Sept. 2, 1958 D. C. HAMMAN 2,850,333

ROLLER ASSEMBLY

Filed April 26, 1956 2 Sheets-Sheet 1

Fig. 1.

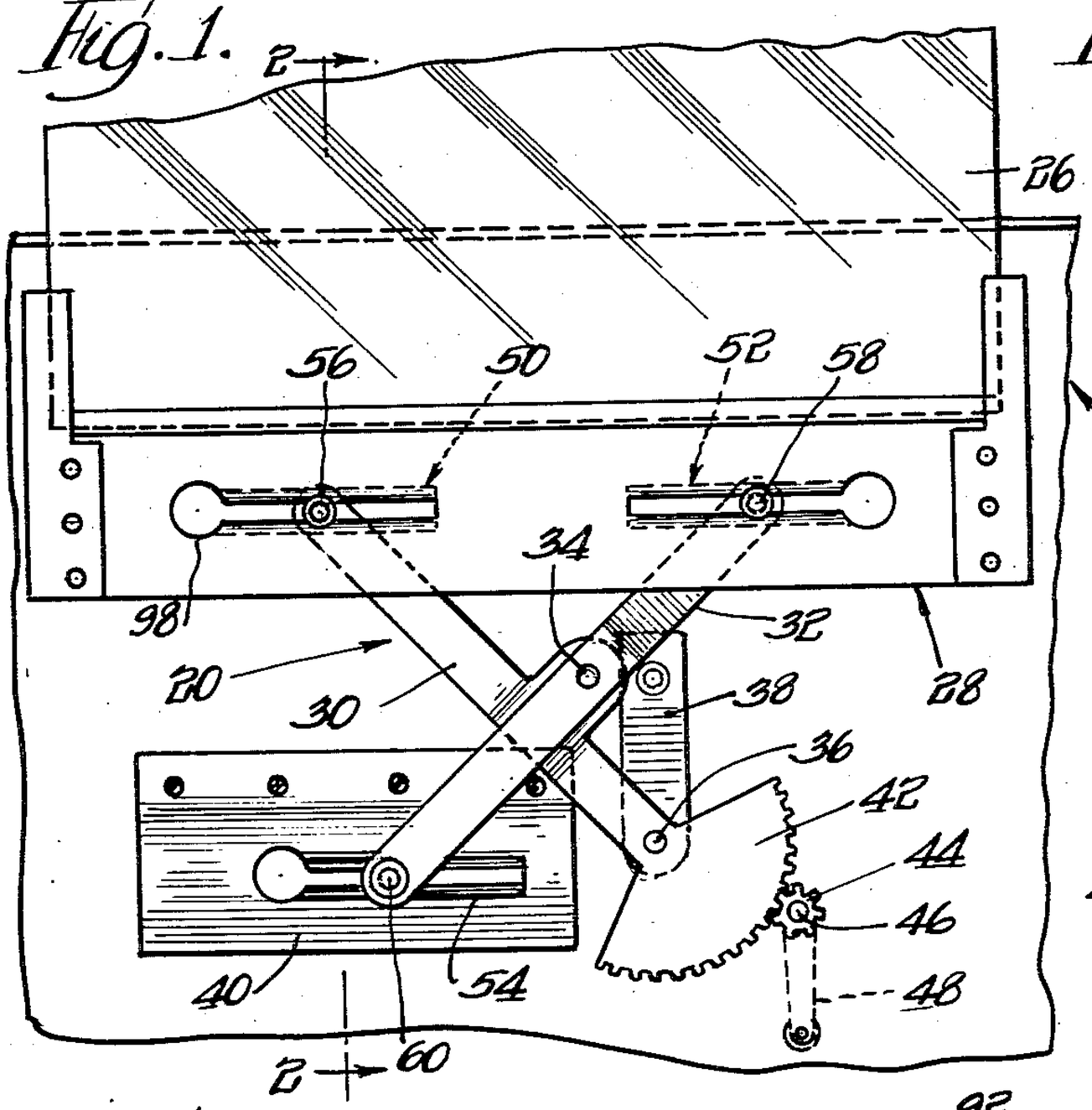


Fig. 2.

