

April 24, 1956

H. M. EBNER

2,743,103

APPARATUS FOR FEEDING SHEET MATERIAL

Filed Nov. 3, 1952

4 Sheets-Sheet 1

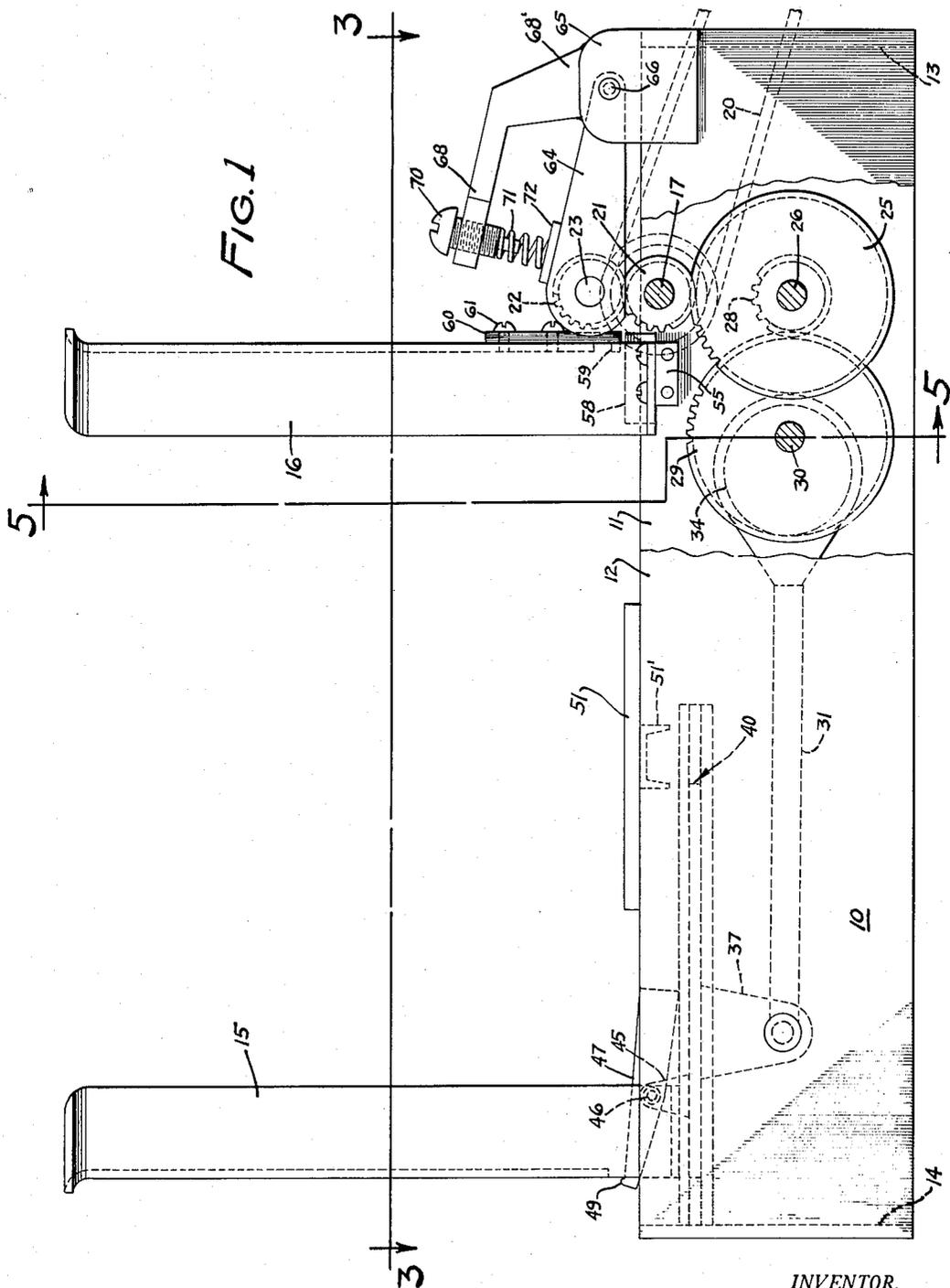


FIG. 1

INVENTOR.  
HENRY M. EBNER  
BY *Paul, Moore & Legger*  
ATTORNEYS

April 24, 1956

H. M. EBNER

2,743,103

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4 Sheets-Sheet 2

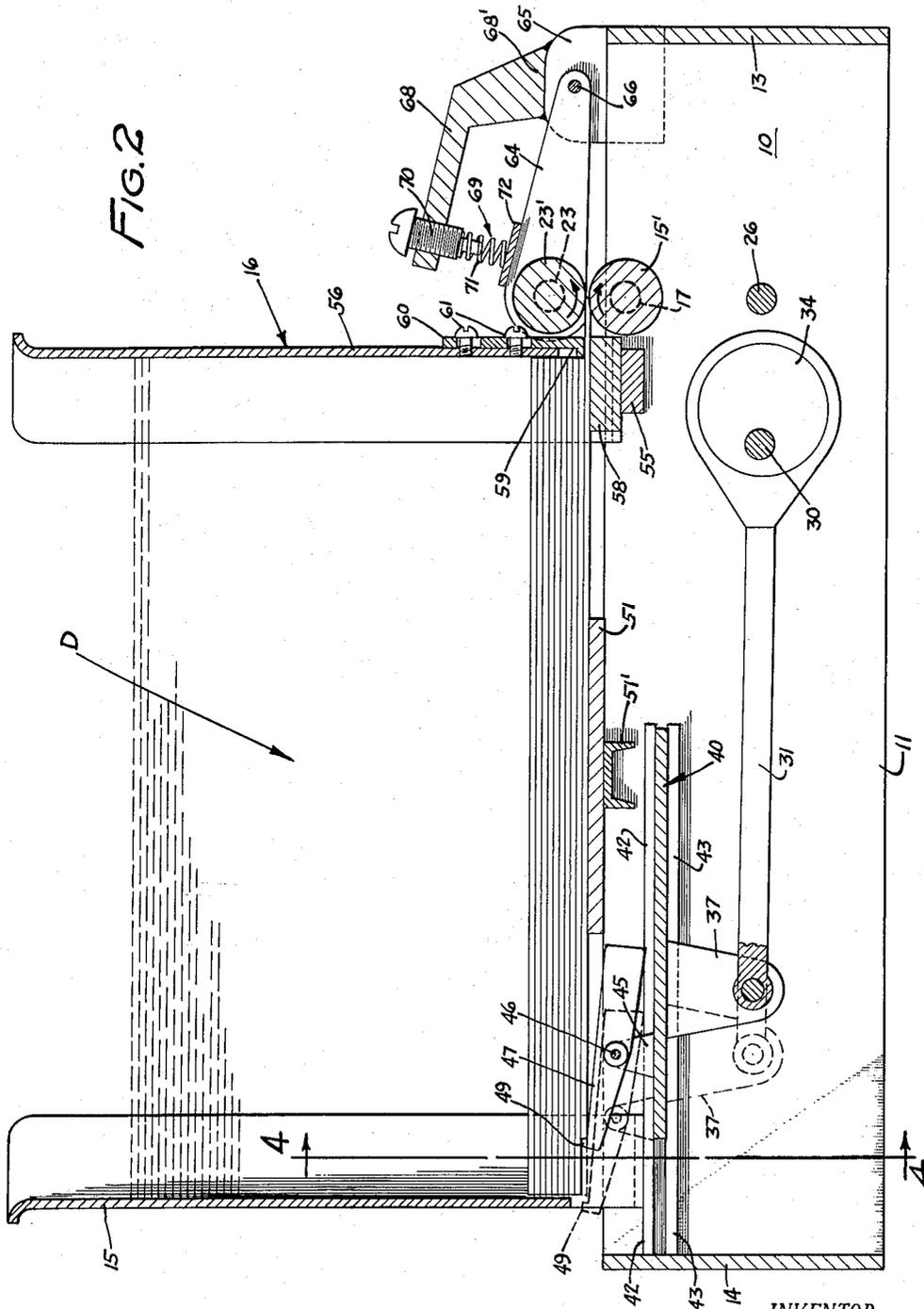


FIG. 2

INVENTOR.  
HENRY M. EBNER  
BY *Paul, Moore & Kugler*  
ATTORNEYS

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H. M. EBNER

2,743,103

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4 Sheets-Sheet 3

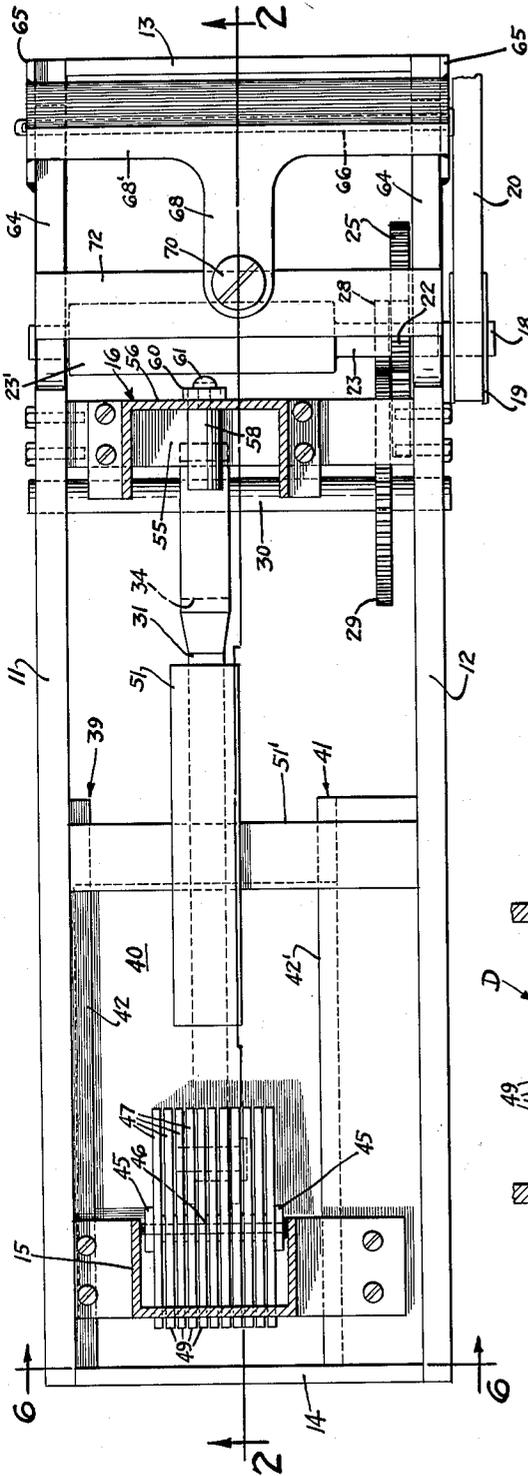


FIG. 3

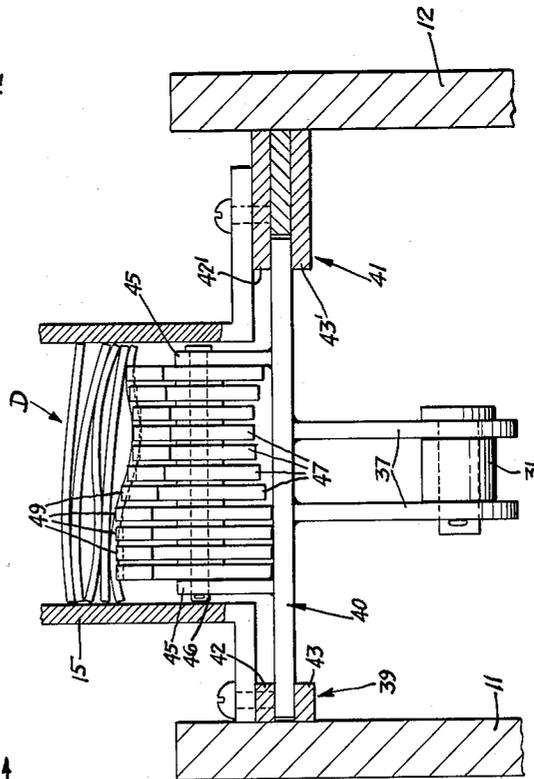


FIG. 4

INVENTOR.  
 HENRY M. EBNER  
 BY *Paul Mosenlueger*  
 ATTORNEYS

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H. M. EBNER

2,743,103

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4 Sheets-Sheet 4

