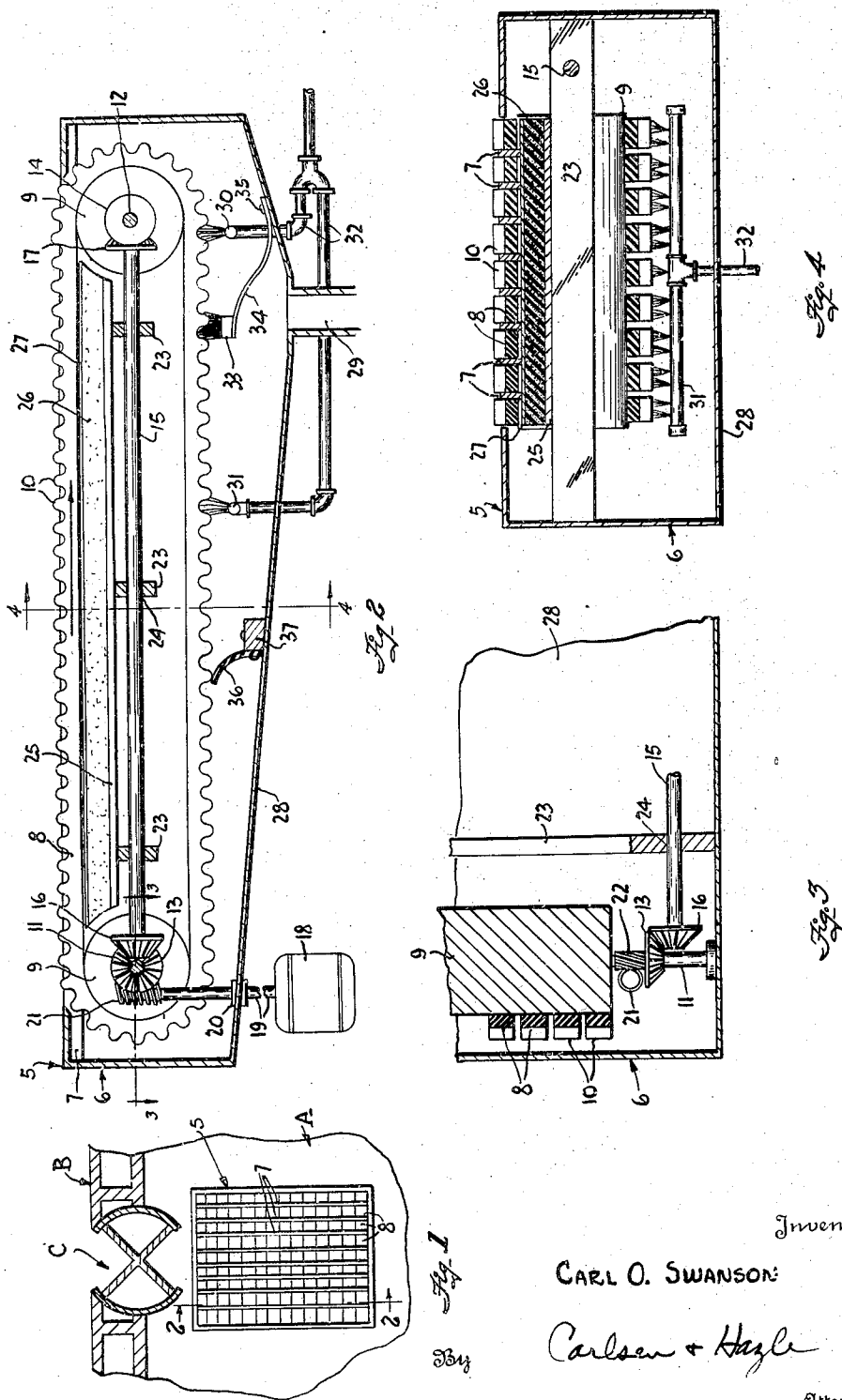


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C. O. SWANSON
SELF-CLEANING DOOR MAT
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SELF-CLEANING DOOR MAT

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This invention relates to improvements in door mats of the type employing mechanically moving and power actuated wiping belts arranged in a grill work over which pedestrians pass, and operative to wipe and clean the soles of the shoes.