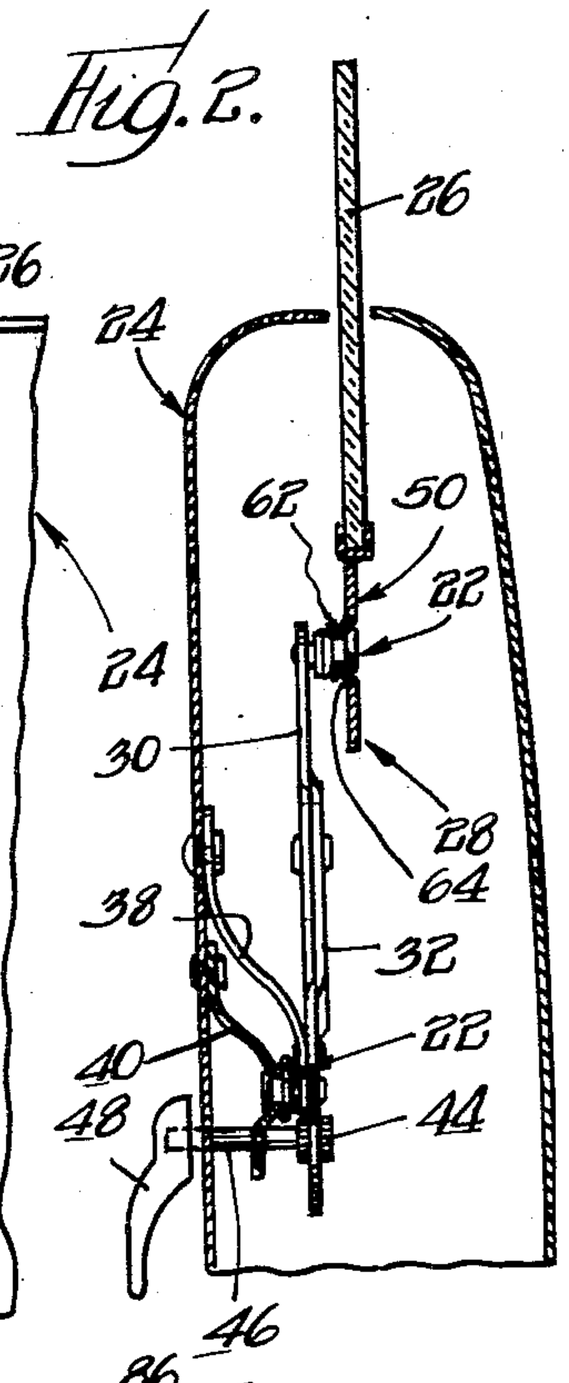


Fig. 3.

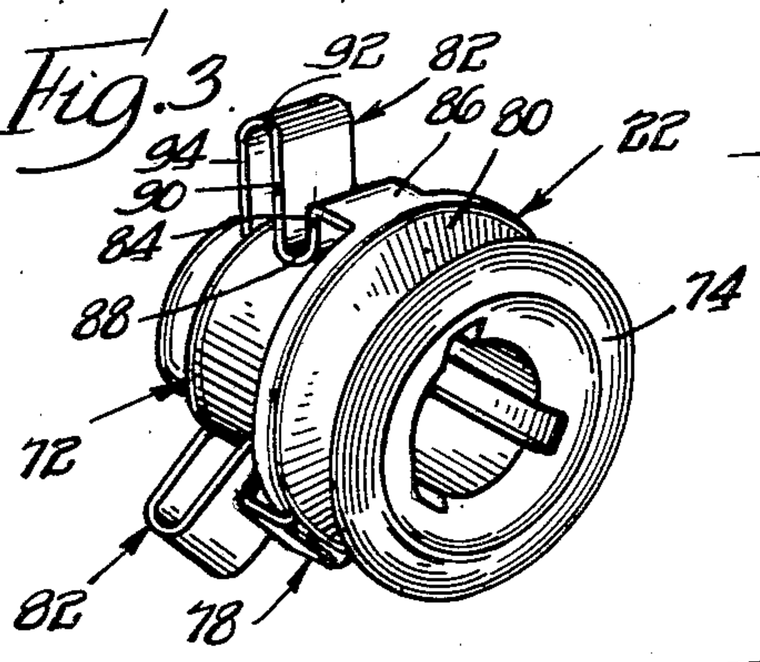


Fig. 5.