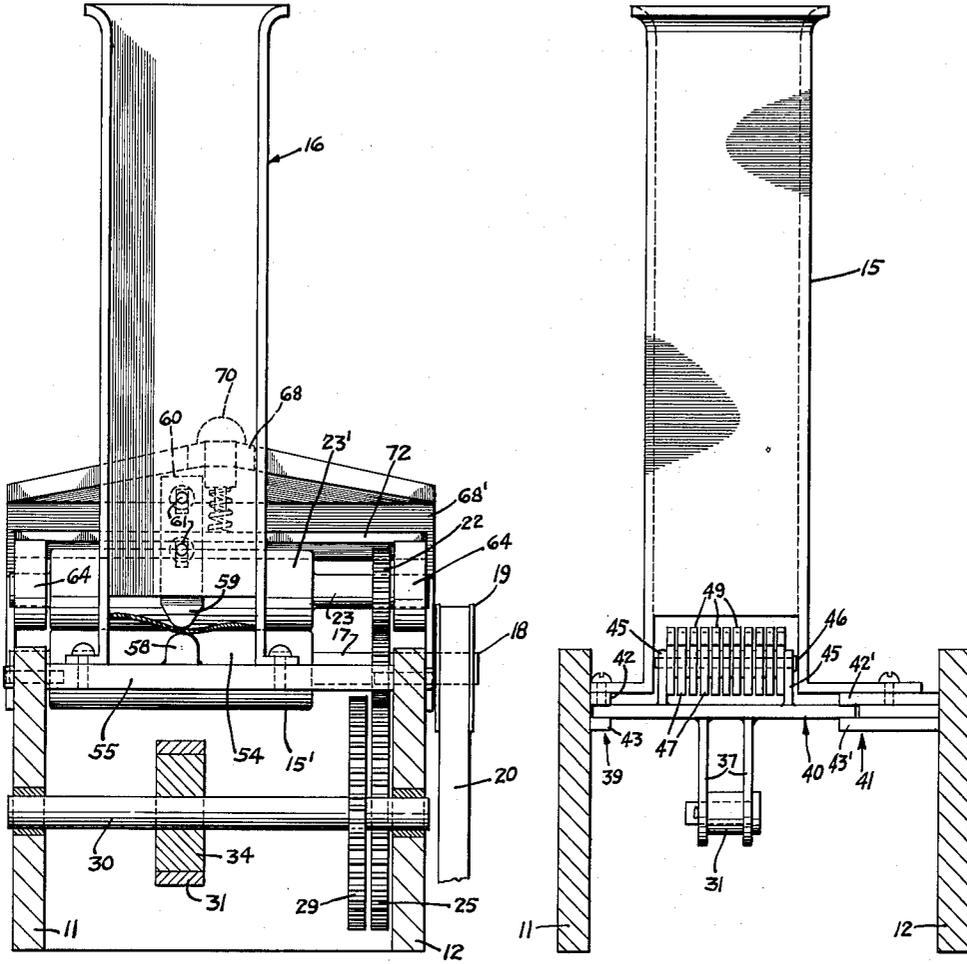


FIG. 5

FIG. 6

INVENTOR.  
HENRY M. EBNER  
BY  
*Paul Moore & Ruggier*  
ATTORNEYS

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2,743,103

**APPARATUS FOR FEEDING SHEET MATERIAL**

Henry M. Ebner, Cameron, Wis.

Application November 3, 1952, Serial No. 318,375

6 Claims. (Cl. 271—44)

This invention relates to new and useful improvements in apparatus for feeding sheet material, and more particularly to such an apparatus for successively feeding pre-sized strips of veneer from a hopper or magazine to a suitable receiving means as, for example, a machine for processing said strips into small containers such as berry boxes.

In the manufacture of small containers such as berry boxes, and the like, sheet veneer is cut into narrow, elongated strips of a given length and width, determined by the size of the box to