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C. F. SMITH

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ROLLER AND SHAFT ASSEMBLY

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FIG. 1.

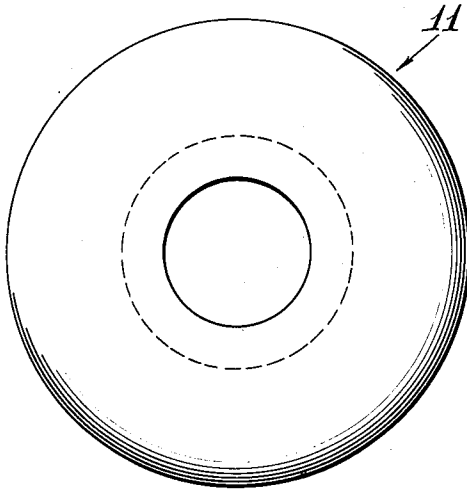


FIG. 2.

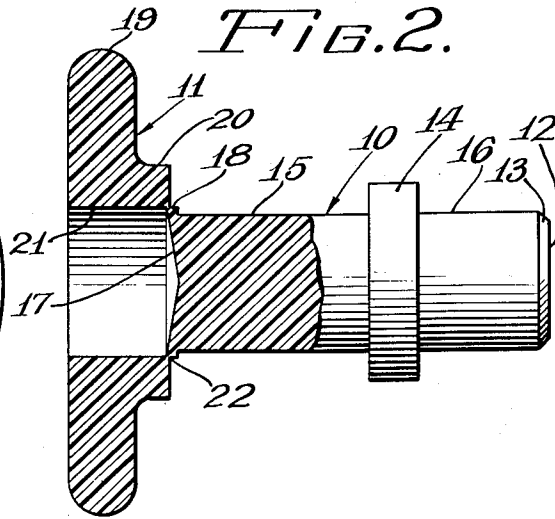


FIG. 3.

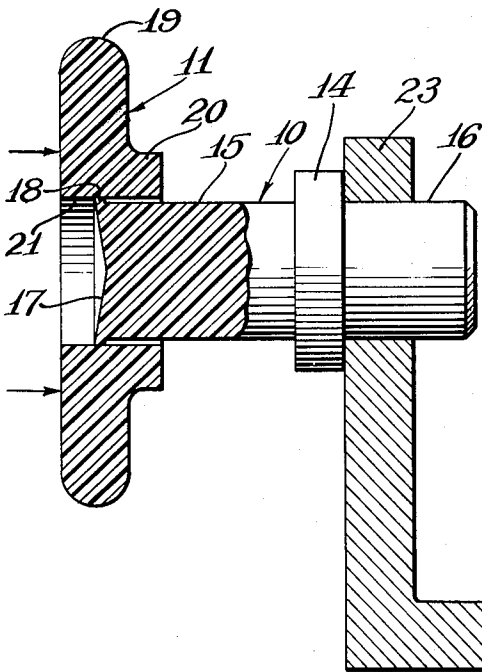
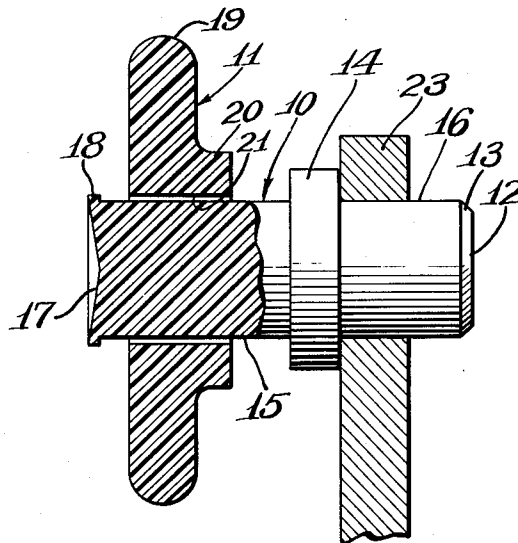


FIG. 4.



Inventor:
Coleman F. Smith
Paul O. Rippe
Atty.

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ROLLER AND SHAFT ASSEMBLY

Coleman F. Smith, Evansville, Ind., assignor to International Harvester Company, a corporation of New Jersey

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9 Claims. (Cl. 18—47.5)

This invention relates generally to a roller and shaft assembly and more particularly to a roller and shaft which are fabricated together in one operation.