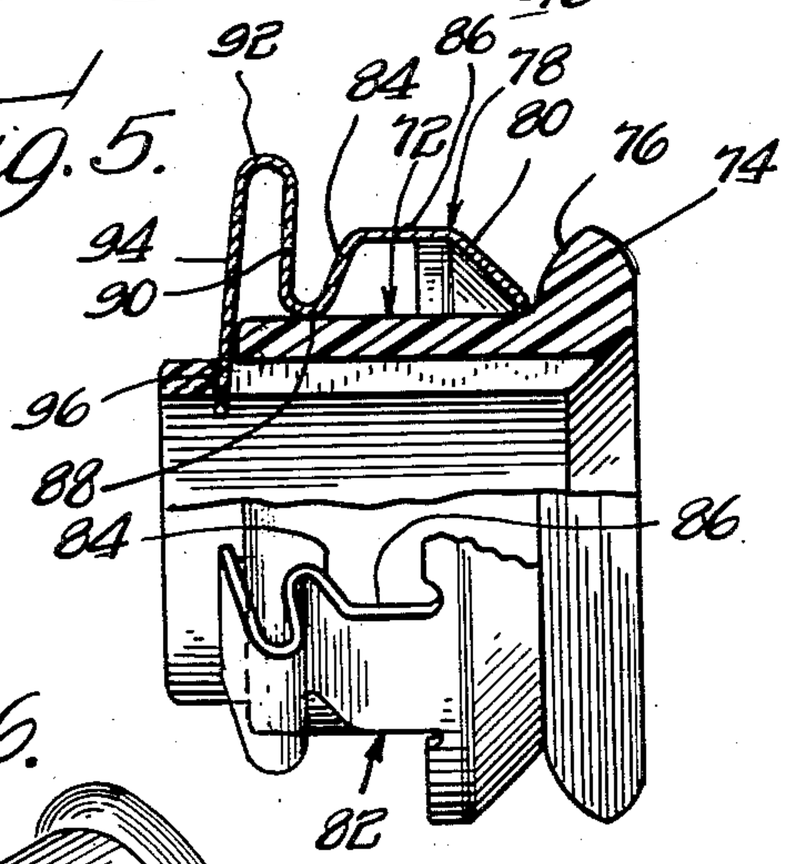


Fig. 4.

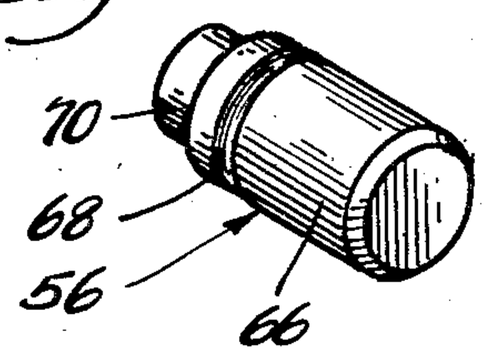
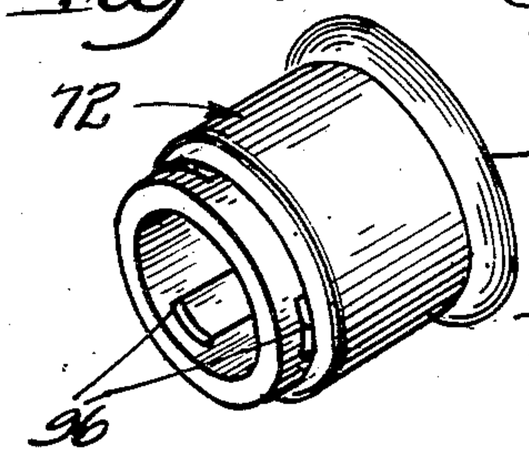


Fig. 6.



INVENTOR.
Denver C. Hamman
BY: Olson & Trexler
Attys.

Sept. 2, 1958 D. C. HAMMAN 2,850,333

ROLLER ASSEMBLY

Filed April 26, 1956 2 Sheets-Sheet 2

Fig. 7.

