Oct. 28, 1941. F. C. HAMILTON 2,260,517

MACHINE FOR PRODUCING BENT SIPPERS

Filed Nov. 30, 1939 3 Sheets-Sheet 1

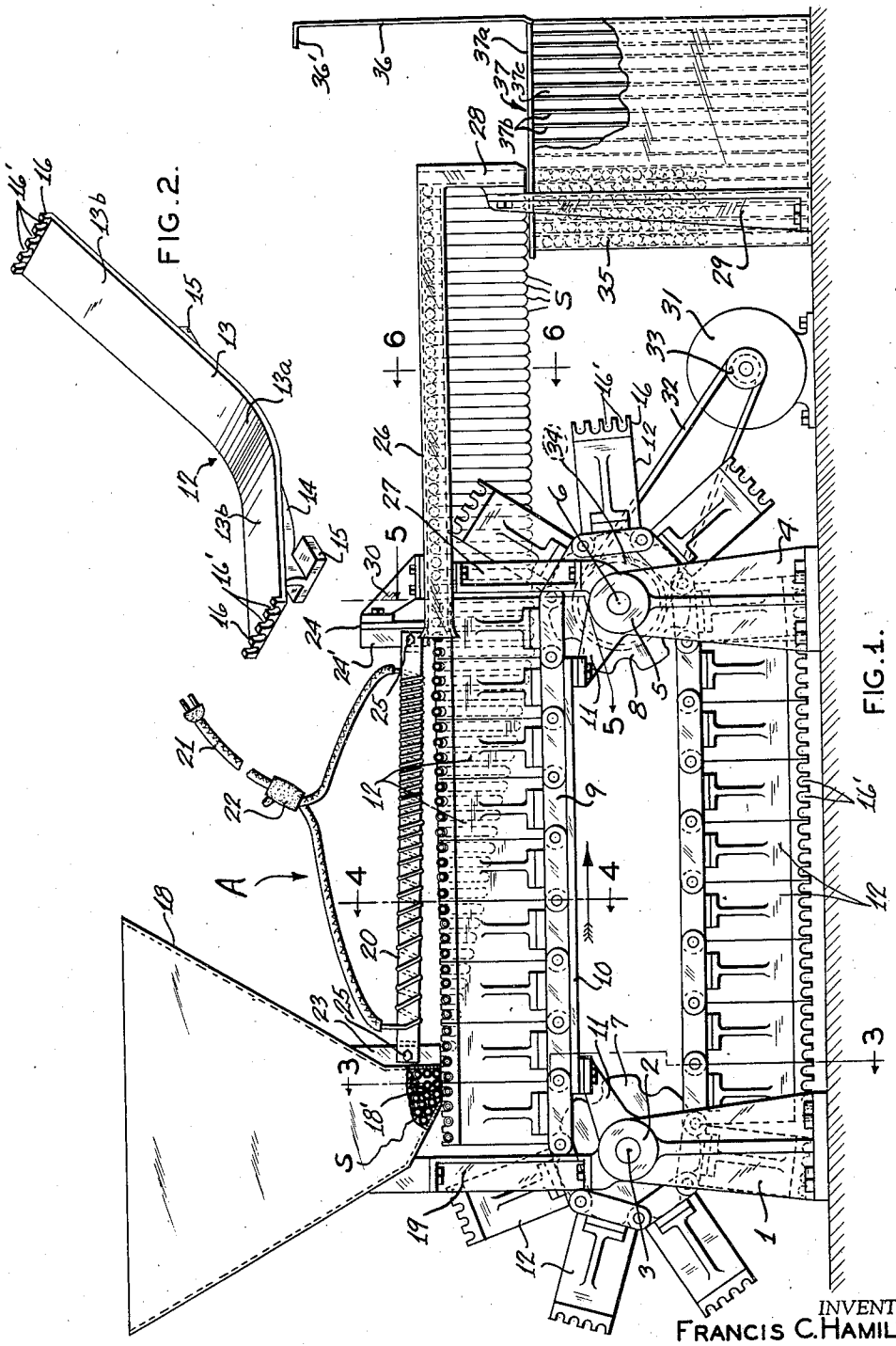


FIG. 1.

FIG. 2.

