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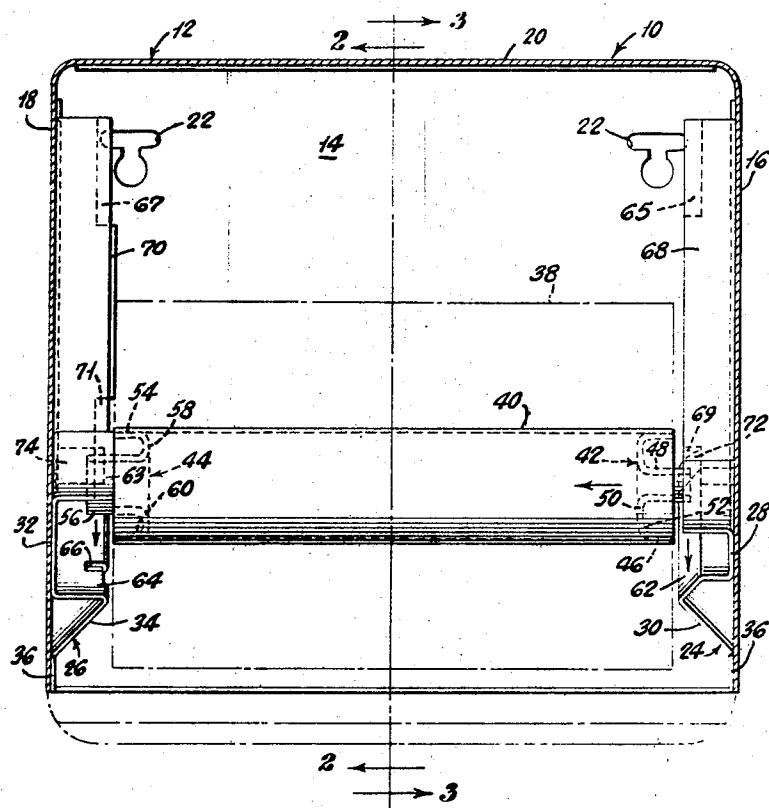
[54] **DISPENSER FOR ROLLS OF FLEXIBLE SHEET MATERIAL**
8 Claims, 4 Drawing Figs.

[52] U.S. Cl..... 242/55.53
[51] Int. Cl..... B65h 19/08
[50] Field of Search..... 242/55.2,
55.53; 1/55.3; 312/39

[56] **References Cited**
UNITED STATES PATENTS

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3,438,589	4/1969	Jespersen	242/55.2

ABSTRACT: A device for rotatably supporting, in a dispensing position, a roll of flexible sheet material having a pair of trunnions disposed adjacent the ends thereof. The device includes a pair of supporting members for rotatably engaging the trunnions to thereby rotatably support the roll in a dispensing position. One of the supporting members has a notch therein adjacent an end thereof. The notch is of an appropriate width for receiving a portion of one of the trunnions therein. The device also includes means for urging the roll radially toward the said one member end, and means for biasing the roll axially toward the said one member. Also, the device includes means for preventing axial shifting of the roll and trunnions until the flexible sheet material has been substantially exhausted from about the roll so that when the material has been substantially exhausted from about the roll, the roll and trunnions will be shifted axially of the roll with the said trunnion portion being received within the notch, whereupon the other trunnion will disengage the other supporting member and the roll and trunnions will automatically gravitate from the dispensing position.