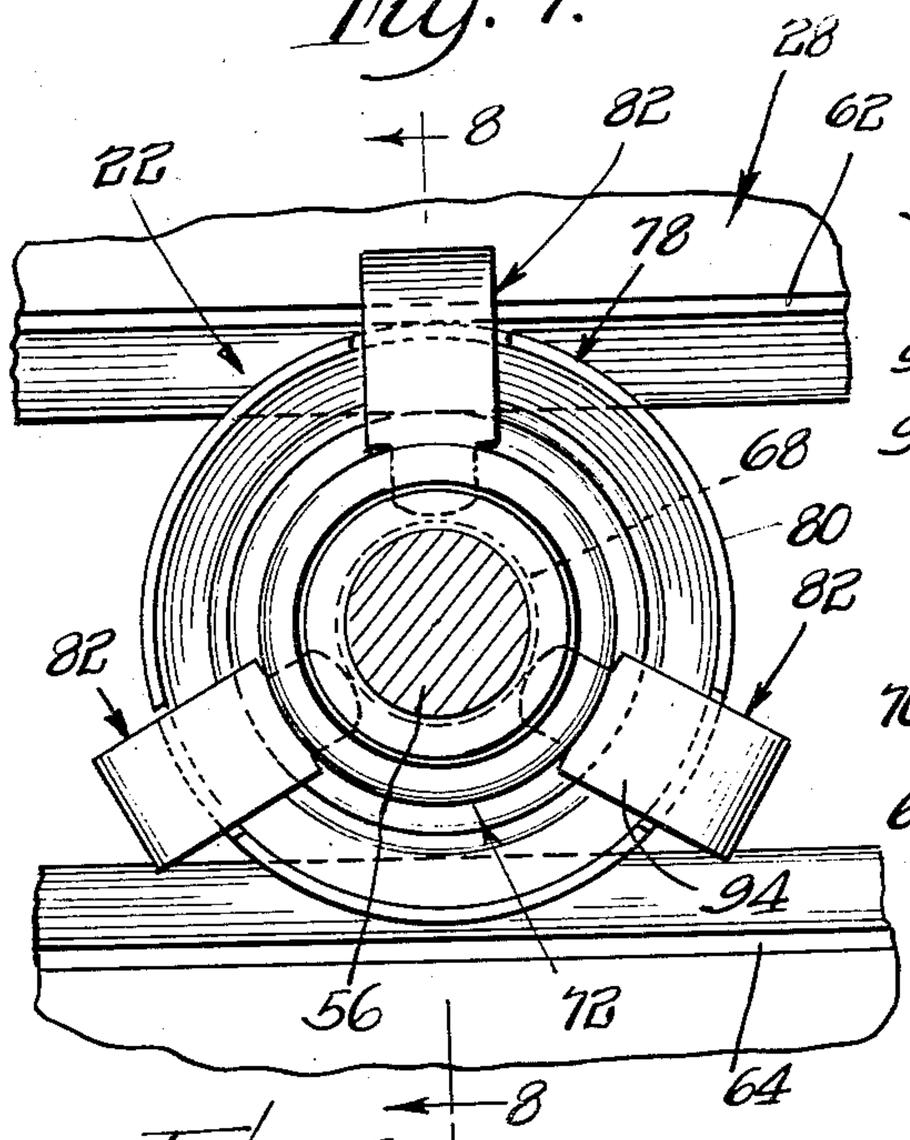


Fig. 8.

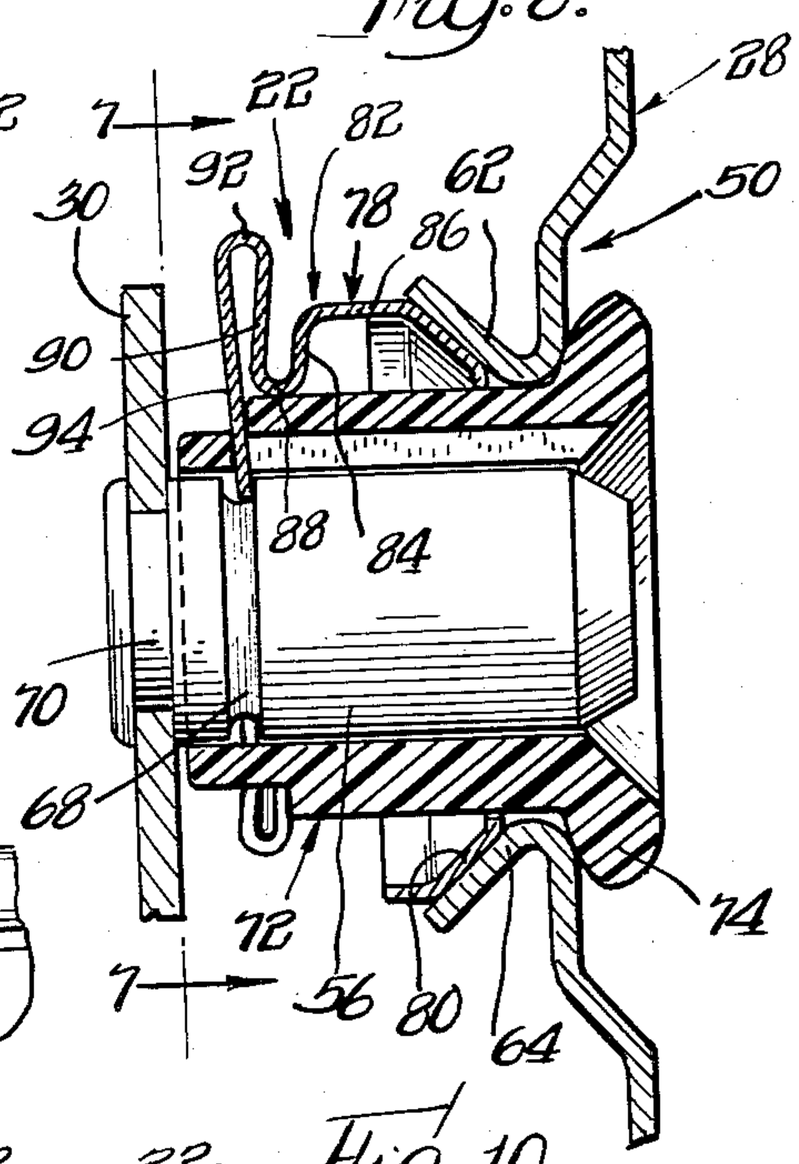


Fig. 9.