be made, such as pint or quart boxes. Veneer strips, because of the inherent nature of the wood from which they are made, frequently tend to warp which, in some instances, may be sufficient to cause considerable difficulty in the handling of the strips, particularly in the successive feeding of said strips from the supply hopper. This difficulty may be further aggravated by the inherent fragility of such veneer strips, whereby they are readily susceptible to fracture and breakage during the feeding operation thereof.

In the manufacture of small berry boxes, as now carried on with conventional machines, the output or capacity of the equipment has been quite limited, largely because of the inability of present day equipment to expeditiously feed the strips of veneer from the supply hopper to the box processing mechanism. The novel apparatus herein disclosed is the result of long and costly development and experimental work in an attempt to provide a mechanism for efficiently and expeditiously feeding narrow strips of veneer from a supply hopper to a receiving mechanism, such as a box-making machine, one at a time, in rapid succession and without failure, regardless of the warped and distorted condition of the veneer strips in the hopper, whereby berry boxes and other small containers constructed of strips of veneer or other sheet material may be manufactured in mass production at very low cost.

An important object of the present invention therefore is to provide an improved hopper type feeder for successively and expeditiously feeding sheets, one at a time, to a box-making machine, whereby such machine may be operated at maximum capacity with the assurance the feeding of the veneer strips thereto will be continuous and without interruption, under normal operating conditions.