The primary object of my present invention is to provide a simple and practical construction for this type of door mat, well adapted to be installed in the floor of a building immediately inside the door, so that persons entering the building will be compelled to traverse the mat as they enter and whereby their shoes or other footwear will be scrubbed and cleaned. Another object is to provide a novel and effective means for cleaning off the belts themselves continuously as they operate. Still another object is to provide efficient means for yieldably supporting the belts under the weight of persons passing over the mat.

These and other more detailed and specific objects will be disclosed in the course of the following specification, reference being had to the accompanying drawings, in which—

Fig. 1 is a plan view of the door mat showing it installed in a floor inside a revolving door, and showing the door and adjacent wall portions of the building in section.

Fig. 2 is an enlarged vertical sectional view partially in elevation and taken substantially along the line 2—2 in Fig. 1.

Fig. 3 is a fragmentary horizontal sectional view taken along the line 3—3 in Fig. 2.

Fig. 4 is a vertical cross section along the line 4—4 in Fig. 2.

Referring now more particularly and by reference characters to the drawing, A designates the ground floor of a building having a wall B provided with a revolving door entrance C, as shown in Fig. 1. Immediately inside the entrance C the floor is provided with a rectangular inset frame, indicated generally at 5, which supports a housing or pan 6 depending below the surface of the floor. Extending lengthwise with respect to the general path of travel of persons entering through the entrance C the frame has a series of transversely spaced parallel frame bars 7 set on edge and secured at their ends in the frame and upper edges of these bars being flush with the floor surface forming a grill-like structure adapted to engage the feet and support the weight of pedestrians entering the building.

Positioned between the bars 7, which cooperate to form channels for the purpose, is a series of flexible belts 8 which are stretched over rollers 9 at opposite ends of the frame, and these belts 8 are of flexible material such as rubber so that

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they may be stretched fairly taut between the rollers 9. The upper surfaces or runs of these belts are normally positioned slightly above the level of the frame bars 7, or more particularly the transverse corrugations or ribs 10, with which the belts are provided, are arranged to normally project above the surface of the frame 5 as a whole. Thus the soles of the footwear of the persons traversing the frame will be yieldably engaged by said corrugations 10 when the belts are set in motion, and so that the belts will scrape or otherwise brush off such material as mud and slush from said footwear.

The rollers 9 are mounted upon shafts 11 and 12 journaled transversely within the housing 6 and at one end of the rollers the shafts carry beveled gears 13 and 14. A countershaft 15 extends lengthwise between the roller shafts and at its end is provided with beveled gears 16 and 17 meshing respectively with the aforesaid gears 13 and 14. The shaft 13 is driven by a motor 18 positioned below the housing 6 and having a shaft 19 extending upwardly therein through a bearing 20. The motor 18 may be located at any remote point, such as in the basement of the building, and drives the rollers through a worm 21 on the shaft 19 and a mating worm gear 22 upon the shaft 11. It will be noted that the beveled gear pairs 13 and 16 and 14 and 17 are oppositely faced so that the rotation of the shafts 11 and 12 will be in the same direction. The motor 18 is, of course, started and stopped as weather conditions may require, and when set in operation in wet or slushy weather will so drive the belts 8 that the footwear of persons passing over the frame 5 and entering the building will be effectively cleaned. The positive drive to both rollers 9 makes it unnecessary to provide any special means for maintaining the belts in a taut condition.

Extending transversely in the housing 6 is a series of cross bars 23 which adjacent one end are apertured at 24 to form bearings for the counter shaft 15. More important, these cross bars 23 form supports for the upper runs of the belts 8, and for this purpose there is provided and secured to upper edges of the cross bars a lower, rigid, pad supporting plate 25. This plate 25 extends almost the full length of the space between the rollers 9, and to its upper surface there is vulcanized or otherwise bonded and anchored a support pad 26 of sponge rubber or other yieldable and resilient material. This pad 26 is of substantial thickness and upon its upper surface I vulcanize or otherwise anchor a thin and

flexible metal covering or pad 27. In the normal position of the belts 8 their upper runs just clear the aforesaid plate 27, but as a person walks across the mat their weight will depress the upper runs of the belts into contact with the plate 27, which forms a smooth surface over which the belts may readily slide as they travel, and in addition transmits the weight and compression forces to the support pad 26, which yieldably urges the belts into positive scraping relation with the soles of said persons' footwear, as will be understood.