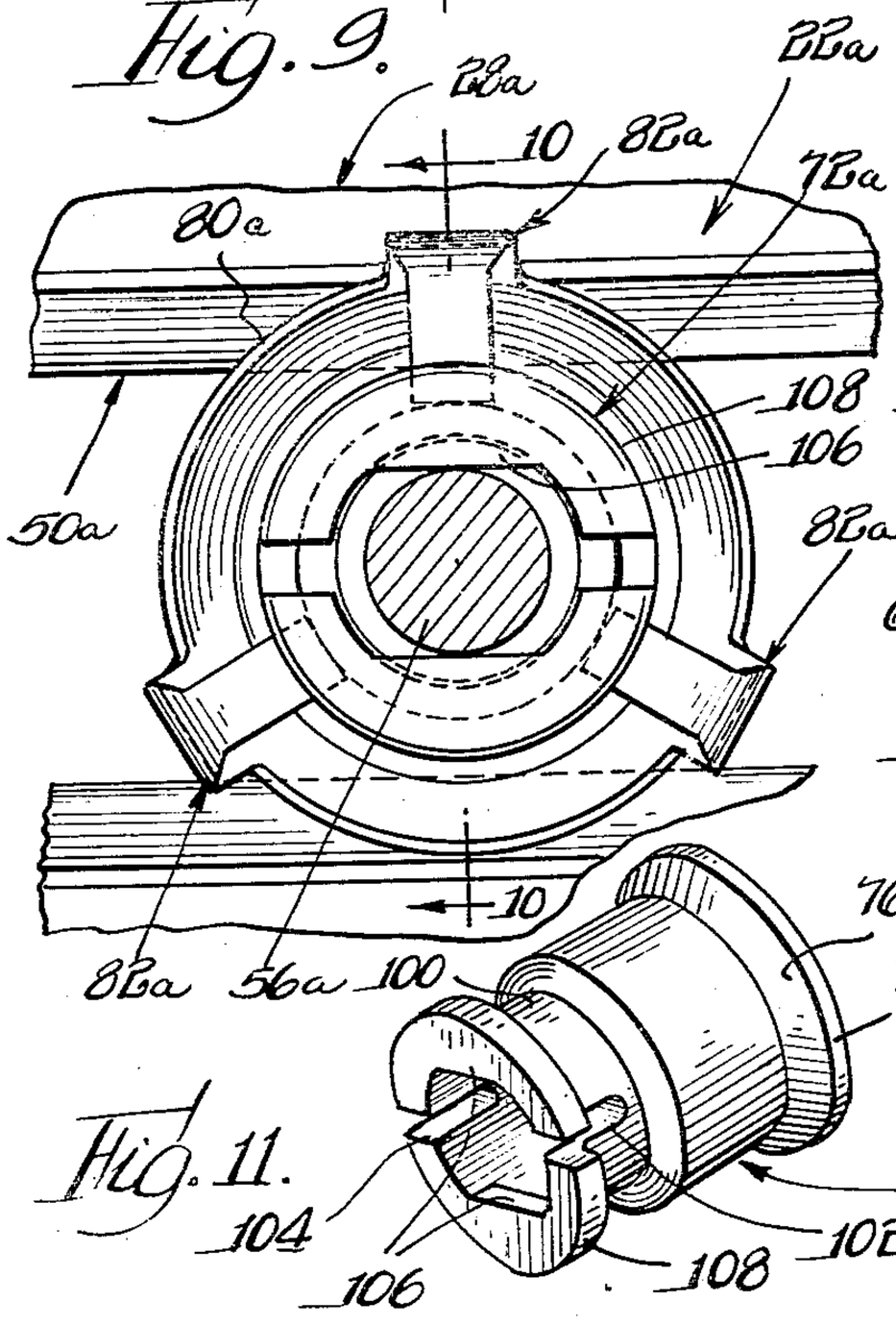


Fig. 10.