A further object of the invention is to provide a feeder for narrow, elongated strips of veneer, such as used in the manufacture of conventional pint and quart size berry boxes, comprising a supply hopper in which the strips of veneer are stacked in superposed relation, and reciprocating means being provided in the bottom of the hopper for successively feeding the strips of veneer therefrom, one at a time, in rapid succession, said means being adapted to engage only the lowermost strip in the hopper and eject it therefrom, and being so fashioned as to assure uniform feeding of the strips from the hopper to the receiving machine, even though the veneer strips may be warped and distorted.

A further and more specific object of the invention is

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to provide a feeder of the class described comprising a hopper for strip sheet material having a member mounted for reciprocal movement in the bottom thereof carrying a plurality of pivotally mounted dogs disposed in closely spaced relation, and each dog having an upright detent or shoulder at one end adapted to engage the rear end of the lowermost veneer strip in the hopper, when the reciprocal member is at the end of its return stroke, and whereby the forward movement of said member will cause one or more of said dogs to engage the rear end only of the lowermost strip and eject said strip from the hopper, means being provided at the opposite end of the hopper for preventing more than one strip from being ejected therefrom during each cycle of operation.

Other objects of the invention reside in the specific construction of the means provided at the discharge end of the hopper for positively limiting the ejection of the veneer strips from the hopper to one at a time; in the provision of a feeder of this general type which is capable of expeditiously feeding narrow, elongated, warped strips of veneer from a hopper, one at a time, whether wet or dry; and in the simple and inexpensive construction of the apparatus, whereby it may be manufactured and sold to the trade at a very low cost, a highly desirable attribute in apparatus of this general type.

These and other objects of the invention and the means for their attainment will be more apparent from the following description taken in connection with the accompanying drawings.

In the accompanying drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a front elevational view of the device partially broken away to more clearly illustrate the constructional details of the discharge end thereof;

Figure 2 is a vertical sectional view on the line 2—2 of Figure 3;

Figure 3 is a sectional plan view on the line 3—3 of Figure 1, showing the arrangement of the material-engaging dogs carried by the reciprocal member in the bottom of the hopper;

Figure 4 is a vertical sectional view on the line 4—4 of Figure 2, illustrating the ability of the pivoted dogs to adapt themselves to the cross-sectional configuration of the lowermost strip, to assure positive ejection thereof from the hopper;

Figure 5 is a vertical sectional view on the line 5—5 of Figure 1, showing the means at the delivery end of the hopper for limiting the ejection of the strips from the hopper to one at a time; and

Figure 6 is a sectional end elevation on the line 6—6 of Figure 3 with some of the parts omitted.

There are at present many various types of veneer box making machines in use. The device forming the subject matter of the present invention is suitable for use in conjunction with most such box making machines which are capable of continuously receiving the blank strips of veneer in rapid succession during the operation thereof.

The novel apparatus herein disclosed is shown comprising a suitable base, generally designated by the numeral 10, comprising side members 11 and 12, and end members 13 and 14. A pair of upright members 15 and 16, of channel cross-section, are secured to and extend upwardly from the base 10 at each end thereof. The members 15 and 16 are disposed in opposed relation, and cooperate to provide the end and side walls of an open hopper or magazine, generally designated by the ref-

erence character D. Hopper D is fashioned to support, in flat side relation, a stack of veneer strips to be utilized in the construction of boxes of a given size, as will be readily understood by reference to Figure 2.

A shaft 17 is rotatively mounted in suitable bearings provided in the side wall members 11 and 12 of the base 10, at the delivery end of the apparatus, and has an end portion 18 extending laterally from the side member 12 of the base, as shown in Figures 3 and 5. A pulley 19 is secured to the shaft extension 18 and may be driven by a belt 20 from a suitable source of power, not shown.

Secured to the shaft 17 within the base 10 is a spur gear 21 which meshes with a similar gear 22 secured to a shaft 23 located directly above shaft 17, whereby shafts 17 and 23 are operatively connected together for rotation in opposite directions. Feed rollers 15' and 23' are secured, respectively, to the shafts 17 and 23 and cooperate to feed the strips of veneer from the magazine and deliver them, one at a time, to a receiving means, not shown, as will subsequently be described. The spur gear 21 also meshes with a relatively larger gear 25, shown mounted upon a shaft 26 journaled for rotation in the side members 11 and 12 of the base 10. A pinion 28 is secured to shaft 26 for simultaneous rotation with the relatively larger gear 25. Pinion 28 meshes with a gear 29 secured to a shaft 30 which also is suitably journaled in the side wall members of the base.