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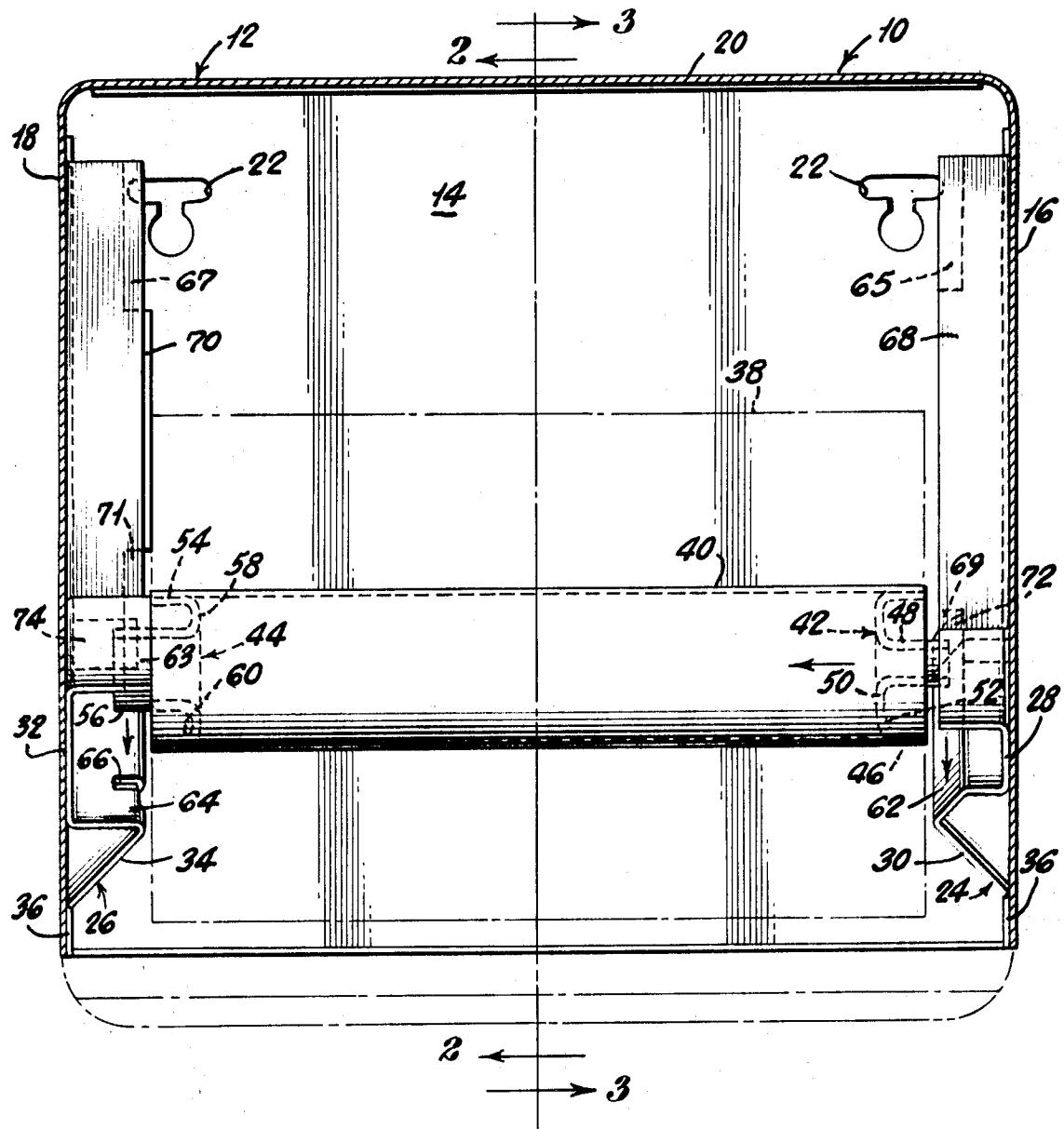


Fig. 1.