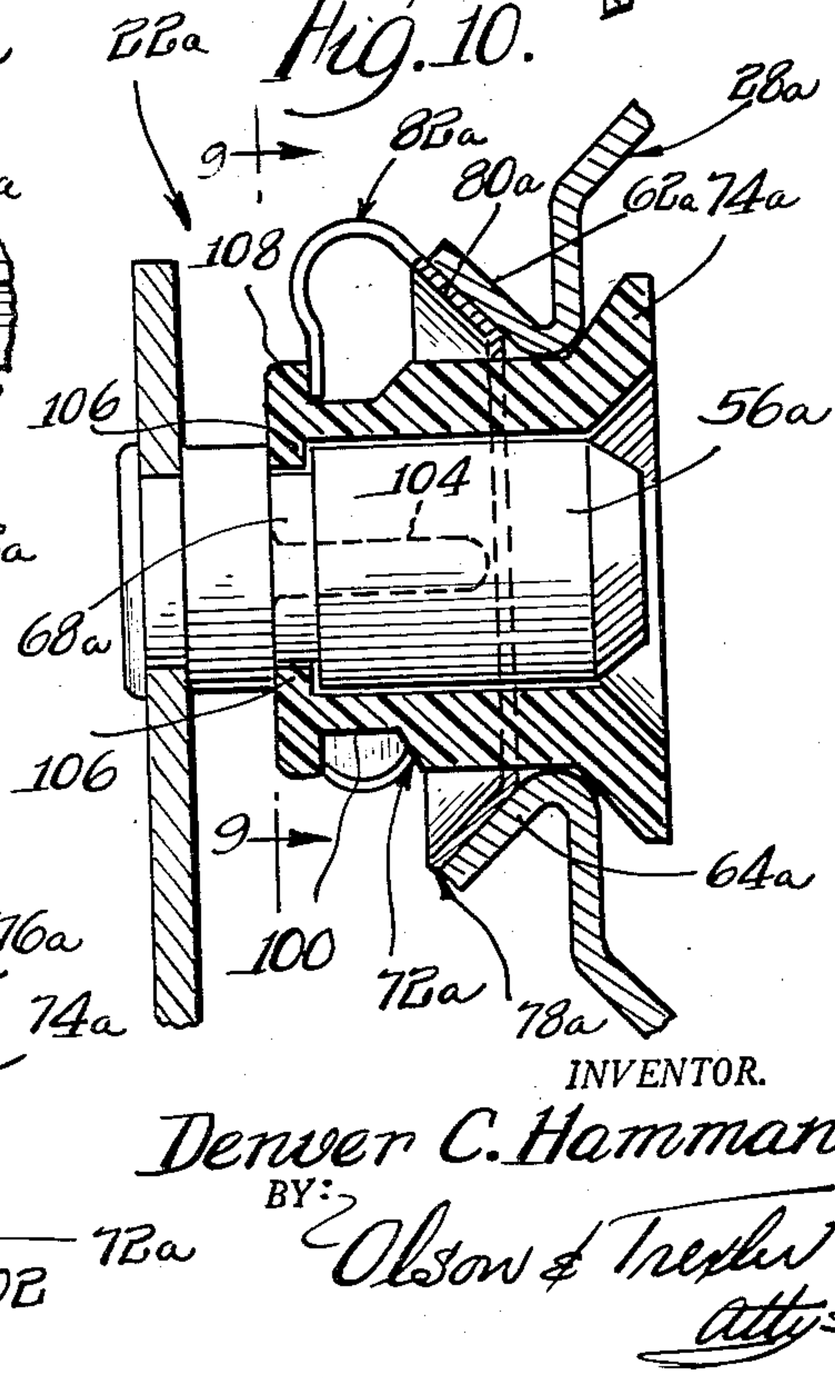


Fig. 11.

INVENTOR.

Denver C. Hamman

BY: Olson & Trexler

Attys.

United States Patent Office

2,850,333

Patented Sept. 2, 1958

2,850,333

ROLLER ASSEMBLY

Denver C. Hamman, Palatine, Ill., assignor to Illinois Tool Works, Chicago, Ill., a corporation of Illinois

Application April 26, 1956, Serial No. 580,927

9 Claims. (Cl. 308—6)

The present invention relates to a novel roller assembly, and, more particularly, to a novel roller assembly especially useful in regulator or lifting mechanisms for automobile windows and the like.

Window regulator mechanisms now in use for automobiles and the like usually include a carriage member connectable with a lower margin of a window, a fixed track member, and pivotally supported linkage means having elements connected to the track member and to track portions of the carriage member by roller assemblies. Such roller assemblies heretofore in use have been constructed so as yieldably to engage opposite surfaces of a track whereby to insure proper engagement and to eliminate window rattling, and such rollers usually include as many as six separate elements so that they are relatively difficult and expensive to manufacture and assemble.

An important object of the present invention is to provide a novel roller assembly for use in automobile window regulator mechanisms or the like, which roller assembly is of simplified construction and has a substantially reduced number of separate elements for facilitating easier and more economical manufacturing thereof.

Another object of the present invention is to provide a novel window roller assembly of the above described type which is adapted yieldably to engage generally opposing surfaces of track means so as substantially to eliminate window rattling.

A further object of the present invention is to provide a novel roller assembly which may be mounted on a pin or shaft of a window regulating mechanism or the like easily and without the aid of auxiliary or separate retaining means such as a cotter pin, snap ring or the like.

Other objects and advantages of the present invention will become apparent from the following description and the accompanying drawings wherein:

Fig. 1 is a fragmentary elevational view showing an automobile window regulating system incorporating roller assemblies constructed in accordance with the present invention;

Fig. 2 is a fragmentary sectional view taken along line 2—2 in Fig. 1;

Fig. 3 is an enlarged perspective view showing the novel roller assembly of the present invention;

Fig. 4 is a fragmentary perspective view showing a pin or stub shaft of the window regulator mechanism on which the roller assembly is to be mounted;

Fig. 5 is an enlarged view partially in cross section of the novel roller assembly of this invention;

Fig. 6 is a perspective view of a main body portion of the roller assembly;

Fig. 7 is a sectional view taken along line 7—7 in Fig. 8;

Fig. 8 is a sectional view taken along line 8—8 in Fig. 7;

Fig. 9 is a sectional view of a modified form of the present invention taken along line 9—9 in Fig. 10;

Fig. 10 is a sectional view taken along line 10—10 in Fig. 9; and

Fig. 11 is a perspective view showing the main body portion of the modified roller assembly.

Referring now more specifically to the drawings wherein like parts are designated by the same numerals throughout the various figures, a regulator or lifting mechanism 20 utilizing roller assemblies 22 involving the principles of the present invention is shown in Figs. 1 and 2. This mechanism is adapted to be housed within a door or body portion 24 of an automobile or the like for supporting a window 26. While the description of the present invention is facilitated by relating it particularly to a window regulator mechanism, it is to be understood that various other uses for the novel roller assembly may suggest themselves.