An eccentric 34 is secured to the shaft 30 and has one end of a pitman 31 operatively engaged therewith. The opposite end of the pitman is pivotally connected to the lower ends of a pair of depending arms 37, constituting a portion of an ejector slide, generally designated by the numeral 40. The slide 40 is mounted for reciprocal movement in suitable guides, generally designated by the numerals 39 and 41, best shown in Figures 3 and 4. Guide 39 may be formed by welding or otherwise securing a pair of horizontally disposed elongated bars 42 and 43 to the side member 11 of the base in vertically spaced relation, as best illustrated at the left hand side, Figure 4. Guide 41 may be similarly formed by a pair of relatively wider bars 42' and 43', similarly secured to the opposite side member 12 of the base. A suitable spacer is shown interposed between the guide forming bars 42' and 43'.

An important feature of the present invention resides in the unique construction of the means provided for successively ejecting the veneer strips from the magazine, one at a time, and whereby only the lowermost strip in the magazine is engaged by the ejector, regardless of the cross-sectional contour of the bottom strip. The means provided for thus ejecting the strips from the hopper is best illustrated in Figures 2, 3 and 4, and comprises a pair of upright brackets or lugs 45 secured to the slide 40 in widely spaced relation, as best shown in Figure 4. A horizontally disposed rod or shaft 46 is removably supported in the upper ends of the brackets 46 and a plurality of dogs 47 are mounted for relative pivotal movement on the rod 46.

Each dog has a hook or tooth 49 at one end adapted to engage the rear edge of the lowermost veneer strip in the magazine, as best illustrated in Figure 2. The opposite or forward ends of the dogs 49 are enlarged, as shown in Figure 2, whereby they are relatively heavier than the rear ends thereof so that the weighted forward ends of the dogs continually urge their hook ends 49 upwardly into engagement with the lowermost veneer strip. If desired, the weighted end portions of the dogs may be dispensed with and suitable spring means provided for urging the hooked ends of the dogs into engagement with the veneer strips, but the weighted construction here shown has been found preferable because of its simplicity.

Another feature of the invention resides in the means provided at the forward or delivery end of the apparatus for controlling and limiting the delivery for ejection of the veneer strips from the hopper or magazine to one at a time, regardless of the warped condition of the veneer

strips in the hopper. To thus limit the ejection of the veneer strips from the hopper to one at a time, a pair of control elements 58 and 59 are provided in the delivery opening 54 at the forward end of the hopper adjacent to the feed rollers 15' and 23', as best shown in Figure 2. The lower control element 58 is shown fixedly supported upon a cross member 55, interposed and secured to the side members of the base 10, as will be understood with reference to Figures 2, 3 and 5.

The lower convex end of the control element 59 is relatively shorter than the upper semi-cylindrical surface of the lower control element 58 in the direction of veneer travel, as best illustrated in Figure 2. The element 59 has an upright strap-like portion 60 which is seated against the front web 56 of the hopper forming member 16 at the delivery end of the apparatus. The strap-like portion 60 is slotted to receive a pair of mounting screws 61, received in threaded engagement with the web 56, thereby to firmly secure the control member 59 in adjusted fixed spaced relation to the lower control element 58. The gap provided between the convex surfaces of the control elements 58 and 59 is so regulated that only a single veneer strip can pass therethrough at a time, as will be readily understood by reference to Figure 2.

A horizontal plate 51 is shown mounted on a cross member 51' of the base 10, and has its upper surface substantially horizontally aligned with the uppermost portion of the lower control element 58, whereby the plate 51 and control element 58 cooperate to support a stack of strip veneer in the hopper, as will be understood by reference to Figure 2. The top surface of the bottom plate 51 bears a certain relation to the hooked ends 49 of the dogs 47 to assure positive engagement of the dogs with the rear edge of the lowermost strip in the magazine, each time the slide 40 reaches the limit of its rearward movement.

The feed rollers 15' and 23', located at the delivery end of the hopper, normally have their peripheries in substantially contacting engagement with one another. They are so positioned relative to the gap between the control elements 58 and 59 and the discharge opening 54 of the hopper that the forward or leading end of each veneer strip ejected from the hopper will enter between the rollers 15' and 23', which then grip the leading end of the strip and withdraws it from the hopper and delivers it to a suitable receiving means, not shown in the drawings.