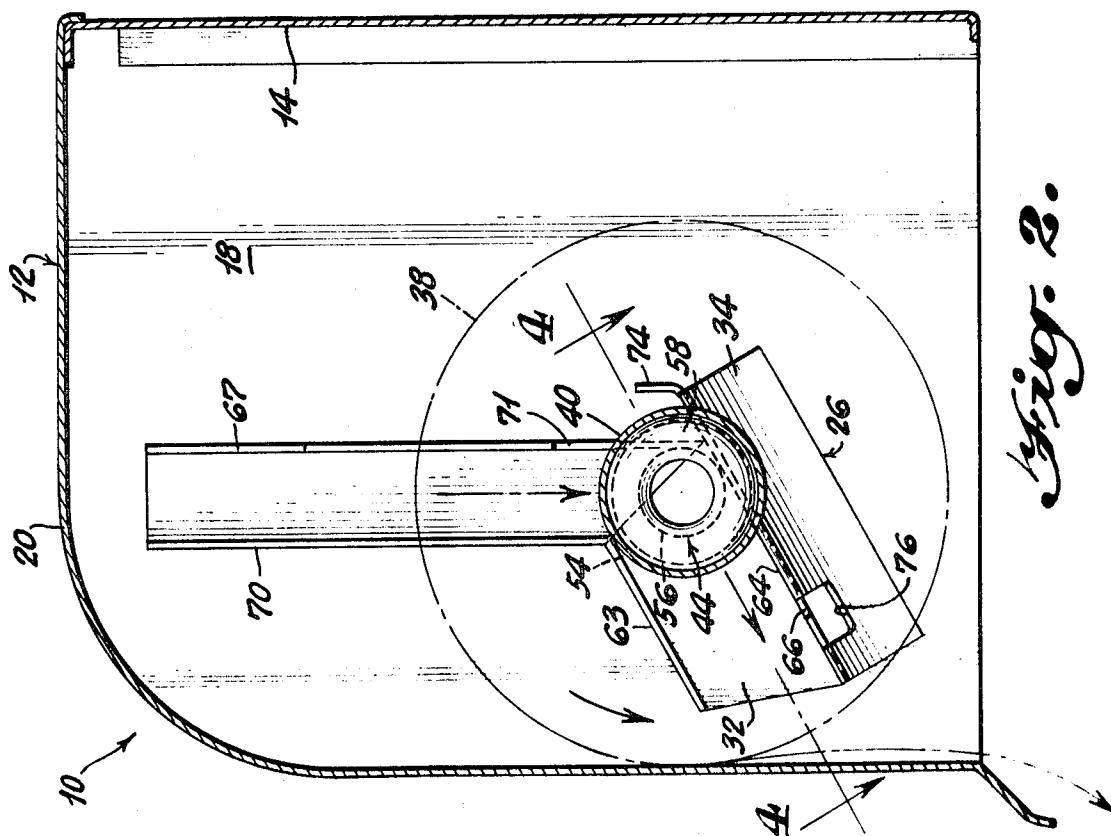
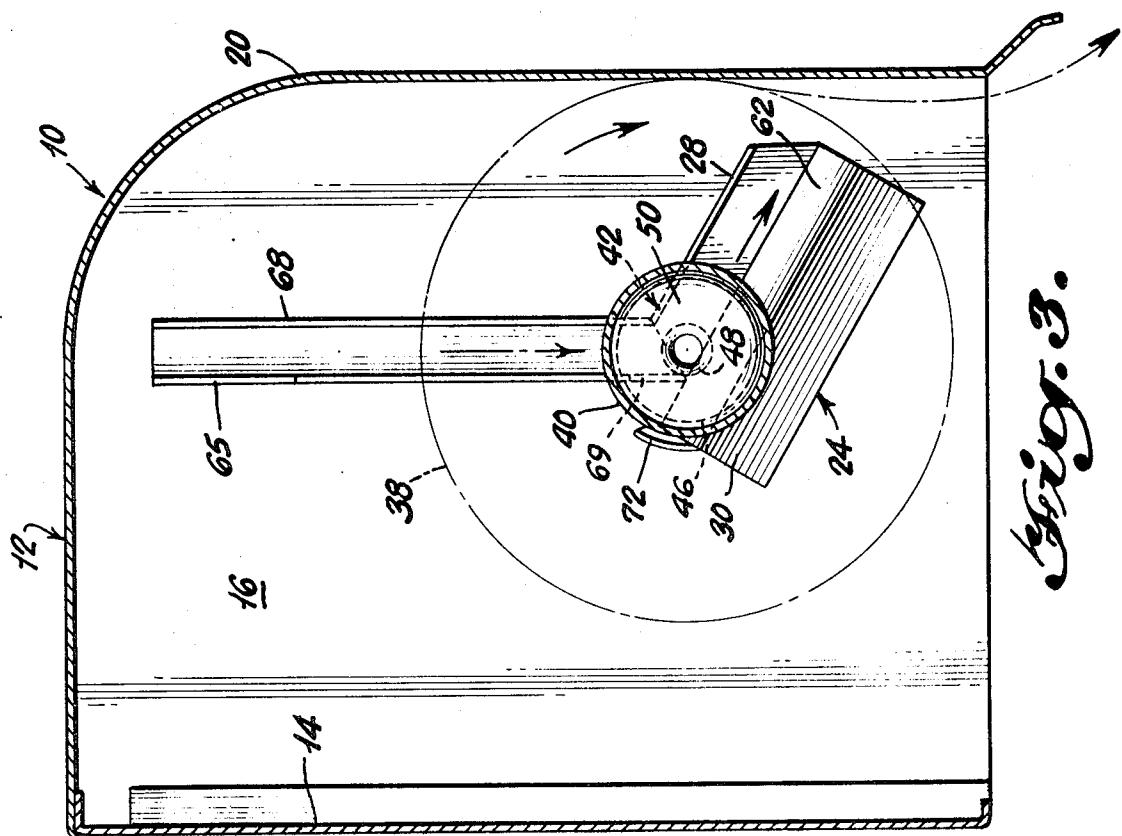
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