The window mechanism 20 comprises a carriage member 28 adapted to receive and support the lower margin of the window 26 and to be raised and lowered within the body or door 24. The carriage member 28 is connected in the manner described in detail below to upper ends of a pair of crossing levers 30 and 32 which are pivotally connected to each other intermediate their ends by a pin 34. A lower end portion of the lever 30 is pivotally mounted on a pin 36 carried by a bracket or the like 38 fixed with respect to the automobile body or door 24. The lower end of the lever 32 is connected in a manner also to be described in detail below with a track member 40 secured to the wall of the body or door 24. A gear segment 42 is secured to or made integral with lower end of the lever 30 so that the center of the fixed pivot 36 is also the center of the gear segment. A pinion 44 carried by a suitably supported shaft 46 and actuated by the usual handle 48 meshes with the gear segment 42 so that when the handle is rotated the gear segment and, thus, the mechanism 20 is actuated selectively to raise or lower the window.

The carriage member 28 which is formed from sheet metal is provided with a pair of substantially identical but oppositely arranged elongated horizontal track portions 50 and 52, and the track member 40 is provided with a similar elongated horizontal track portion 54. Pin members or stub shafts 56 and 58 are secured to upper ends of the levers 30 and 32 respectively and a similar pin or stub shaft 60 is secured to the lower end of the lever 32. A roller assembly 22 is mounted on each of the pins or stub shafts respectively for interengagement with the track portions 50, 52 and 54. Since the groups of associated elements including a stub shaft, a roller assembly and a track portion are essentially identical only the pin 56, track portion 50 and associated roller assembly will be described in detail.

As shown best in Figs. 2 and 8 the track portion 50 is formed by slitting the carriage member 28 and bending sections of the member 28 at opposite sides of the slit so as to provide elongated and opposed generally V-shaped portions 62 and 64. The pin 56 has a main shank portion 66 which is provided with an annular groove 68 for the purpose described below. A reduced diameter end portion 70 of the pin is adapted to be inserted through an aperture in the lever 30 and upset for connecting the pin to the lever.

The roller assembly 22 comprises a tubular body portion 72 adapted to be rotatably mounted on the pin 56 and preferably formed from a suitable plastic material such as nylon. The body portion 72 has a diameter less than the width of the slot defined by the V-shaped track portions 62 and 64 so that the roller body portion may extend freely through the slot in the manner shown. A radially extending flange 74 is formed integrally with an outer end of the tubular body portion 72 and is provided with a bevelled surface 76 engage-

able with generally outwardly facing leg sections of the V-shaped track portions **62** and **64**.

The roller assembly **22** is provided with a one-piece resilient sheet metal member **78** which is adapted to insure proper engagement of the roller assembly with the track portions and also to rotatably connect the roller assembly with the pin or stub shaft **56**. More specifically, the member **78** includes a bevelled annular portion **80** slidably disposed on the roller body portion **72** in opposing relationship to the bevelled flange **74**. The portion **80** is adapted to engage the generally inwardly facing leg sections of the V-shaped track portions **62** and **64**. Furthermore, the annular portion **80** is resiliently biased so that the track portions **62** and **64** are resiliently clamped between the flange **74** and the annular portion **80** so as to insure proper engagement with the track portions and to eliminate rattling of the window.

In order to bias the annular portion **80** resiliently, the member **78** is provided with a plurality of circumferentially spaced integral spring elements **82**. Each of the spring elements **82** includes an intermediate portion **84** extending generally radially inwardly from an axially extending portion **86** integrally connecting it with the annular portion **80**. Each portion **84** also merges with a reversely bent portion **88** from which extends a generally radially outwardly projecting portion **90**. The portion **90**, in turn, merges with a reversely bent portion **92** which is integral with a generally radially inwardly extending terminal end portion **94**. The main plastic body portion **72** is provided with a plurality of circumferentially spaced slots **96** adjacent its inner end into which the terminal end portions **94** of the spring elements extend for anchoring the member **78** to the plastic body. It should also be noted that as is shown best in Figs. 7 and 8, the terminal end portions **94** extend through the plastic body and into the groove **68** in the pin or stub shaft **56** when the roller assembly is applied to the pin for operatively and rotatably connecting the roller assembly with the pin.

In order to permit the roller assembly to be connected with the track portion **50**, an enlarged opening **98** is provided through the carriage member **28** at the outer end of the track portion. Similar enlarged openings are provided at ends of the other track portions. As shown best in Figs. 5 and 8 respectively the one-piece sheet metal member **78** is formed so that the bevelled annular portion initially substantially abuts the flange of the plastic rollers body whereby to insure shifting of the annular portion **80** away from the flange upon application of the roller assembly to the track portion. As a result, initial stressing of the spring elements is assured so as to obtain proper resilient engagement of the opposed bevelled surfaces of the roller assembly with opposed surfaces of the track portions.

