheet **13** is emulsion side outward, and as it passes through squeegee rollers **26**, it is oriented emulsion side downward. Hence to be readable by an operator, master sheet **13** must be inverted. This is accomplished according to the invention by guide wires **27** fastened to backing plate **28** to form an output chute or guide **32**. Guide wires **27** cooperate with the natural curl of offset master sheet **13** to guide such sheet upward and over squeegee rollers **26** onto the top **29** of processor **10** where it is positioned emulsion side up and readable by an operator. Such inversion of offset master sheet **13** not only makes the offset master readable as deposited on top of processor **10**, but also saves space and gives another function to the top **29** of processor **10**.

Offset master sheets **13** of various lengths may be fed through processor **10** and through the outlet guide **32** onto the top **29** of processor **10**, and the shorter lengths of sheets tend to slide off of the top **29**, back down under squeegee rollers **26**, and into processor **10**. To prevent any such obviously detrimental movement, stop wires **30** secured to backing plate **31** are arranged immediately beyond and below the nip of squeegee rollers **26** so as to catch the trailing edge of an offset master sheet **13** as it emerges from squeegee rolls **26** and to prevent any reverse motion of the sheet. Stop wires **30** are bent upward near squeegee rolls **26** so as to retain the trailing edge of offset master sheet **13** against any downward or reverse motion of the sheet. Thus, for masters **13** that are too short to reach a self supporting position of rest on the top **29** of processor **10**, guide wires **30** prevent their sliding back into processor **10**. For longer offset master sheets **13** which can maintain a position of rest on the top **29** of processor **10**, the stop wires **30** lightly support trailing edges only.

The various guide wires such as **18**, **19**, **23**, **24**, **27**, and **30** provide a plurality of raised ribs or ridges spaced along substantially the full width of offset master sheet **13** for controlled guiding. The various shaped guides according to the invention are provided with such raised ribs or ridges to reduce the friction and drag of wet master sheets moving relative to a guide. Alternative to guide wires, a guide plate may be corrugated or swaged to provide a plurality of raised ridges according to the invention. Such guide means can meet the requirement of feeding inherently stiff and curled offset master sheets through the various paths as required according to the invention without great expense in shaping guide means, and such means also offer a maximum of guiding with a minimum of contact with offset master sheets **13**.

It will thus be seen that the inventive structure accomplishes the above stated objects, and while the invention has been disclosed herein by reference to the details of a preferred embodiment, it is to be understood that such disclosure is intended in an illustrative rather than a limiting sense, and it is contemplated that various modifications of the construction and arrangement of the parts will readily occur to those skilled in the art within the spirit of the invention and the scope of the appended claims.

We claim:

1. In a processor adapted to receive offset master sheets from associated equipment having independent sheet feeding means and to transport said offset master sheets through processing solutions, said processor having drive means for advancing said sheets, the improvement comprising: input means for receiving said sheets from said associated equipment, said input means including curved guide means formed with upper and lower walls having a curved horn-shape in cross section for receiving the leading edge of one of said sheets in the wide end of said guide means and guiding said leading edge through the narrow end of said guide means into a nip for said advancing means, means for increasing the tangential drive velocity of said independent sheet feeding means relative to the tangential drive velocity of said sheet advancing means to form a loop in each of said sheets between said independent sheet feeding means of said associated equipment and said advancing means of said processor; and guide means consisting of substantially stationary components for guiding said sheets along an output path having a direction which is gradually changing and extending from said advancing means through an outward path, an upward path, and a reverse path for inverting said sheets and depositing said sheets on top of said processor.

2. The processor of claim **1** wherein said curved horn-shaped input guide means is arranged so that said loop formed is each of said sheets in confined to a portion of each of said sheets near said wide end of said guide means so as to be spaced from said nip.

3. The processor of claim **2** wherein said guide means comprises a plate provided with a plurality of raised ridges arranged for engaging said offset master sheet at spaced intervals transversely of said offset master sheet.

4. The processor of claim **1** wherein said output means comprises a sheet metal guide plate and means providing a plurality of raised ridges arranged at spaced intervals transversely of said offset master sheet.

5. In a processor for transporting offset master sheets through processing solutions and having drive means for advancing said sheets, the improvement comprising: roller squeegee means positioned beyond said advancing means for removing excess fluid from said sheets; and guide means consisting of substantially stationary components arranged beyond said roller squeegee means for guiding said sheets along an output path having a direction which is gradually changing and extending from said squeegee means and tending upward and over said squeegee means for inverting said sheets relative to their orientation of said squeegee means, and for depositing said sheets on a sheet receiving platform located above said squeegee means.

6. The apparatus of claim **5** wherein a stop means is arranged immediately beyond and below said squeegee means to prevent the trailing edges of said sheets from falling downward under said roller squeegee and into said processor.

7. In a processor adapted to receive offset master sheets from associated equipment having independent sheet feeding means and to transport said offset master sheets through processing solutions by means of drive means

for advancing said sheets, means for guiding said offset master sheets, comprising: input means formed with upper and lower walls having a curved horn-shape in cross section and arranged for receiving the leading edges of said sheets in the wider end of said input means and for guiding said leading edges through the narrower end of said input means; first roller means positioned beyond the narrower end of said input means and having a nip for receiving said master sheet emerging from said input means, second roller means positioned beyond the wider end of said input means for introducing said sheets into said input means and for driving said sheets at a higher velocity than the tangential velocity of said first roller means so as to allow formation of a loop in said sheets near said wide end of said input means.

8. The process of claim **7** wherein said guide means comprise a plurality of bearing ridges raised from backing plates and arranged at spaced intervals transversely of said offset master sheet.

9. The processor of claim **7** including output means arranged beyond said drive means for guiding said sheets through a path leading outward, upward, and back for

inverting said sheets and depositing said sheets on top of said processor.

10. The processor of claim **9** wherein said output means comprises a sheet metal guide plate provided with a plurality of raised bearing ridges arranged at spaced intervals transversely of said offset master sheet.

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