# United States Patent

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[54] **SHRINK DEVICE FOR WEARABLE PRODUCTS MADE OF HEAT SHRINKABLE FILM**


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[52] **U.S. Cl.** .....**219/215,** 219/349, 219/518

[51] **Int. Cl.**.....**H05b 1/00**

[58] **Field of Search**.....219/339, 342, 343, 347–354, 219/200, 215, 441, 518; 200/85; 29/447; 264/230, 342, DIG. 71



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[57] **ABSTRACT**

A shrink device having a casing with an opening for receiving a foot or other body part and a receptacle within the casing for holding the foot in position with electrical means for applying heat to an overshoe or other article made of heat shrinkable film for shrinking thereof onto the shoe of the wearer or a foot or other body part placed within the receptacle.


**11 Claims, 4 Drawing Figures**

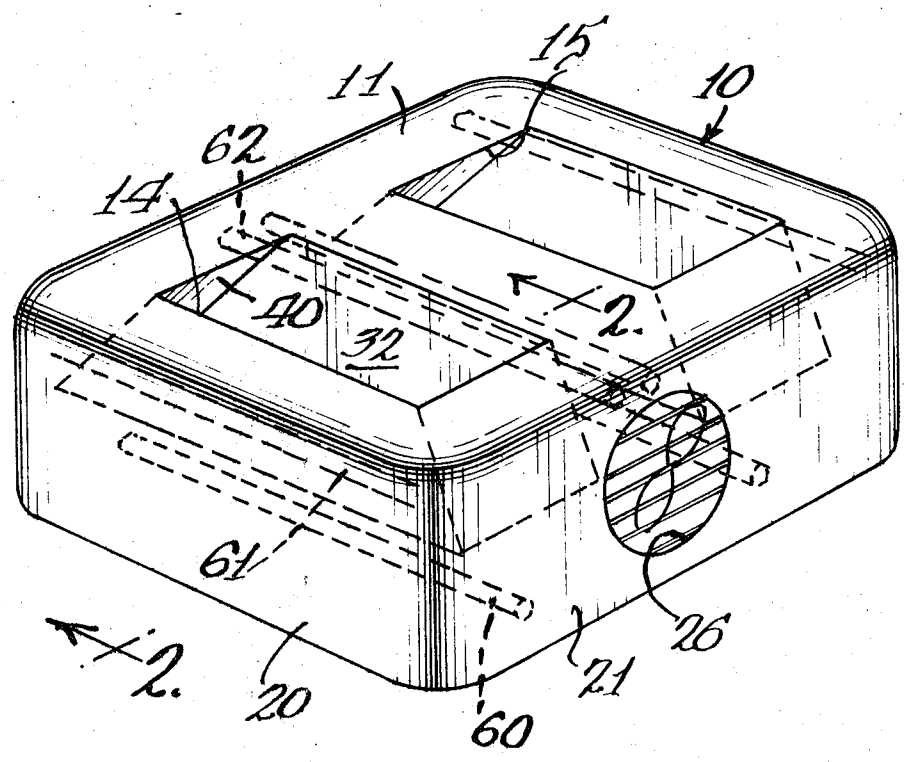


Fig. 1.

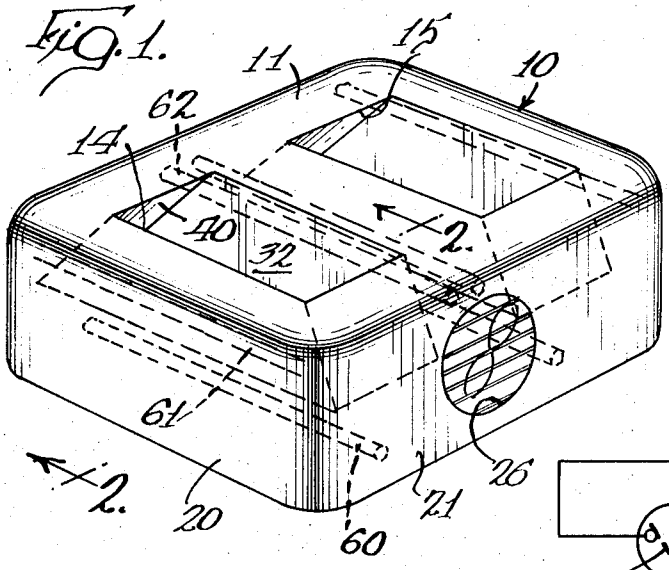



Fig. 4.