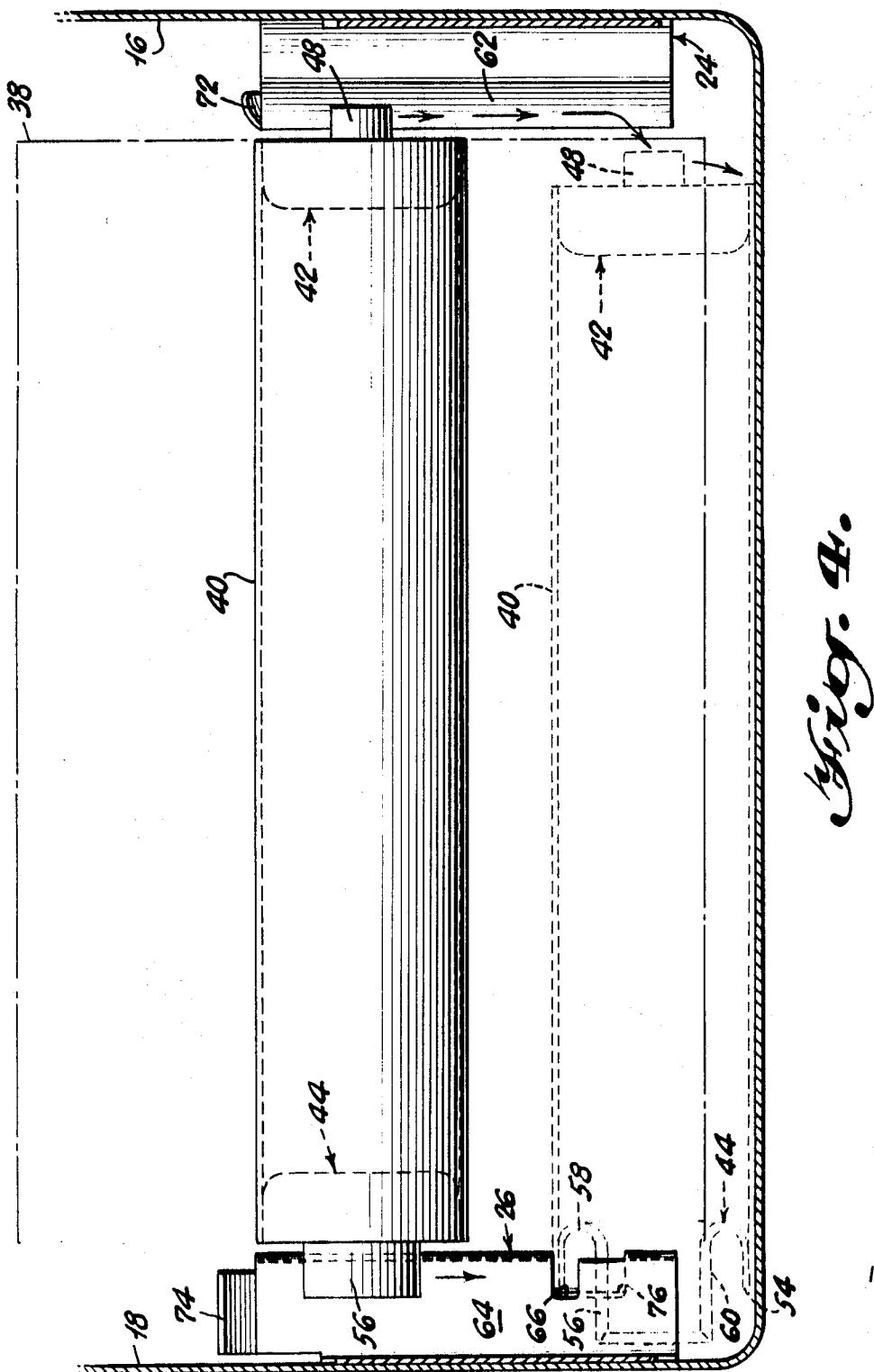
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DISPENSER FOR ROLLS OF FLEXIBLE SHEET MATERIAL