To effect such feeding action of the rollers 15' and 23', the upper roller 23' is supported in the side arms 64 of a pivoted yoke, generally designated by the numeral 69. The side arms 64 of the yoke are tied together by a cross-member or plate 72, which is fixedly secured to the arms 64 for movement therewith as an integral unit. The forward ends of the arms 64 of the yoke are pivoted to a cross-shaft or pin 66, shown having its ends supported in upright brackets or plate elements 65—65, secured to the side members of the base 10 by suitable means, such as welding.

Means is provided for constantly urging the upper feed roller 23' into feeding engagement with the lower roller 15', and is shown comprising a spring 71 having its lower end seated upon the cross-member 72 of the yoke 69. The upper end of spring 71 is engaged with the reduced terminal of an adjusting screw 70 mounted for axial adjustment in an overhanging supporting arm 68, provided on a cross-member 68' shown having its opposed ends mounted upon and secured to the upper portions of the brackets 65—65 to which the yoke is pivoted. The feed rollers 15' and 23' are geared together for simultaneous rotation in opposite direction by the gears 21 and 22, as hereinbefore stated.

Thus, when the leading end of a strip of sheet veneer enters between the rollers 15' and 23', as a result of the reciprocal action of the dogs, the pressure exerted on the upper feed roller 23' will cause said rollers to grip

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and positively feed or withdraw the partially ejected lowermost veneer strip from the hopper and deliver it to a berry box making machine, or some other form of receiving means.

#### Operation

In the operation of the novel apparatus herein disclosed, a plurality of strips of sheet veneer of a given size are introduced into the hopper D in flatwise relation, as will be understood by reference to Figure 2. Before the apparatus is started, the upper control element 59 is vertically adjusted upon the member 16 to regulate the size of the gap between the control elements 58 and 59 so that said gap will be slightly larger than the maximum thickness of the veneer, so that a single strip of veneer may readily pass therethrough.

In some instances, the strips of veneer may be considerably warped so that their cross-sectional contours may appear somewhat as illustrated in Figure 4. Such excessive warping of the strips, however, will have no effect upon the ejection of the strips from the hopper because the hooked ends 49 of the dogs 47 individually engage the rear edge of the lowermost strip, when the dogs are moved rearwardly into feeding engagement therewith, as indicated in dotted lines in Figure 2. By reference to this figure, it will also be noted that the height of the tooth 49 of each dog is not any greater than the thickness of the veneer so that when the hooked terminals of the dogs engage the rear edge of the bottom strip, the hook 49 of each dog will engage the veneer strip whereby said dogs will cooperate to engage the strip substantially the full width thereof.

Since the sheet veneer generally used in the construction of berry boxes, and the like, is usually very fragile, it is extremely important that the unit stress applied to the rear edge of each strip is very low in order to lessen the possibility of breaking or fracturing the strips as they are successively ejected from the hopper. In the present invention this is accomplished through the use of the multiplicity of notched dogs 47, above described, which are individually and pivotally mounted for relative pivotal movement on their supporting rod or shaft 46, whereby they may readily adapt themselves to the transverse contour of each strip of sheet veneer, as clearly illustrated in Figure 4.

After the machine has been adjusted to the particular size and thickness of the sheet veneer to be fed from the hopper, the shaft 15 is driven by belt 20, which imparts reciprocal motion to the slide 40 through the pitman 31 and eccentric 34, because of the eccentric shaft 30 being operatively connected with the shaft 17 through a train of gears 21, 25, 28 and 29, and simultaneously the feed rollers 15' and 23' are driven. As the leading end of the lowermost strip is ejected from the hopper by the dogs 49 into engagement with the feed rollers 15' and 23', said rollers will grip the end of the strip and positively withdraw the strip from the hopper and deliver it to the receiving means, as will be understood.

When the veneer strips to be fed from the hopper are to be used in the construction of small berry boxes, said strips are usually transversely scored at predetermined intervals to facilitate transversely bending each strip in the operation of processing them into berry boxes, as is well known in the trade. The effective or adjacent surfaces of the control elements 58 and 59 are made convex or cylindrical to enlarge the surface portions thereof which directly engage the opposed sides of the sheet veneer sufficiently to eliminate any danger of said elements tending to split or fracture the strips, as they are successively fed therebetween to the feed rollers 15' and 23'.