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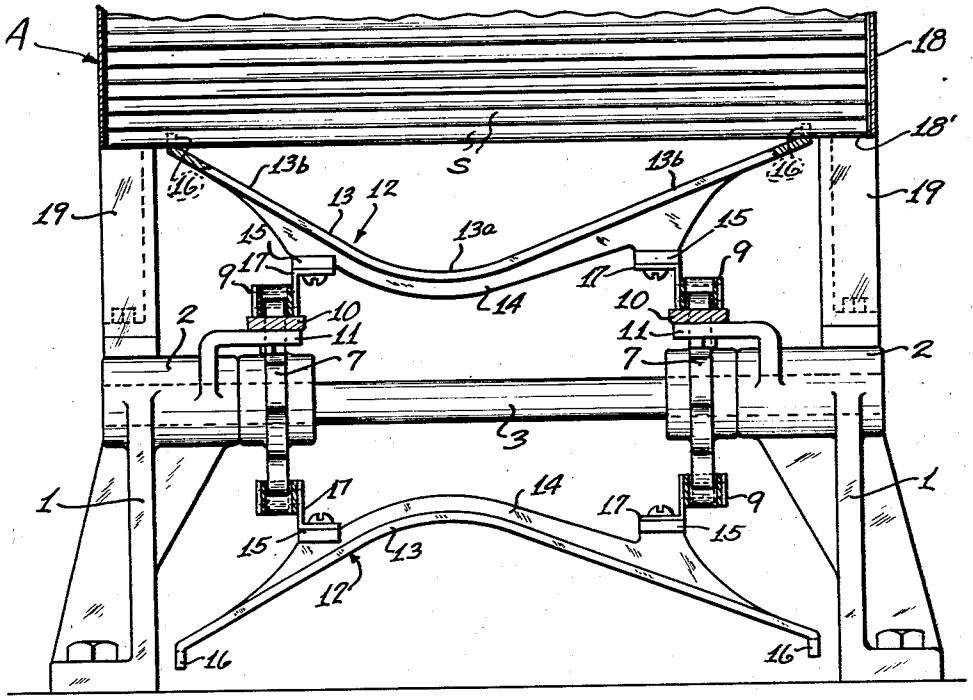


FIG.3.

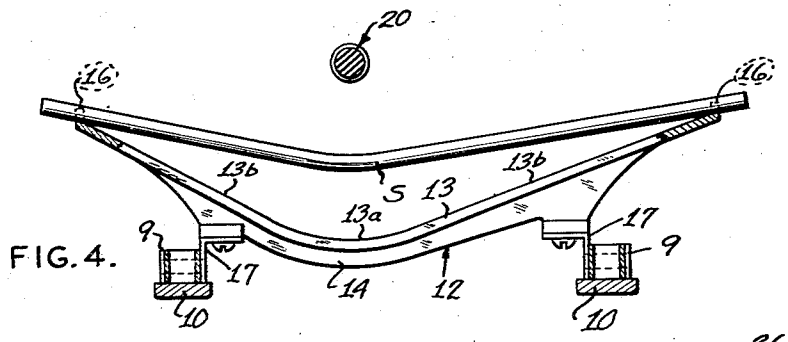


FIG.4.

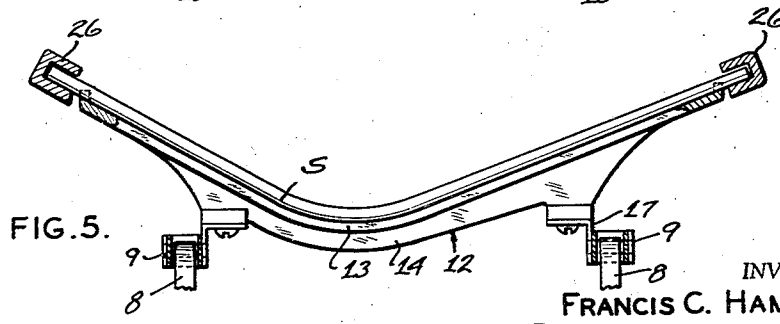


FIG.5.