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to dispensers for rolls of flexible sheet material, and specifically to a dispenser of the aforesaid type in which a roll is automatically discharged from a dispensing position after the flexible sheet material comprising the roll has been substantially exhausted from thereabout.

2. Description of the Prior Art

Many types of dispensers are known for rolls of flexible sheet material, such as rolls of paper toweling. Some of these dispensers include means for automatically discharging a substantially consumed roll from a dispensing position. Representative of such devices are the structures shown in Britt et al. U.S. Pat. No. 2,299,301 and Perrin U.S. Pat. No. 3,089,659. The Britt et al. device employs a relatively complex and expensive system of guide tracks, levers and cams for controlling and effecting the automatic discharge of a consumed roll from a dispensing position.

The Perrin device, while embodying a relatively simple means for automatically discharging a roll from a dispensing position, does not possess the operational reliability desired. In this device, a pair of stub shafts are provided for rotatably engaging and supporting the roll ends. One of these shafts engages a recess cut into the roll so that the shaft directly contacts the flexible sheet material comprising the roll. When the flexible material has been exhausted from about this shaft, the shaft no longer supports the adjacent roll end, thereby permitting the roll to gravitate from the dispensing position. However, since the stub shaft directly contacts the flexible sheet material defining the recess, as the material is progressively removed from about the shaft, the remaining material provides a progressively weakened bearing surface for engaging the shaft. Since the material is flexible and has virtually no bending strength, such remaining material can buckle around the shaft, particularly when a tension force is applied to the leading edge of the material for withdrawing the material from the roll. This causes the roll to become jammed in the dispensing position between the stub shafts, thus necessitating the attention of a custodian to free the jammed roll and place the dispenser in operational condition again.

SUMMARY OF THE INVENTION

The present invention obviates the foregoing problems, and in particular provides a relatively simple, inexpensive, and operationally reliable dispenser for flexible sheet material rolls in which substantially consumed rolls are automatically discharged from a dispensing position.

The dispenser of the invention is designed to be used with a roll of flexible sheet material having a pair of trunnions disposed adjacent the ends thereof. Each of the trunnions includes an annular, outer, flange portion, an annular, inner, shaft portion which extends axially outwardly beyond the adjacent roll end, and an annular web joining the flange and shaft portions. The flange and shaft portions and web of each trunnion define an annular recess opening axially outwardly of the roll.

Basically described, the device of the invention comprises a framework including a pair of substantially horizontally opposed supporting members for rotatably engaging the shaft portions of the trunnions to position the roll for rotation about a substantially horizontal axis between said members to thereby rotatably support the roll in a dispensing position, one of said members defining a bearing surface engageable with the shaft portion of one of the trunnions and having a notch therein of a width greater than the thickness of the flange portion of said one trunnion, the notch being spaced from one end of said one member a distance less than the inside diameter of said one trunnion flange portion; means associated with the framework for urging the roll radially thereof toward said

one member end; means associated with the framework for biasing the roll and trunnions axially of the roll toward the said one member; and means for preventing axial shifting of the roll and trunnions until the flexible sheet material has been substantially exhausted from about the roll so that when the material has been substantially exhausted from about the roll, the roll and trunnions will be shifted axially toward said one member with said one trunnion flange portion being received within the notch and the section of said one member between the notch and said one member end being received within the outwardly opening recess defined by said one trunnion, whereupon the other trunnion will disengage the other supporting member and the trunnions and roll will automatically gravitate from the dispensing position.

With the foregoing in mind, it is an object of the present invention to provide a device for rotatably supporting a roll of flexible sheet material in a dispensing position, which device includes means for automatically discharging the roll from the dispensing position after the flexible sheet material has been substantially consumed.

It is also an object of the invention to provide a device as described in the preceding object which embodies a relatively simple, inexpensive, and operationally reliable structure.