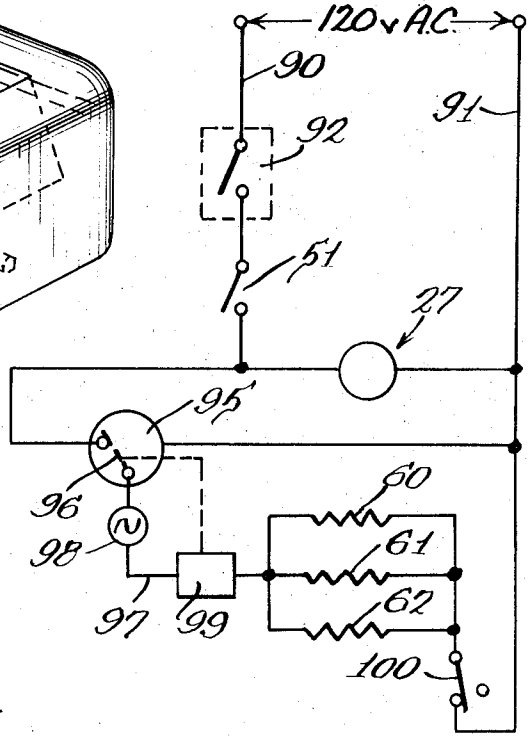
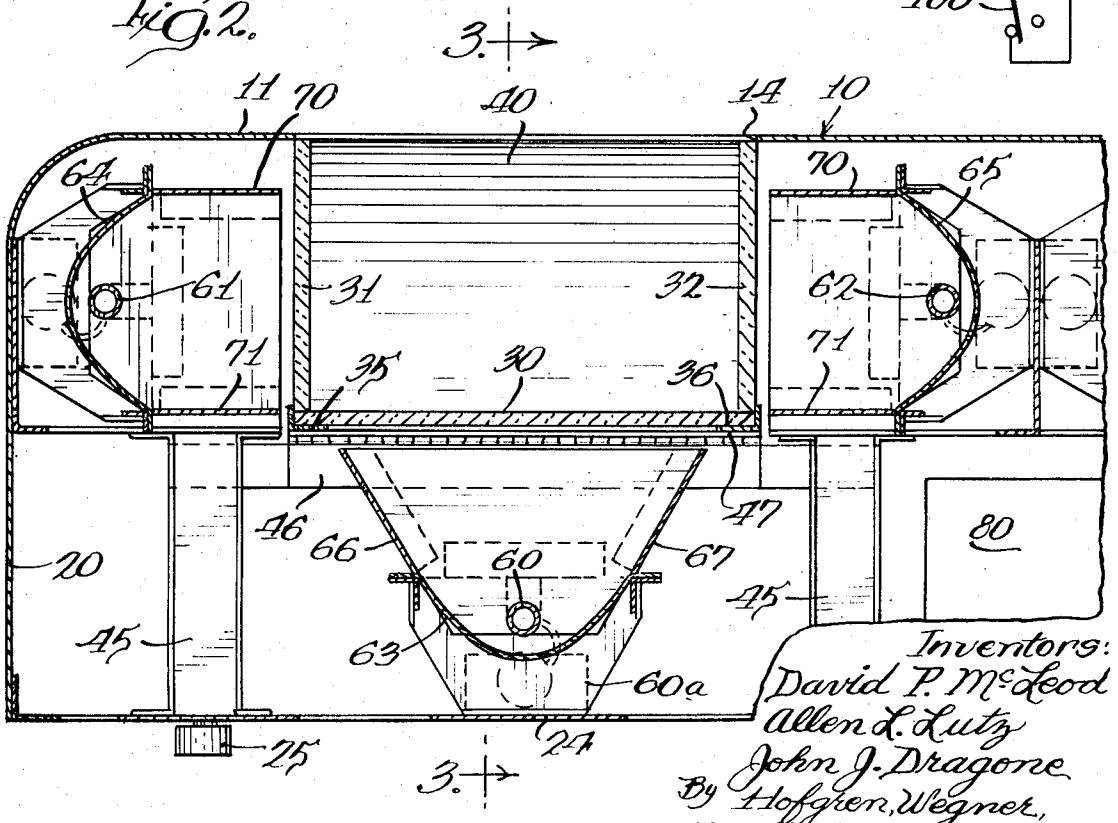