In the mass production factories of today, material handling and assembly operations represent a substantial portion of the manufacturing costs of an article. For this reason every effort is being made to decrease the number of assembly operations required and the amount of material handled. It is well known in the art to support a movable object by a roller and shaft assembly, and such assemblies are being installed in many mass production articles. Heretofore, separate operations have been required to first insert the roller on the shaft, and then to secure stop means on the end of the shaft to prevent the roller from working its way off that shaft. The roller, shaft and stop means are normally stored in separate containers on the assembly line in order that they are readily accessible to an assembler. The present invention provides a roller and shaft assembly which requires less material handling and fewer assembly operations than the conventional roller and shaft assembly.

One object of the present invention is to provide an assembly in which a roller and shaft are fabricated together as one article.

Another object of the invention is to provide a roller and shaft which can be assembled in one operation.

Another object of the invention is to provide a roller and shaft assembly which does not require separate stop means for maintaining the roller on the shaft.

Another object of the invention is to provide an assembly in which the shaft is provided with an annular flange having substantially the same diameter as the internal bore of the roller so that the roller can be forced thereover to its operating position upon the shaft but will be prevented from working off the shaft by the flange.

Another object of the invention is to provide an assembly in which the roller is attached to said shaft by a thin section of material which may be easily broken by forcing the roller onto the shaft.

Another object of the invention is to provide a roller and shaft assembly which is economical to manufacture.

These and other objects of the invention will be pointed out in more detail hereinafter, or will be apparent to those skilled in the art upon reading the specification, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is an end view of a roller and shaft fabricated as one article.

Fig. 2 is a longitudinal view, partly in section, of the roller and shaft of Fig. 1.

Fig. 3 is a longitudinal view, partly in section, of the roller and shaft showing the roller being forced onto the shaft.

Fig. 4 is a longitudinal view, partly in section, of the roller and shaft showing the roller in operating position.

Referring to the drawings for a detailed description of

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the invention, Figs. 1 and 2 show an article of manufacture which comprises a shaft 10 and a roller 11. The shaft 10 is generally cylindrical shaped with end 12 having its outer edge 13 beveled slightly. Spaced inwardly from end 12 is an annular shoulder 14 which divides the outer surface of the shaft 10 into a bearing portion 15 and a mounting portion 16. These two portions are shown of equal diameter but could be constructed of unequal diameters if desired. End 17 of the shaft is inclined inwardly toward the center thereof. The outer edge of end 17 is provided with a small annular flange 18 which protrudes above bearing portion 15.

Roller 11 is constructed in the shape of a flat disc having both sides of its outer edge 19 curved smoothly inwardly. The central portion of the roller 11 is provided with a strengthening hub 20 which projects toward the shaft 10. A centrally disposed bore 21 extends through the roller 11 and has substantially the same diameter as the outer surface of annular flange 18 of the shaft 10. As best seen in Fig. 2, the shaft 10 and roller 11 are fabricated as one article and are joined by a small section or web 22 of material. The joining web 22 of the material is only a few thousandths of an inch in thickness but has been exaggerated in the drawing for purposes of clarity. The joining web 22 is disposed between the outer edge of the flange 18 and the inner edge of hub 20, and may be a continuous section extending completely around the periphery of the flange 18, or may be a plurality of short sections spaced around the periphery of the flange.

It has been found that a suitable material for the shaft 10 and roller 11 is a high impact plastic, such as polystyrene, polyethylene, ethyl cellulose, cellulose nitrate, nylon or etc. Plastic is adaptable for molding so that the shaft 10 and roller 11 can be integrally molded in one operation. After molding, the roller 11 and shaft 10 is ready for assembling. In Fig. 3 and Fig. 4 of the drawing, a portion of a frame 23 is shown in section. This frame is provided with an aperture therethrough into which the beveled end 12 of the shaft 10 is secured with shoulder 14 disposed against the frame. A force is then applied inwardly against the outer surface of the roller 11 as indicated by the arrows in Fig. 3. This force breaks the joining web 22 between the roller 11 and shaft 10 and forces the roller 11 over the flange 18. In Fig. 3 the roller 11 has been forced part way over the flange 18, whereas in Fig. 4 the roller has been forced completely over the flange 18 onto the bearing portion 15 of the shaft 10.

Joining web 22 is of such small size that it breaks easily and smoothly so that the roller 11 will slide over flange 18. A suitable tool or machine may be used for forcing the roller 11 over the flange 18 in order to maintain the axial bore 21 in alignment with the shaft 10 during the assembling operation. After roller 11 has been forced onto the bearing surface 15 of the shaft, it will be free to rotate thereon since the bore 21 is of larger diameter than bearing portion 15. Shoulder 14 will position the shaft 10 in reference to the frame 23 and will prevent the roller 11 from rubbing against the frame. It is contemplated that a drawer or other movable object be supported upon the outer edge 19 of the roller 11, and since flange 18 is substantially the same size as bore 21, the flange will prevent the roller 11 from working its way off the shaft 10.