These and other objects of the invention will become apparent upon a consideration of the detailed description of a preferred embodiment thereof given in connection with the following drawings, wherein like reference numerals identify like elements throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front view, partially in section, of the dispenser of the invention;

FIG. 2 is a sectional view taken on line 2—2 of FIG. 1;

FIG. 3 is a sectional view taken on line 3—3 of FIG. 1; and

FIG. 4 is a sectional view taken on line 4—4 of FIG. 2 showing the manner in which a substantially consumed roll of flexible sheet material is automatically discharged from the dispensing position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A preferred embodiment of the dispenser of the invention is shown in the drawings, as designated by reference numeral 10.

Dispenser 10 comprises a framework including a cabinet 12. Cabinet 12 includes a rear panel 14, a right side panel 16, a left side panel 18 and an integral combination top and front panel 20. The various panels comprising cabinet 12 may be secured together in any convenient manner, as by spot welding, or brazing. A plurality of holes 22 are provided in rear panel 14 to facilitate attachment of the dispenser to a wall or other supporting structure. The lower end of combination panel 20 is flared outwardly for a purpose described below. The bottom of cabinet 12 is open to provide an opening through which rolls may be inserted into, and consumed rolls discharged from, the dispenser.

The framework of dispenser 10 also includes right-hand and left-hand supporting members 24 and 26, respectively. Supporting members 24 and 26 are secured to right and left side panels 16 and 18, respectively, in any convenient manner, as by spot welding or brazing. Members 24 and 26 basically comprise channels having different transverse cross-sectional configurations.

As shown in FIG. 1, member 24 includes an upper portion 28 having a substantially J-shaped cross section and a lower portion 30 having a substantially L-shaped cross section. Portions 28 and 30 are integrally joined at the extremities of their respective shorter cross-sectional legs.

Member 26 includes an upper portion 32 having a substantially U-shaped cross section and a lower portion 34 having a simple straight line cross section. Portions 32 and 34 are integrally joined at the upper extremity of one of the cross-sectional legs of portion 32 and one of the cross sectional extremities of portion 34.

If desired, each of the members also may include a lower flange 36 to facilitate attachment of the members to the respective side panels of cabinet 12. Members 24 and 26 preferably are made from integral sheet metal blanks by stamping.

The supporting members are adapted to rotatably support a roll 38 of flexible sheet material, such as a roll of paper toweling, in a dispensing position therebetween. Roll 38 is of the type described in Jespersen U.S. Pat. No. 3,438,589 with respect to the embodiment shown in FIGS. 1-4 of the patent. Basically, the roll includes a centrally disposed core 40 onto which flexible sheet material, such as paper toweling, is wound. Disposed adjacent the ends of roll 38 and inserted into the ends of core 40 are a pair of trunnions 42 and 44.

Trunnion 42 comprises an annular, outer, flange portion 46, an annular, inner, shaft portion 48 and an annular web 50 joining portions 46 and 48. Portions 46 and 48 and web 50 define a recess 52 opening axially outwardly from the adjacent end of roll 38.

Similarly, trunnion 44 comprises an annular, outer, flange portion 54, an annular, inner, shaft portion 56 and an annular web 58 joining portions 54 and 56. Portions 54 and 56 and web 58 define a recess 60 opening axially outwardly from the adjacent end of roll 38.

Shaft portions 48 and 56 extend axially outwardly beyond the ends of roll 38, and are adapted to be rotatably engaged by supporting members 24 and 26, respectively. Specifically, shaft portion 48 is adapted to be engaged by the outer surface of the shorter cross-sectional leg of lower portion 30. This surface is inclined laterally downwardly and inwardly toward supporting member 26, as shown in FIG. 1, and defines a camming surface 62. Camming surface 62 comprises a means for biasing roll 38 axially of the roll toward supporting member 26. This result is obtained due to the gravitational force acting on the roll. The gravitational force produces a reaction force which is applied to the roll by surface 62 and which includes a force component extending axially of the roll in the direction of member 26.

Also, shaft portion 56 is adapted to be engaged by the inner surface of one of the cross-sectional legs of portion 32. This surface extends substantially laterally horizontally, as shown in FIG. 1, and defines a bearing surface 64. Surface 64 has a notch 66 therein which is of a greater width than the combined thickness of flange portion 54 and core 40. Also, notch 66 is spaced from one end of member 26 a distance less than the inside diameter of flange portion 54. However, the notch is of a lesser width than the outside diameter of shaft portion 56. The purpose of notch 66 is described below.