Fig. 2.




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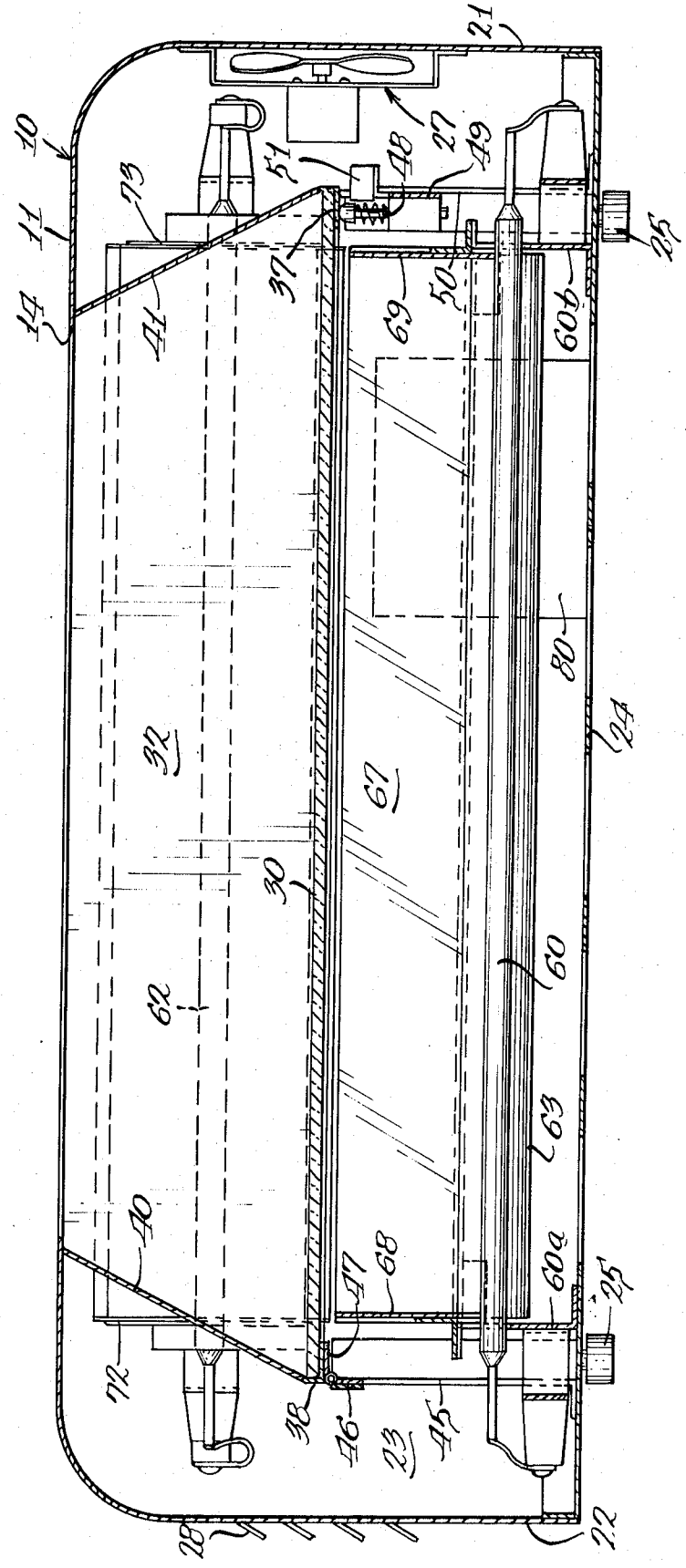

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FIG. 3.