From the foregoing description, it can be readily understood that the roller and shaft assembly described has many advantages for mass production work. Only one set of molding dies and one molding operation are required to fashion all the elements of the roller and shaft assembly. There will be a minimum amount of material

handling required since the complete assembly consists of only one article. The roller 11 can be easily and quickly assembled onto the shaft 10 by one simple operation. Flange 18 will retain the roller in its operating position upon the shaft 10 so that separate stop means are not required.

While a preferred form of the invention has been shown and described, it will be obvious to those skilled in the art that it is not so limited, but is susceptible to various changes and modifications without departing from the spirit thereof, and it is desired that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What is claimed is:

1. An article of manufacture comprising a shaft and a roller having an axial bore therethrough, said shaft and said roller connected together and maintained in axial alignment by a web section, said web section formed about the outer periphery of said shaft and the marginal edges of said axial bore of said roller, said shaft and said roller adapted to be assembled by breaking said web section and inserting said shaft into said bore.

2. An article of manufacture comprising a roller and a shaft, said shaft being provided with a projection which extends past the outer diameter of the shaft, said roller having an axial bore which is large enough to slip over said projection onto said shaft, and a thin web section which joins said roller and shaft and which is easily broken when the roller is forced over said projection, said thin web section formed about the circumference of said projection and the marginal edges of said axial bore of said roller.

3. An article of manufacture comprising a shaft and a roller, said shaft being provided with an annular flange having a larger outside diameter than said shaft, said roller having an axial bore of substantially the same diameter as said flange, and a thin web section disposed about the periphery of said flange and one marginal edge of said axial bore of said roller which joins the roller and shaft and which may be broken by forcing the roller over said flange onto said shaft.

4. An article of manufacture comprising a shaft and a roller, said shaft being provided with an annular shoulder and a spaced annular flange each of which has a larger outside diameter than said shaft, said roller having an axial bore of substantially the same diameter as said flange, and a weak web section disposed about the periphery of said flange and one marginal edge of said axial bore of said roller which joins the roller and shaft and which may be easily broken by forcing the roller over said flange onto said shaft to its operating position between said flange and said shoulder.

5. An article of manufacture comprising an integral shaft and roller, said shaft being provided with a bearing portion and an annular flange having a larger outside diameter than the bearing portion, said roller having an axial bore of substantially the same diameter as said flange, said roller being joined to said flange with said

bore in axial alignment with said shaft by a weak web section disposed about the periphery of said flange and one marginal edge of said axial bore of said roller, said weak web portion being adapted to be easily broken as the roller is forced over said flange onto said bearing portion.

6. In an article of manufacture, a one piece plastic molding comprising a roller, a shaft and a joining web section, said shaft having a bearing portion, said roller being provided with an axial bore which is held in axial alignment with said bearing portion by said web section, said web section being disposed about the periphery of said shaft and one marginal edge of said axial bore of said roller, said web portion being adapted to break easily and smoothly along the inner edge of said roller as the roller is forced inwardly onto said bearing portion.

7. In an article of manufacture, a one piece plastic molding comprising a roller, a shaft and a joining web section, said shaft being provided with a bearing portion and an annular flange having a larger outside diameter than said bearing portion, said roller having an axial bore of substantially the same diameter as said flange, said roller being joined to said flange with said bore in axial alignment with said shaft by said web section which is disposed about the periphery of said flange and one marginal edge of said axial bore of said roller, said web section having a small cross-sectional area whereby it is adapted to be broken easily and smoothly along said one marginal edge of said axial bore of said roller.

8. The method of making a roller and shaft assembly which comprises fabricating a roller and shaft as one article with a thin web connecting the inner periphery at one end of said roller to the periphery at one end of said shaft, and then forcing the roller toward said shaft whereby said web is broken and the roller is moved onto said shaft.

9. The method of manufacturing a plastic roller and shaft assembly which comprises molding a plastic material into an integral roller and shaft which are connected by a thin web section which is formed about the periphery of said shaft at one end thereof and about the inner periphery of said roller at one end thereof, and then forcing the roller toward said shaft whereby said thin web section is smoothly broken and the roller is moved onto said shaft.

References Cited in the file of this patent

UNITED STATES PATENTS

50	777,653	Foster	Dec. 13, 1904
	1,680,823	Teed	Aug. 14, 1928
	2,013,968	McKee	Sept. 10, 1935
	2,367,235	Morin	Jan. 16, 1945
	2,479,695	Morin	Aug. 23, 1949
55	2,540,034	Maxam	Jan. 30, 1951
	2,577,350	Morin	Dec. 4, 1951

FOREIGN PATENTS

479,185	Canada	Dec. 11, 1951
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