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Oct. 28, 1941. F. C. HAMILTON 2,260,517

MACHINE FOR PRODUCING BENT SIPPERS

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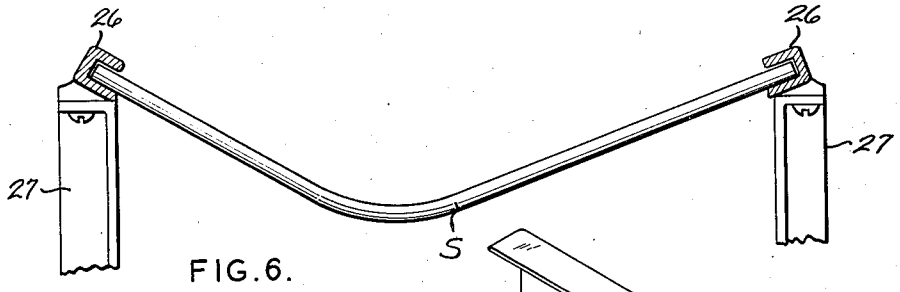


FIG. 6.

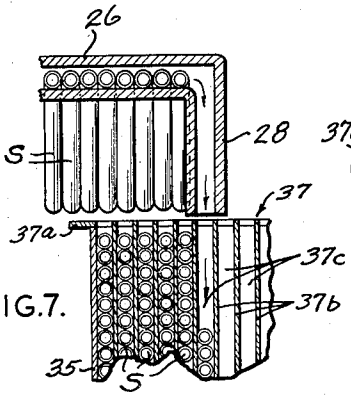


FIG. 7.

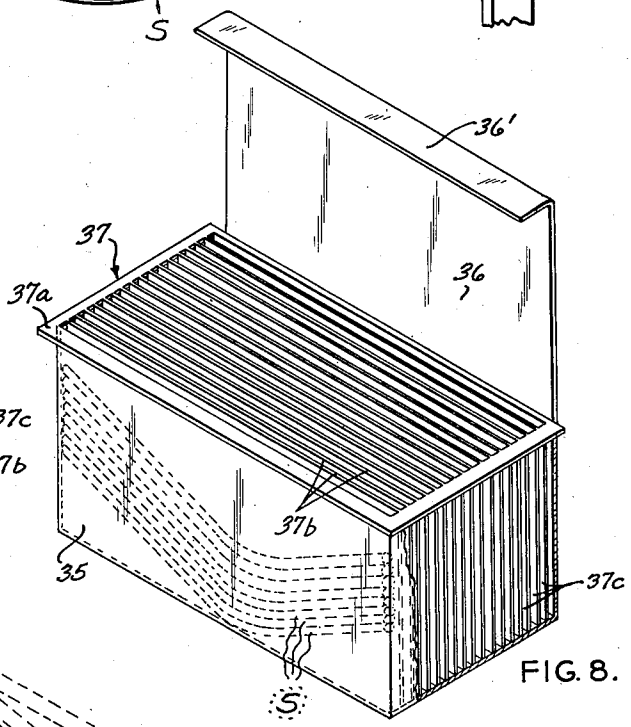


FIG. 8.

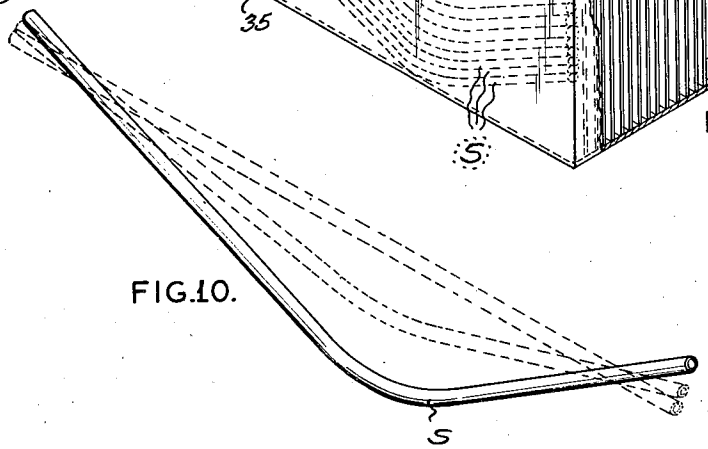


FIG. 10.