The housing 6 has a bottom 28 which slopes toward a drain opening or pipe 29 and a pair of transversely extending spray pipes 30 and 31 spray water or other cleansing liquid upon the lower runs of the belts to clear the same of accumulated materials scraped from the shoes. The surplus water will of course run out through the drain 29, and I indicate conventional piping generally at 32 for carrying the cleansing liquid to said spray pipes. In addition, I also provide a transversely extending brush 33 which is supported by a spring 34 secured at 35 to the housing bottom 28. This brush is positioned between the sprays to assist in removing material from the belts after it has first been softened and partially dislodged by the first spray 30. The spring 34 of course yieldably urges the brush 33 upwardly into contact with the lower runs of the belts so that it will best accomplish its purpose. It will be noted that the brush 33 is located immediately over the drain 29 so that material dislodged by the brush will readily drop into and adjacent said drain to be carried off with maximum ease. I further provide a transversely extending wiper blade 36 secured at 37 to the housing bottom 28 and this blade is of rubber or similar flexible material, so positioned as to engage and wipe the belts as they travel through the housing. This wiper is so located as to engage the belts after the spraying and brushing operations thereon previously described, and serves to remove any surplus liquid from the belts before they return to floor level.

The operation of the device as thus set forth will no doubt be obvious, but will be summarized as follows:

Under dry or fairly normal weather conditions the device merely serves as an ordinary or conventional door mat and people entering the building may wipe their feet upon it as they pass over in the usual manner. Any dust or dirt so dislodged will escape downwardly between the belts 8 and the frame bars 7 to be collected in the pan or housing 6. When the weather is wet or snowy, power is applied by the motor 18 and water or other liquid is admitted to the spray pipes 30 and 31. The resulting travel movement of the belts 8 will cause them to scrape the footwear of the persons entering the building, as has been previously described, and the mud and other material thus collected by the belts will be deposited in the pan 6 and there removed by the flushing action of the water from the sprays 30 and 31 to be finally carried off through the drain 29. The belts themselves will be continuously cleaned and wiped as they travel below floor level so that as they return to floor level they will be in best condition for effective scraping operation, and a person leaving the mat and continuing on into the building will do so with his footwear in comparatively dry and clean condition.

It is understood that suitable modifications may be made in the structure as disclosed, pro-

vided such modifications come within the spirit and scope of the appended claims.

Having now therefore fully illustrated and described my invention, what I claim to be new and desire to protect by Letters Patent is:

1. A floor mat of the character described, comprising a frame having a series of parallel supporting bars, a series of horizontal, power actuated, flexible, endless belts mounted on end rollers so that their upper runs will travel between the bars, the upper surfaces of the belts having ribs normally projecting above the upper edges of the bars, a rigid support plate below the upper runs of the belts, a pad of resilient material positioned upon said plate and adapted to yieldably support the upper runs of the belts between said rollers in such manner as to permit downward flexing of the belts at pressure areas produced by foot pressure, and a flexible plate of smooth material positioned atop said pad to facilitate travel movements of the belts thereover while permitting flexing of the belts at such pressure areas.

2. In a floor mat of the character described and including a series of parallel supporting bars and a series of horizontal, flexible, endless belts mounted on end rollers so that their upper runs will travel between the bars, said belts having ribs normally projecting above the upper edges of the bars, support means for the upper runs of the belts comprising a pad of resilient material positioned between the rollers and beneath said upper runs of the belts, and a thin flexible metal plate secured on the upper surface of the pad and forming a smooth surface for the belts while permitting flexing of the belts at pressure areas produced by foot action on the projecting ribs.

3. In a self cleaning floor mat, a series of horizontally extending supporting bars disposed in spaced vertical planes, a series of power actuated, flexible, endless belts mounted on end rollers below the floor surface and with their upper runs extending longitudinally between respective pairs of said bars, shoe scraping projections extending outwardly from the belt so as to normally project above the upper edges of the bars, horizontally extending supporting means cooperating with the lower edges of the bars to form substantially U-shaped channels therewith substantially coextensive with the spacing between the rollers to provide supporting channels for the upper runs of the belts, the said belts being of such thickness as to extend down between the bars substantially to the plane of said supporting means, said horizontal supporting means for each belt being vertically compressible at any point throughout the length of the channel whereby the belt may flex in response to foot pressure to permit said projections, coincident to the area of foot pressure, to move down to a level with the top edges of the supporting bars.