It will also be noted by reference to Figure 5, that the discharge opening 54 of the hopper is considerably larger than the size of the gap provided between the control elements 58 and 59, whereby the marginal side edge portions of the leading end of each strip may readily be

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ejected from the hopper, even though said marginal side edge portions may be disposed at varying elevations, as when the strips are excessively warped, transversely. Thus, the individual strips or veneer sheets may be ejected from the hopper in rapid succession without danger of becoming fouled with the control elements 58 and 59 or the walls of the opening 54. In apparatus of this general type, it is imperative that the sheets be fed from the hopper, one at a time, to minimize failure of the receiving means, and the present invention assures such uninterrupted delivery of the strips of sheet material from the hopper.

The unique apparatus herein disclosed has been found extremely practical and efficient in actual operation, and is capable of successively delivering the strip veneer to a box-making machine at a speed commensurate with maximum capacity of the machine, whereby the box making machine may be operated at top speed with a resultant increase in the output thereof, and a corresponding reduction in the cost of manufacturing the berry boxes. The apparatus is extremely simple and inexpensive in construction, and readily lends itself for manufacture in large quantities at very low cost.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, and the appended claims should be construed as broadly as permissible in view of the prior art.

I claim as my invention:

1. In an apparatus of the class described, a supporting frame, a pair of opposed inwardly facing upright channel members secured to said frame in spaced relation and forming the ends of a hopper adapted to support a plurality of strips of veneer in superimposed relation, a slide mounted for longitudinal reciprocal movement in said frame below the hopper, a plurality of weighted dogs mounted for independent pivotal movement about a common axis on said slide in side by side relation substantially the width of the hopper and each having an upwardly directed shoulder or hook at one end, said shoulders being positioned to engage one end of the lowermost strip in the hopper and successively eject said strips therefrom, one at a time when the slide is actuated, an eccentric for operating said slide, a pair of feed rolls mounted adjacent to the delivery end of the hopper for receiving and completely withdrawing each strip from the hopper, and means for simultaneously driving said slide and feed rolls.

2. In an apparatus of the class described, a hopper for supporting a stack of elongated veneer sheets or strips, said hopper comprising opposed upright inwardly facing channel members forming the end walls of the hopper, a plate member forming the bottom wall of the hopper and having its opposed ends spaced inwardly from said channel members whereby the end portions of the lowermost strip in the hopper overhang the ends of said bottom wall, an enlarged discharge opening at one end of the hopper, control elements located centrally of said discharge opening and cooperating to provide a restricted discharge passage through which but a single veneer strip may pass from the hopper at a time, a slide mounted for reciprocal movement below the bottom wall member of the hopper, a plurality of dogs pivotally mounted on said slide in contiguous flatwise relation the width of the hopper and each having an upright tooth at one end thereof, the height of said teeth being substantially equal to the thickness of a single sheet of veneer, said dogs being mounted for independent pivotal movement on said slide and being longitudinally movable with said slide beneath the unsupported end portion of the lowermost sheet or strip in the hopper, whereby when the slide is actuated, the teeth on said dogs will engage the trailing end of the lowermost strip in the hopper substantially the width thereof and longitudinally translate said strips therein and through the

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restricted passage in the opposite end of the hopper, whereby continued operation of the slide and said pivoted dogs will successively feed said veneer sheets or strips from the hopper, one at a time, without interruption, and regardless of the warped or distorted condition of the veneer sheets or strips contained in the hopper.

3. An apparatus according to claim 2, wherein the dogs are mounted on a common pivot, and each dog has a weighted end portion for constantly retaining the hooked ends of said dogs in operative relation to the lowermost veneer sheet or strip in the hopper.

4. In an apparatus of the class described, a supporting frame, upright members secured to said frame adjacent to the ends thereof and cooperating to form the ends of a hopper adapted to support a plurality of strips of veneer in superimposed relation, a slide mounted for reciprocal movement in said frame below the hopper, a plurality of dogs mounted for independent pivotal movement about a common axis on said slide in side-by-side relation and each having an upwardly directed shoulder or hook at its trailing end, said shoulders being positioned to engage one end of the lowermost strip in the hopper to successively eject said strips therefrom, one at a time, when the slide is actuated, means for imparting reciprocal

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movement to said slide, a pair of feed rolls adjacent to the delivery end of the hopper for receiving and completely withdrawing each strip from the hopper.

5. An apparatus according to claim 4, wherein cooperating elements are provided at the delivery end of the hopper for limiting the ejection of the veneer strips from the hopper to one at a time.

6. An apparatus according to claim 5, wherein the cooperating elements at the delivery end of the hopper cooperate with the dogs at the opposite end of the hopper to provide, in effect, a three-point suspension for the stack of veneer strips in the hopper.

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