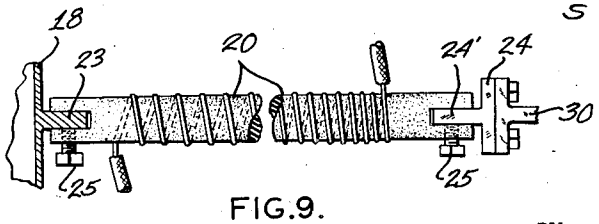


FIG. 9.

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Patented Oct. 28, 1941 2,260,517

UNITED STATES PATENT OFFICE

2,260,517

MACHINE FOR PRODUCING BENT SIPPERS

Francis C. Hamilton, Columbia, Ill., assignor of one-half to L. Ray Schuessler, St. Louis, Mo.

Application November 30, 1939, Serial No. 306,809

12 Claims. (Cl. 18—1)

This invention relates generally to machines for producing sippers of the type employed as an aid in drinking liquids from receptacles, and more specifically to machines for producing sippers which are provided with bends in their length so as to make more convenient the use of such sippers, the predominant object of the invention being to provide an improved machine which is capable of convenient and efficient use in providing sippers formed of thermo-plastic material with bends in their lengths.

As is quite generally known to the average person, the familiar sippers, or straws as they are ordinarily called, are straight, and because of this fact such straight sippers are not entirely convenient to use. This is so because the straight sipper makes it necessary that a user of such a sipper lean forwardly so as to bring his mouth to, or close to, a position immediately above the receptacle with which the sipper is being used when the receptacle is supported on a table or counter. In the case of a grown person the forward leaning posture described may be assumed with some inconvenience, but in the case of a child, or an unusually short person, the inconvenience is substantial, usually requiring that the receptacle be held in the hands below the elevation of the table or counter, or that the child kneel on his chair or stool to bring his mouth to the proper elevation. In the use of bent sippers however, the users thereof whether children or grown persons, may assume substantially natural, upright postures at tables or counters and thereby eliminate the inconveniences mentioned above.

Another inconvenience in connection with the ordinary straight sipper has to do with the use thereof by a person in a reclining position, a sick person, for instance, in which situation the ordinary straight sipper is practically useless. I am aware that hospital patients are supplied with glass drinking tubes which are provided with bends in the lengths thereof, but the repeated use of such tubes is unsanitary. Additionally the glass drinking tubes referred to are relatively expensive when compared with an ordinary sipper having a bend therein, and said glass drinking tubes are subject to breakage. By providing a sick person with a supply of bent sippers of the type produced with the aid of the improved machine disclosed herein, the matter of sanitation in connection with the sippers is completely taken care of because of the fact that each sipper is used only once and then disposed of. Also the question of breakage of the glass drinking tubes heretofore used is entirely eliminated by the use of bent sippers, and the cost of supplying the sippers will be very slight due to the fact that the bent sippers will cost very little more than the familiar ordinary straight straws.

The improved machine disclosed herein functions in an efficient manner to provide ordinary straight sippers formed of thermo-plastic material with bends in their lengths, the operation of the machine including the application of heat to the sippers at the points where it is desired that the sippers be bent. An important feature of the invention is that heat is applied to the sippers being produced by the machine in such manner that there is no undesirable distortion of the sippers at the point where the heat is applied thereto, but instead, smooth, symmetrical curves are formed in the sippers to provide bends which do not in any manner restrict free passage of liquid through the sippers.

Fig. 1 is a side elevation of the improved machine of the present invention.

Fig. 2 is a perspective of one of the sipper receiving members of the machine.

Fig. 3 is an enlarged vertical section taken on line 3—3 of Fig. 1.

Fig. 4 is an enlarged fragmentary section taken on line 4—4 of Fig. 1.

Fig. 5 is an enlarged fragmentary section taken on line 5—5 of Fig. 1.

Fig. 6 is an enlarged fragmentary section taken on line 6—6 of Fig. 1.

Fig. 7 is an enlarged fragmentary section illustrating the discharge end of the machine and showing the manner in which bent sippers are discharged from the machine into receptacles provided to receive them.

Fig. 8 is a perspective of one of the receptacles provided to receive bent sippers discharged from the machine, together with the packing frame which is assembled with each receptacle when it is receiving bent sippers to insure proper packing of the sippers within the receptacle.

Fig. 9 is an enlarged horizontal section illustrating the manner of supporting the heat producing means of the machine for vertical adjustment.