Dispenser 10 also includes means for urging roll 38 radially of the roll toward the end of member 26 proximate notch 66. Such means are comprised by supporting members 24 and 26, including surfaces 62 and 64, respectively, being inclined longitudinally downwardly, as shown in FIGS. 2 and 3, with the end of member 26 proximate notch 66 being the lower end of that member.

The dispenser also includes means for preventing roll 38 and trunnions 42 and 44 from shifting axially of the roll until the flexible sheet material has been substantially exhausted from about the roll. Such means is comprised by the outer extremity 63 of the upper cross-sectional leg of portion 32. As shown in FIG. 1, the left end of roll 38 abuts extremity 63 when the roll is disposed in the dispensing position.

When an unused roll 38 is positioned between supporting members 24 and 26 in the dispensing position, the circumferential periphery of the roll engages the inner surface of combination panel 20, as shown in FIGS. 2 and 3, and the left end of the roll engages extremity 63, as shown in FIG. 1, so that trunnions 42 and 44 are engaged by supporting members 24 and 26, respectively, near the upper ends of the members. As the roll is consumed, the trunnions move progressively down the supporting members toward panel 20 until the flexible sheet material has been substantially exhausted from about the roll. Thereafter, the left end of the roll no longer engages

extremity 63 and the roll and trunnions are shifted axially of the roll toward supporting member 26 due to the action of camming surface 62. Upon axial shifting of the roll and trunnions, flange portion 54 and core 40 are received within notch 66 and flange portion 54 is received beneath the upper cross-sectional leg of portion 32, while the section of supporting member 26 between the notch and the proximate end of the supporting member is received within recess 60 below shaft portion 56, as shown in FIG. 4. The axial shifting of the roll and trunnions results in shaft portion 48 becoming disengaged from supporting member 24, whereupon the roll and trunnions gravitate downwardly out of the dispensing position.

The distance between the end of member 26 proximate notch 66 and panel 20 is less than the outside diameter of flange portion 54, as shown in FIG. 4. Therefore, the trunnions are prevented from rolling off the lower ends of the supporting members so that the roll and trunnions may be discharged from the dispensing position only upon the above-described axial shifting thereof.

Also, panel 20 and extremity 63 serve as braking means for minimizing uncontrolled spinning of the roll.

The flexible sheet material is removed from about the top of roll 38, as shown in FIGS. 2 and 3. The material passes between the front of the roll and panel 20, and downwardly out of the dispenser through the open bottom thereof. The outwardly flared lower portion of panel 20 serves as a means for guiding the material from the dispenser and holds the material while it is being torn along the lower edge of such portion.

The framework of dispenser 10 also includes a pair of guide channels 68 and 70 positioned above supporting members 24 and 26, respectively. The guide channels each have a substantially U-shaped transverse cross section for guiding the trunnions to the supporting members, to thereby guide the roll into the dispensing position between the supporting members. Specifically, guide channel 68 is adapted to engage shaft portion 48 and guide channel 70 is adapted to engage shaft portion 56. Shaft portions 48 and 56 have different diameters and channels 68 and 70 have different cross-sectional widths corresponding to the diameters of portions 48 and 56, respectively. Thus, roll 38 can be inserted between the channels, and the shaft portions of the trunnions engaged thereby, only when shaft portion 48 is received by channel 68 and shaft portion 56 is received by channel 70. This feature insures that roll 38 will be inserted into the dispenser in the proper attitude for the flexible sheet material to be drawn from about the top of the roll, as described above.

As mentioned above, rolls 38 are inserted into the dispenser through the open bottom thereof. As shown in FIG. 1, the upper portions of the rear cross-sectional legs of channels 68 and 70 are cut away at 65 and 67, respectively, to permit a roll to be inserted between the channels from the rear thereof. The channels are long enough to accommodate therebetween two unused rolls of relatively small diameter or a single unused roll of relatively large diameter, such as roll 38. When only a single roll is to be inserted into the dispenser, it may be inserted directly between supporting members 24 and 26. For this purpose, the lower portions of the rear cross-sectional legs of channels 68 and 70 are also cut away at 69 and 71, respectively, as shown in FIG. 1. Supporting members 24 and 26 include restraining flanges 72 and 74, respectively, integrally formed at the upper ends of camming surface 62 and bearing surface 64, respectively, for preventing the trunnions from being pushed off the upper ends of the supporting members.