# SHRINK DEVICE FOR WEARABLE PRODUCTS MADE OF HEAT SHRINKABLE FILM

## CROSS REFERENCES TO RELATED APPLICATIONS

he shrink device disclosed herein has particular applicability to an overshoe and, more particularly, a disposable bowling shoe as disclosed in a copending application of Messrs. Larsen, Trier, and Rytina, filed Dec. 3, 1969, Ser. No. 881,769.

## BACKGROUND OF THE INVENTION

This invention pertains to a shrink device for shrinking articles made of heat shrinkable film onto the foot or shoe of a wearer or another body part wherein the article can be a disposable overshoe and, more particularly, a bowling shoe or can be a glove for use on the hand of a wearer.

Although hand dryers and other devices are known for blowing air for drying and similar uses, applicants are not aware of any prior art which provides for heat shrinking an article of heat shrinkable film onto the shoe or a human body part, wherein the article is prepositioned on the shoe and the shoe then inserted within a casing opening wherein radiant heat is applied to the heat shrinkable film for shrinking thereof onto the shoe and with suitable means provided for complete safety of use of the shrink device.

## SUMMARY

An object of this invention is to provide a shrink device for shrinking an article of heat shrinkable film onto part of a person's body, such as the hand, foot or a shoe worn by the person with complete safety and in a minimum period of time.

Another object of the invention is to provide a shrink device for heat shrinking disposable overshoes or the like, such as a bowling shoe formed from heat shrink material onto the street shoe of a wearer, wherein the device comprises a casing with a foot-receiving opening and a receptacle within the casing for holding the foot in position and preventing access to the remainder of the casing interior, and electrical means for rapidly applying heat to the overshoe for shrinking thereof onto the wearer's shoe.

Still another object of the invention is to provide a shrink device, as defined in the preceding paragraph, wherein the electrical means includes a circuit having radiant heat elements and reflectors directing the radiant heat toward the receptacle and a shoe positioned therein, and further added features whereby: the receptacle is yieldably mounted for movement and a switch in circuit with the radiant heat elements is closed to energize the circuit when a foot is properly positioned; a thermal-responsive safety switch is in the circuit to limit the temperature achieved and applied to the overshoe; the circuit further includes a dispenser operated switch for conditioning the circuit for operation upon dispensing of overshoes; a timer in the circuit for limiting the time of a heat shrink cycle; and timer operated means for supplying a reduced voltage initially to the circuit to avoid a high inrush of current on start-up.



## DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective front view of the shrink device;

FIG. 2 is a vertical fragmentary section on an enlarged scale, taken generally along line 2—2 in FIG. 1;

FIG. 3 is a vertical section, taken generally along the line 3—3 in FIG. 2; and

FIG. 4 is a circuit diagram for the shrink device electrical components.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

The shrink device, as shown generally in FIG. 1, has a casing, indicated generally at 10, with a top panel 11 having a pair of openings 14 and 15 for insertion of the feet of a user of the shrink device. Preparatory to use of the shrink device, a person will have obtained a pair of overshoes for street wear or for use in bowling formed of heat shrink film which can loosely fit on the shoes or feet of the wearer. Such overshoes are more particularly described in a copending application of Messrs. Larsen, Trier, and Rytina, Ser. No. 881,769, filed Dec. 3, 1969. Such overshoes are of sufficient size to be easily fitted and the shrink device disclosed herein rapidly heats the film to shrink the overshoes down onto the street shoes of the wearer or a foot.

For purpose of description, reference will hereinafter be made to shrinking an overshoe onto a shoe; however, it should be understood that a foot without a shoe can have the overshoe applied, or the device could be used with a hand.

The casing further has side walls 20, 21, 22 and 23 depending downwardly from the periphery of the top panel 11 to form an enclosing casing which is closed off by an apertured bottom panel 24 which permits air to flow into the interior of the casing. The casing is supported spaced from a support surface by feet 25. Because of the heat generated within the casing, additional means are provided for achieving air circulation through the casing, including an opening 26 in the side wall 21 in which a motor-driven fan, indicated generally at 27, is positioned. The opposite side wall 22 has a series of louvers 28 through which air can exhaust from within the casing.