Fig. 10 is a perspective of a bent sipper and showing by dotted lines the sipper when in a straight condition and when it has been partially bent to its ultimate, completely bent condition.

In the drawings, wherein is shown for the purpose of illustration, merely, one embodiment of the invention, A designates the improved machine generally. The machine A includes a pair

of upstanding supports 1 which are located at one end of the machine, only one of said supports being shown in Fig. 1. The supports 1 are spaced apart transversely of the machine, said supports being secured to a floor or other supporting means and being extended upwardly therefrom. At the upper ends of the supports 1 bearings 2 are provided which support for rotation a shaft 3 which extends transversely of the machine. Spaced from the supports 1 longitudinally of the machine A is a similar pair of supports 4, one of which is shown in Fig. 1. As in the case of the supports 1 the supports 4 are secured to a floor or other supporting means and are extended upwardly therefrom. Also the supports 4 are provided at their upper ends with bearing portions 5 which support for rotation a shaft 6 that extends transversely of the machine.

Fixedly mounted on the shaft 3 for rotation therewith, and spaced longitudinally thereof, is a pair of sprocket wheels 7, and fixedly mounted on the shaft 6 is a similar pair of spaced sprocket wheels 8, the sprocket wheels of the shaft 6 being alined longitudinally of the machine with the corresponding sprocket wheels of the shaft 3. Operating over the corresponding pairs of sprocket wheels 7 and 8 of the shafts 3 and 6 is a pair of sprocket chains 9 which, of course, are spaced transversely of the machine A, the upper flights of said sprocket chains being supported for sliding movement by a pair of plates 10 which are supported by and are secured to bracket arms 11 that are extended from the bearing portions 2 and 5 of the supports 1 and 4.

Carried by the associated pair of sprocket chains 9 is a plurality of sipper-receiving members 12, each of which is constructed as shown to the best advantage in Fig. 2. In other words, each sipper-receiving member 12 comprises a plate 13 of angular formation which is provided at one of its sides with a rib or web of material 14 that extends longitudinally of the plate and serves to impart to the plate the required strength and rigidity. When each sipper-receiving member is moving longitudinally of the machine A with the upper flights of the sprocket chains 9 it is disposed as is the sipper-receiving member shown in the upper portion of Fig. 3; that is to say, the curved portion 13*a* of the plate 13 is at the bottom and slightly to one side of the longitudinal center of said plate, and the straight portions 13*b* of the plate diverge upwardly and outwardly from said curved portion 13*a*. Each sipper-receiving member is provided with flange portions 15 which are located adjacent to opposite ends of the plate portion thereof and are parts of the rib or web of material 14, and at the opposite ends of the plate portion of each sipper-receiving member flanges 16 are provided which are provided with sipper-receiving notches 16', corresponding notches of the opposed flanges 16 of each sipper-receiving member being alined with each other longitudinally of the sipper-receiving member. The sipper-receiving members 12 are secured to the sprocket chains 9, each sipper-receiving member having a pair of angular elements 17 secured to the flanges 15 thereof and these angular elements being attached to the sprocket chains by means of the pivot pins which pivotally attach adjacent links of the sprocket chains together.

Arranged at the end of the machine A at which the shaft 3 is located is a hopper 18 which is supported in place by supporting means 19 fixed to the upper portions of the supports 1 and to said hopper. The hopper is adapted to receive straight sippers which are to be provided with bends by the machine A, and said hopper is provided with a discharge opening 18' at its bottom through which sippers may pass. The hopper 18 is disposed at such elevation that the top edges of the flanges 16 of the sipper-receiving members 12 move beneath the bottom wall of the hopper in close proximity thereto as the sipper-receiving members travel with the top flights of the sprocket chains 9, so that the notches 16' in said flanges will receive sippers as they are discharged through the discharge opening 18' of the hopper.