4. In a self cleaning floor mat, a series of horizontally extending supporting bars disposed in spaced vertical planes, a series of power actuated, flexible, endless belts mounted on end rollers below the floor surface and with their upper runs extending longitudinally between respective pairs of said bars, shoe scraping projections extending outwardly from the belt so as to normally project above the upper edges of the bars, horizontally extending supporting means cooperating with the lower edges of the bars to form substantially U-shaped channels therewith substantially coextensive with the spacing between the rollers to provide supporting channels for

the upper runs of the belts, the said belts being of such thickness as to extend down between the bars substantially to the plane of said supporting means, said horizontal supporting means for each belt being vertically compressible at any point throughout the length of the channel whereby the belt may flex in response to foot pressure to permit said projections, coincident to the area of foot pressure, to move down to a level with the top edges of the supporting bars, said horizontally extending means for each pair of bars comprising a rigid support and a superposed compressible element extending the length of the channel.

5. In a self cleaning floor mat, a series of horizontally extending supporting bars disposed in spaced vertical planes, a series of power actuated, flexible, endless belts mounted on end rollers below the floor surface and with their upper runs extending longitudinally between respective pairs of said bars, shoe scraping projections extending outwardly from the belt so as to normally project above the upper edges of the bars, horizontally extending supporting means cooperating with the lower edges of the bars to form substantially U-shaped channels therewith substantially coextensive with the spacing between the rollers to provide supporting channels for the upper runs of the belts, the said belts being of such thickness as to extend down between the bars substantially to the plane of said supporting means, said horizontal supporting means for each belt being vertically compressible at any point throughout the length of the channel whereby the belt may flex in response to foot pressure to permit said projections, coincident to the area of foot pressure, to move down to a level with the top edges of the supporting bars, said horizontally extending means for each pair of bars comprising a rigid support and a superposed layer of sponge rubber extending the length of the channel.

6. In a self cleaning floor mat, a series of horizontally extending supporting bars disposed in spaced vertical planes, a series of power actuated, flexible, endless belts mounted on end rollers below the floor surface and with their upper ends extending longitudinally between respective pairs of said bars, shoe scraping projections extending outwardly from the belt so as to normally project above the upper edges of the bars, horizontally extending means cooperating with the lower edges of the bars to form substantially U-shaped channels therewith substantially coextensive with the spacing between the rollers to provide supporting channels for the upper runs of the belts, said horizontal supporting means for each belt being vertically compressible at any point throughout the length of the channel whereby the belt may flex in response to foot pressure to permit said projections, coincident to the area of foot pressure, to move down to a level with the top edges of the supporting bars, said horizontally extending means for each pair of bars including a rigid supporting plate, a layer of compressible rubber supported thereon, and

a thin layer of flexible metal over the rubber to provide a wear surface for the movement of the belt thereover while permitting restricted area compression of the rubber in response to foot pressure flexing of the belt portion thereabove.

7. A floor mat of the character described, comprising a series of parallel frame bars adapted to support the weight of a person walking over the mat, a series of flexible wiping belts arranged to travel at their upper runs between the said bars and having ribs normally projecting thereabove to wipe the soles of the footwear of said person, a pad of resilient material positioned beneath said upper runs of the belts and adapted to yieldably support the belt in such manner that the ribs may be depressed, under direct foot pressure at points of foot contact, to a level with the tops of the adjacent frame bars while holding other parts of the belts in normal rib projected positions above the bars, and the said belts being of such thickness as to extend down between the bars substantially to the plane of the said pad.

8. A floor mat of the character described, comprising a frame having a series of parallel supporting bars, a series of horizontal endless belts mounted on end rollers so that their upper runs will travel between the bars, the outer surfaces of the belts having projections adapted to normally project above the upper edges of the bars, a rigid support plate below the upper runs of the belts, a pad of resilient material positioned upon said plate and adapted to yieldably support the upper runs of the belts between said rollers, whereby the belts may be depressed by foot pressure at any exposed area while the pad continues to hold other parts of the belts with their projections in projected positions above the bars, the said belts being of such thickness that the undersides of the upper runs thereof will travel immediately over the upper surface of the said pad.

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