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CORRUGATED CUSHION ROLL

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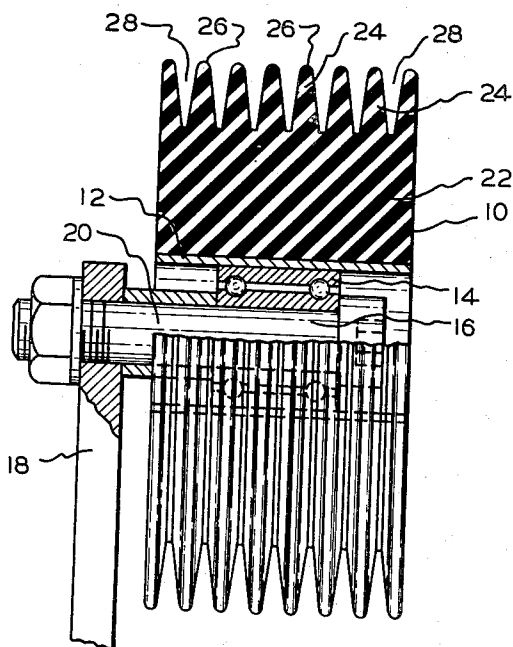


FIG. I.

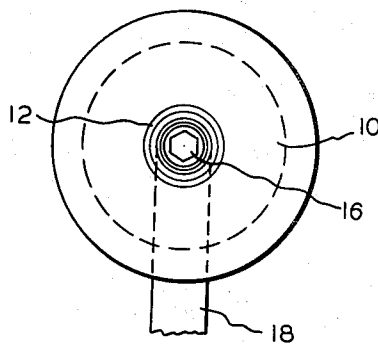


FIG. II.

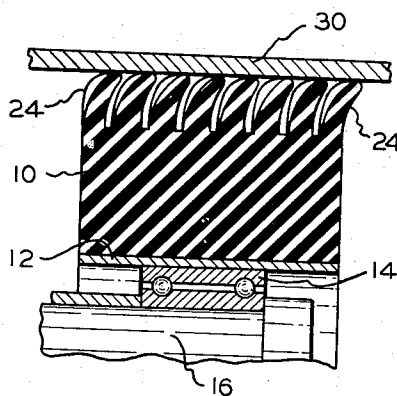


FIG. III.

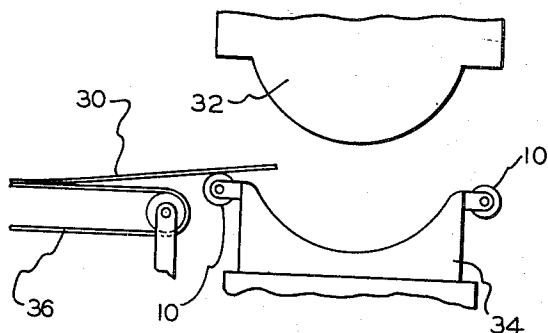


FIG. IV.

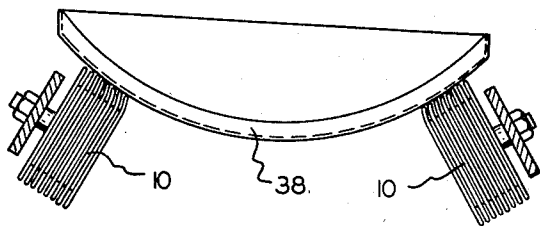


FIG. V.

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UNITED STATES PATENT OFFICE

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CORRUGATED CUSHION ROLL

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1 Claim. (Cl. 193—37)

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The present invention relates to improvements in self-cleaning cushion rolls and bumpers particularly designed for the handling of materials which are susceptible to being marred or denting by rough handling.

In the automotive industry, the sheet metal panels making up the exterior of the automobile must be handled with great care if an excessive amount of rework and refinishing is to be avoided. During the course of fabrication and finishing, these panels are handled a great many times. First in the unformed sheet state, then into and out of the forming presses. Thereafter they are handled many times in the finishing and leading up to the final assembly line.

Heretofore both hard and sponge rubber rolls have been employed for cushioning and conveying material. The contour of the rolls has generally been either crown or cylindrical. While some form of ribs on the surface of the roll have been used, the shape and construction has been such as to be completely lacking in any self-cleaning properties or of possessing the degree of cushioning and softness required to obtain the desired freedom from marring, scratching and denting of the conveyed parts which are very roughly handled by the fabricating operators.