Receptacle means are positioned within the casing and beneath each of the casing openings 14 and 15 to hold a foot of a wearer i position for heating of the overshoe of heat shrink film. For the opening 14, this means comprises a box formed of glass which has minimal effect on transmission of radiant energy with a bottom 30 and sides 31 and 32, with the bottom resting on a peripheral angle iron frame having side members 35 and 36 which are interconnected at their ends by transverse members 37 and 38. The ends of the receptacle chamber are defined by a pair of upwardly inclined reflector panel members 40 and 41 spanning the gap between the side walls 31 and 32 and which reflect heat onto the top of a shoe.

The receptacle is movably mounted for slight downward movement in response to the weight of a foot within the receptacle. This is accomplished by having the angle iron supporting frame supported at one end by a pair of vertical frame legs 45 interconnected by a strap 46 which mounts a hinge 47 connected

between the strap and the angle iron 38 of the supporting frame. The receptacle is held in generally horizontal position by means at the opposite end thereof, including a pair of upwardly urged spring-urged plungers 48, one of which is shown in FIG. 3, which are mounted to a strap 49 extended between a pair of vertical frame legs, one of which is indicated at 50. A switch 51 is positioned beneath the angle iron member 37 to sense lowering of the receptacle and cause the heating cycle to occur, as subsequently described.

Heat is applied to the overshoe positioned within the receptacle by a series of radiant heat energy sources in the form of quartz lamps having a length to extend along the length of the receptacle and with there being a first quartz lamp 60 extending beneath the receptacle and a pair of quartz lamps 61 and 62 disposed near the level of the shoe top and extending along opposite sides of the receptacle. Each of these lamps has a back reflector 63 64, and 65, respectively. The quartz lamp 60 is mounted on base plates 60*a* and 60*b* and has an outwardly flaring shield with side walls 66 and 67 and with end walls 68 and 69 whereby the radiant energy is focused onto the bottom 30 of the receptacle. The additional reflectors for the quartz lamps 61 and 62 are of the same construction, with spaced-apart top and bottom reflector surfaces 70 and 71 and end panels 72 and 73. The reflectors 40 and 41 also assist in reflecting the energy toward the top of the shoe.

With a wave length of approximately 1.15 microns, the receptacle can be formed of silica glass and will transmit approximately 92 percent of the energy. A longer wave length would be less sensitive to the transparency of the heat shrink film. If the peak wave length were in the neighborhood of 3.3 microns, the receptacle could be formed of a material different than silica glass to have good energy transmission while still confining a shoe of a user within the receptacle area and preventing contact with the components within the casing.

The circuit for operating the quartz lamps 60, 61 and 62 is shown in FIG. 4 and the major part thereof would be positioned within a casing 80, as shown in FIG. 2.

The circuit embodies the power lines 90 and 91, with the line 90 having the main on-off switch 51 responsive to the positioning of a foot of the wearer in the receptacle and which is closed when the receptacle is depressed. Optionally usable is a vend cycle switch 92 which can condition the shrink device circuit for operation, dependent upon a pair of disposable overshoes having been vended by a machine with which the shrink device is associated. The motor for the fan 27 is connected across the line and commences operation when the switches 51 and 92 are closed. A timer motor 95 is also connected across the lines and commences operation when the switches 51 and 92 are closed to close a cycle switch 96 which causes current flow through the quartz lamps 60, 61 and 62 and, after a predetermined period of time, the switch 96 will open and the lamps will be deenergized. A wire 97 between the timer switch 96 and the quartz lamps includes a fuse 98 and a voltage regulator unit 99 operated from the timer unit 95 which, for a short interval of time, initially applies a reduced voltage to the lamps to reduce the inrush current on start-up. After approximately 1 second, full voltage is applied to the lamps for the remainder of the cycle. A temperature sensing switch 100 is connected in the circuit and is closed below a certain temperature, such as 150° but is positioned to sense a temperature of the receptacle walls above such temperature and open the circuit to discontinue the cycle and thus provides a safety feature for the shrink device.