In Figs. 9, 10 and 11 there is shown a modified form of the present invention which is similar to the above described structure as indicated by the application of identical reference numerals with the suffix "*a*" added to corresponding elements. In this embodiment a reduced diameter and relatively flexible end portion **100** of the plastic body portion **72***a* is axially split as at **102** and **104** and is provided with terminal radially inwardly extending flange elements **106** and an outwardly extending flange **108**. The flange elements **106** project within the internal diameter of the remainder of the body portions **72***a* so that when the roller assembly is applied to the pin or stub shaft **56***a*, the split end portion **100** is first expanded until the flange elements **106** are aligned with the groove **68***a* of the pin. Then the inherent resiliency of the plastic material causes the split end portion to contract so that the flange elements **106** are snapped into and retained within the groove **68***a* for rotatably connecting the roller assembly with the pin.

In this embodiment the flexure spring elements **82***a* are simplified and each comprises a single portion which initially extends outwardly from an integral connection with the annular portion **80***a* and is then reversely bent so that a generally radially inwardly extending terminal end thereof abuts the flange **108** for operatively connecting the member **78***a* with the plastic body member.

From the above description it is seen that the present invention has provided a novel roller assembly including only two simple parts which may be readily manufactured and assembled in an economical manner. It is also seen that the present invention has provided a roller assembly which may be easily applied to a window regulator mechanism or the like without the aid of auxiliary fastening devices and which is capable of effectively resiliently engaging cooperable track means so as to insure a tight fit and to eliminate rattling.

While the preferred embodiments of the present invention have been shown and described herein, it is obvious that many details may be changed without departing from the spirit and scope of the appended claims.

The invention is claimed as follows:

1. A roller assembly comprising roller body means, a pair of oppositely facing generally radially extending and relatively axially shiftable annular means on said body means for engaging generally oppositely facing surfaces of a track means, and flexure spring means integral with a relatively short circumferentially limited extent of a margin of one of said annular means spaced radially outwardly from said body and connected with said body means radially inwardly from said margin for resiliently biasing said pair of annular means relative to each other and toward generally oppositely facing surfaces of a track means.

2. A roller assembly, as defined in claim 1, wherein said pair of annular means provide generally oppositely facing diverging track engageable surfaces for accommodating a generally V-shaped portion of a track means.

3. A roller assembly comprising roller body means including generally radially extending flange means engageable with one surface of track means, and a one-piece resilient sheet material member including annular substantially circumferentially continuous means axially slidable on said body means in opposing relationship with respect to said flange means for engaging a surface of track means facing generally oppositely from said one surface, and a plurality of circumferentially spaced flexure spring elements integral with said annular means and connected to said body means for resiliently biasing said annular means and said flange means relatively toward each other.

4. A roller assembly comprising a roller body member rotatably mountable on a shaft having an annular groove therein, annular means on said body member for engaging a track means surface facing generally in one direction, and a one-piece resilient sheet material member including annular means for engaging a track means surface facing generally oppositely from said one surface, said first and second mentioned annular means being axially relatively shiftable with respect to each other, said sheet material member including flexure spring means connected with said body member for resiliently and oppositely relatively biasing said first and second annular means for engagement with track means surfaces, and one of said members including means projecting generally radially for entering said annular groove of a shaft and connecting the roller assembly to the shaft.

5. A roller assembly, as defined in claim 4, wherein said last named means for connecting the roller assembly to the shaft comprises a portion of said sheet material member projecting radially inwardly of said body member.

6. A roller assembly, as defined in claim 4, wherein said last named means for connecting the roller assembly to a shaft comprises flange means integral with an end portion of said body member, said body member end

portion being resiliently expandable or enabling said flange means to be snapped into a groove in a shaft.

7. A roller assembly, as defined in claim 4, wherein said body member and said first mentioned annular means are integral and are formed of plastic material.

8. A roller assembly, as defined in claim 4, wherein said flexure spring means comprises a plurality of circumferentially spaced spring elements each having one end integral with said second mentioned annular means, an opposite end connected with said body member, and an intermediate portion extending at least in part transversely of said body member.

9. A roller assembly comprising a one-piece plastic roller body, including a generally radially extending flange engageable with one surface of track means, and a one-piece sheet material member including an annular relatively rigid portion slidable on and flaring outwardly from said body means in opposing relationship with respect to said flange for engaging a surface of track means facing generally oppositely from said one surface, and a

plurality of separate flexure spring elements each having one end integral with a margin of said annular portion radially spaced from said body means and an opposite end portion axially offset from said margin and extending transversely of and connected to said body means for resiliently biasing said annular portion and said flange relatively toward each other.

References Cited in the file of this patent

UNITED STATES PATENTS

1,332,130	Lefkowitz	Feb. 24, 1920
1,416,745	Peters	May 23, 1922
2,610,876	Roethel	Sept. 16, 1952
2,628,833	Blanton	Feb. 17, 1953
2,676,043	Roethel	Apr. 20, 1954
2,699,346	Roethel	Jan. 11, 1955

FOREIGN PATENTS

285,038	Germany	June 15, 1915