One of the objects of the present invention is to provide a resilient conveying roll or bumper, which may be of any suitable resilient and flexible material, for example, natural or synthetic rubber, so constructed and arranged that the supporting surface of the roller is soft, resilient and flexible and under the action of the supported load has a self cleaning character.

Another object is to provide a conveying roll or bumper of the type described consisting of a series of closely arranged and tapered peripheral fins so constructed and arranged to avoid to a great extent the accumulation of foreign and abrasive matters upon the peripheral crown at each fin and at the same time have an inherent self-cleaning motion under the rolling and supporting action while in use.

A further object and advantage of the present invention is provided in an improved soft cushion roll for conveying and bumper purposes comprising a corrugated surface formed by a plurality of relatively thin flexible fins.

These and other objects and advantages residing in the specific construction, arrangement and combination of parts will more fully appear from a consideration of the following specification and the appended claim.

In the drawings,

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Fig. I is a planned view of a roll embodying the principles of the present invention and partly shown in vertical cross section,

Fig. II is an end view on a reduced scale of Fig. I,

Fig. III shows the deflection of the fins under a supported load,

Fig. IV shows the present invention being used on opposite sides of a large panel die for assisting in the conveying of the sheet metal strip into the die before forming and from the die after forming, and

Fig. V is an end view of a conveying arrangement in which the conveying rolls are complementary to the surface of the article being conveyed.

Referring to the drawings, in Fig. I the principles of the present invention are shown applied to a molded rubber roll 10 vulcanized to a sheet metal sleeve 12 in which the bearing 14 is preferably press fitted. A bolt 16 clamps the bearing 14 to the support structure 18 through the use of a suitable spacer 20. It is to be understood, however, that the present invention resides in the surface construction of the roller and that any suitable mounting structure may be employed.

As more clearly shown in Fig. I, the molded rubber roll 10 is preferably provided with a solid molded intermediate body portion 2 with which the peripheral tapered fins 24 are integrally molded. To avoid an accumulation of foreign and abrasive matter, the outer edge of each fin 24 is preferably crowned as at 26. The tapered construction of each fin 24 provides a groove 28 between each fin 24 the sides thereof converging outwardly.

In practice, a natural or synthetic roll molded with a softness not to exceed a Shore durometer reading of 33 points has been found satisfactory for handling material loads capable of being manually manipulated. The fins are spaced approximately $\frac{1}{4}$ inch with a radial depth of approximately $\frac{1}{2}$ inch.

As more clearly shown in Fig. III, the deflection of the fins under a load causes a progressive wave action of each fin as the roll rotates upon its axis. It is this action which gives the roll 10 its self-cleaning characteristic, assisted by the tapered construction of the fins and the crowned outer edges 26.

Fig. IV shows the roll 10 handling a sheet 30 being inserted between the punch 32 and die 34 from the conveyor 36.

In Fig. V a panel 38 is shown supported and conveyed by the rolls 10 with the fins thereof be-

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ing indicated as deflected by the supported weight.

I claim:

A cushion conveyor and bumper roll characterized by its self-cleaning action under conditions of deflection by the supported load comprising a rubber body to receive an axle about which the roll is rotatably mounted, a plurality of narrow, slightly tapered rubber radial fins integral with said body, the radial height of said fins being substantially greater than the basal width of said fins, said fins being axially spaced with the annular peripheral edge of each fin being substantially pointed and collectively defining the peripheral supporting surface of the roll, the rubber of said fins being of a consistency providing said fins with structural characteristics resulting in said fins being readily deflected by the supported load for which the roll is designed to displace the peripheral edges of said fins in an axial direction shifting the point of load support slightly to one side of the pointed peripheral edge

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of each fin whereby a wiping action takes place across the peripheral edge of each fin as rolling support is given the load to obviate accumulation of foreign matter upon the peripheral surface of the roll, adjacent fins defining narrow V-grooves which are distorted upon axial deflection of said fins under load tending to dislodge any accumulation of foreign matter in said grooves, the resiliency of said fins returning said fins to their normal radial position following deflection by the load.

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