The foregoing description is of the structure and circuit for shrinking a heat shrinkable overshoe onto a single shoe of a wearer and the structure is duplicated for the second opening 15 in the casing, both in the plurality of quartz lamps, the shoe-receiving receptacle and the control circuit, whereby the overshoes of heat shrink film can simultaneously be shrunk onto both shoes of a wearer.

With the structure disclosed herein, an overshoe of heat shrink film, either for wear in inclement weather, for use in bowling or for any other use wherein a disposable overshoe is required can be obtained, preferably as a pair, as by dispensing from a vending machine located in a public place, such as an airport or in a bowling establishment, and the overshoes can then be easily placed on the shoes of the wearer. The wearer sits in a chair adjacent the shrink device and positions both feet within the receptacles in the casing and the shrink device automatically senses this occurrence and causes the shrink device to operate through a heat cycle to shrink the overshoes tightly onto the shoes of a wearer. The time of the heat cycle can be controlled by the timer unit 95 to provide sufficient heat for shrink of the film and with the switch 100 providing a safety limit for the temperature to which the shoes are exposed.

We claim:

1. A device for heat shrinking a disposable overshoe onto the shoe of the wearer comprising, a casing with a foot receiving opening, a receptacle within the casing adapted to receive the shoe of the wearer and electrical means including radiant heat elements for applying heat to the unshrunk overshoe to shrink the same onto the shoe of the wearer, said receptacle being yieldably mounted for movement in response to placement of a foot therein and further including a switch in circuit with said electrical means and responsive to movement of said yieldable receptacle to energize said radiant heat elements when a foot is placed therein.

2. A shrink device as defined in claim 1 wherein said receptacle has an open top with sides and a bottom of materials to prevent physical access to said radiant heating elements within the casing while minimizing the effect of wave transmission.

3. A shrink device as defined in claim 1 wherein said electrical means includes a power circuit, a first switch in said circuit responsive to the presence of a foot in said receptacle, and a second dispenser operated switch for conditioning said circuit for operation upon dispensing of overshoes.

4. A shrink device as defined in claim 1 wherein said overshoes are disposable bowling shoes.

5. A shrink device for shrinking heat shrinkable overshoes or the like onto the feet of a wearer comprising, a casing having a foot-receiving opening, means within the casing to locate a shoe in position, a plurality of radiant heat elements in said casing and reflectors associated therewith to direct radiant heat toward the bottom and the sides of a shoe, and circuit means for

controlling operation of said radiant heat elements, said casing and said shoe-locating means together comprising a receptacle open only to the outside so as to prevent physical access to the interior of the casing and the radiant heating elements therein.

6. A shrink device as defined in claim 5 wherein said receptacle is mounted for depressing movement by a foot, a circuit for controlling energization of said radiant heat elements and a switch in said circuit and in series with said elements and closable upon depression of said receptacle.

7. A shrink device as defined in claim 6 including a temperature responsive switch in series in said circuit for opening the circuit when a set temperature is exceeded.

8. A shrink device for heat shrinking a disposable overshoe or the like of heat shrink film onto the shoe of a wearer comprising, a casing with a top opening, a receptacle within said casing underlying said opening for receiving a shoe and holding thereof in position for a heat shrink cycle, an electrical circuit including at least three quartz lamps in parallel, said lamps being positioned under and to the sides of said receptacle and extending for substantially the entire length thereof, reflectors associated with said lamps for directing the radiant heat waves toward the receptacle, foot operated switch means for closing said circuit, and temperature responsive switch means in said circuit for opening thereof when a set temperature of the receptacle is exceeded.

9. A shrink device as defined in claim 8 including a timer in said circuit for limiting the time of a heat shrink cycle.

10. A shrink device as defined in claim 8 including timer operated means for supplying a reduced voltage initially to said circuit.

11. A shrink device of claim 8 wherein a dispenser operated switch pre-conditions said circuit for operation.

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