The longest cross-sectional leg of lower portion 30 and lower portion 34 are inclined inwardly and upwardly for guiding a roll 38 into the proper position for insertion between supporting members 24 and 26 over flanges 72 and 74. Lower portion 34 has a notch 76 therein, as shown in FIGS. 2 and 4, which cooperates with notch 66 to permit the roll and trunnions to be shifted axially of the roll toward supporting member 26 after the roll has been substantially consumed.

While the foregoing constitutes a detailed description of the preferred embodiment of the invention, it is recognized that various modifications thereof may occur to those skilled in the art. For example, cabinet 12 may have a closed or partially closed bottom and an openable top, front or side panel to permit the insertion of rolls into the dispenser. Also, means other than camming surface 62 could be employed for biasing the roll and trunnions axially of the roll toward supporting member 26, such as a small spring affixed to right side panel 16. Similarly, means other than the longitudinal downward inclination of the supporting members could be employed for urging the roll radially thereof toward the end of member 26 proximate notch 66, such as a small spring affixed to rear panel 14. Therefore, the scope of the invention is to be limited solely by the scope of the appended claims.

I claim:

1. A device for rotatably supporting, in a dispensing position, a roll of flexible sheet material having a pair of trunnions disposed adjacent the ends thereof, each of said trunnions including an annular outer flange portion, an annular inner shaft portion extending axially outwardly beyond the adjacent roll end, and an annular web joining said portions, said flange and shaft portions and web defining an annular recess opening axially outwardly of the roll, said device comprising;

a framework including a pair of substantially horizontally opposed supporting members for rotatably engaging said trunnion shaft portions to position the roll for rotation about a substantially horizontal axis between said members to thereby rotatably support the roll in a dispensing position, one of said members defining a bearing surface engageable with the shaft portion of one of said trunnions and having a notch therein of a width greater than the thickness of the flange portion of said one trunnion, said notch being spaced from one end of said one member a distance less than the inside diameter of said one trunnion flange portion;

means associated with said framework for urging the roll radially thereof toward said one member end;

means associated with said framework for biasing the roll and trunnions axially of the roll toward the said one member; and

means associated with said framework for preventing axial shifting of the roll and trunnions until the flexible sheet material has been substantially exhausted from about the roll so that when the material has been substantially exhausted from about the roll, the roll and trunnions will be shifted axially toward said one member with said one

trunnion flange portion being received within said notch and the section of said one member between the notch and said one member end being received within said outwardly opening recess defined by said one trunnion, whereupon the other trunnion will disengage the other supporting member and the trunnions and roll will automatically gravitate from said dispensing position.

2. A device as recited in claim 1, wherein said biasing means is comprised by a camming surface defined by said other supporting member and engageable with the shaft portion of said other trunnion, said camming surface being inclined downwardly and inwardly toward said one supporting member.

3. A device as recited in claim 1; wherein said urging means is comprised by said supporting members being inclined downwardly and said one member end comprises the lower end of said one member; and further comprising means associated with said framework for preventing the trunnions from rolling downwardly off the lower ends of said members.

4. A device as recited in claim 3; wherein said framework further includes a cabinet enclosing said supporting members, said cabinet including a front panel; and wherein said means for preventing the trunnions from rolling off the lower ends of the members is comprised by said front panel being spaced outwardly from said one member end a distance less than the outside diameter of said one trunnion flange portion.

5. A device as recited in claim 1, wherein said framework further includes a pair of guide channels disposed above said supporting members and being engageable with said trunnion shaft portions upon the insertion of a roll into the device for guiding the trunnions to the supporting members to thereby guide the roll to said dispensing position.

6. A device as recited in claim 5, wherein said guide channels are long enough to simultaneously accommodate a plurality of rolls therebetween.

7. A device as recited in claim 5, wherein said trunnion shaft portions are of different diameters and said guide channels are of different widths corresponding to the diameters of said shaft portions so that the roll may be inserted between the channels only when each trunnion shaft portion is engaged by the dimensionally corresponding channel.

8. A device as recited in claim 1, wherein said means for preventing axial shifting of the roll and trunnions is comprised by a portion of said one supporting member, said one member portion being adapted to engage the end of the roll adjacent said one member when the roll is disposed in said dispensing position.