Disposed above the sipper-receiving members carried by the upper flights of the sprocket chains 9 is an electrical heat-producing element 20 in the form of a resistance coil to which electrical energy is conducted from a source of supply by conducting means 21, there being a switch 22 associated with said conducting means to control passage of electrical energy therethrough to the heat-producing element 20. The heat-producing element 20 is supported at one of its ends by a vertical web of material 23 associated with the hopper 18 and at its opposite end by a vertical web of material 24' of an element 24 which is secured in place in a manner to be hereinafter set forth. The opposite end portions of the heat-producing element 20 are bifurcated as shown in Fig. 9 and said bifurcated end portions embrace the opposed webs of material 23 and 24', there being set screws 25 employed to fix the heat-producing element with respect to said webs of material and to permit of vertical adjustment of the heat producing element. It is to be noted that the heat-producing element 20 is not absolutely parallel with respect to the upper portions of the sipper-receiving members carried by the upper flights of the sprocket chains 9, but instead the end of the heat-producing element at the hopper 18 is spaced a greater distance from the upper portions of the sipper-receiving members carried by the upper flights of the sprocket chains than is the opposite end of said heat-producing element. The reason for this arrangement will be hereinafter pointed out. Also, it will be noted that the windings of the resistance coil of the heat-producing element 20 are not uniform throughout the length of the coil. This arrangement also will be explained later in this specification.

The machine A includes oppositely disposed guiding members 26 which extend longitudinally of the machine from a point approximately above the shaft 6 to a point beyond the end of the machine at which said shaft 6 is located. The guiding members 26 are supported at the machine ends thereof by supporting elements 27 which are secured to said guiding elements and are fixed to the upper portions of the supports 4. At the ends of the guiding members 26 remote from the machine said guiding elements are provided with downwardly extended portions 28, and said remote ends of said guiding elements are supported by supporting elements 29 which are secured to said downwardly extended portions 28 and are fixed to the floor or other support by which the machine is supported. Each of the guiding elements is of channel shape in cross-section as shown clearly in Figs. 5 and 6 and the downwardly extended portions 28 of said guiding elements are continuations of the main portions of the guiding elements and are of like cross-sectional shape and are open at their lower ends.

It is to be noted from an inspection of Figs. 5 and 6 that the guiding elements **26** are disposed so that the transverse dimensions thereof are in substantial parallelism with respect to the straight portions **13***b* of the plate portions of the sipper-receiving members **12** carried by the upper flights of the sprocket chains **9**. Also, as shown in Fig. 1, the machine ends of the guiding elements **26** are flared and facilitate passage of sippers into said guiding elements as will be hereinafter explained. The element **24**, heretofore referred to as providing a support for one end of the heat-producing element, is supported by an arm **30** which in turn is supported by the guiding elements **26**.

In the operation of the machine A the shaft **6** is rotated by an electric motor **31** to thereby cause the sprocket chains to travel in the direction indicated by the arrow in Fig. 1, motion being transmitted from said motor to said shaft **6** by a belt **32** which operates over pulleys **33** and **34** mounted on the motor shaft and shaft **6**, respectively. During operation of the machine a supply of straight sippers S is maintained in the hopper **18** and as each sipper-receiving member **12**, moving with the top flights of the sprocket chains **9**, passes beneath the hopper, sippers will be discharged through the discharge opening of the hopper and will be received by alined notches **16'** of the sipper-receiving member. As each sipper-receiving member **12** moves from beneath the hopper the sippers carried thereby travel beneath the heat-producing element **20** and are subjected to the heat radiating from said heat-producing means. The resistance coil of the heat-producing means is so wound that very little heat is radiated therefrom at the end of the coil adjacent to the hopper, the windings of the resistance coil being of such character that the heat radiated from the coil is gradually increased longitudinally of the coil until the maximum heat is produced adjacent to the end of the coil remote from the hopper. Also the resistance coil is closer to the upper portions of the sipper-receiving members at the end of the coil which is remote from the hopper.

As the sippers pass beneath the heat-producing element **20** the suspended central portions of said sippers are subjected initially to a relatively low degree of heat, which, because of the fact that the sippers are made of a thermo-plastic material, will cause said central portions of the sippers to sag, as shown in Fig. 4. As movement of the sippers longitudinally of the heat-producing element continues the central portions of the sippers are subjected to heat of gradually increased intensity and this gradually increased heat will cause the sippers to gradually sag to the position of the sipper shown in Fig. 5 by the time the sipper reaches the position of the hottest and lowermost portion of the heat-producing element. When the sippers have sagged to the position of the sipper shown in Fig. 5 they contact with the top face of the angular plate portion of the sipper-receiving member by which they are supported, and as they pass from beneath the heat-producing element the sippers quickly cool in the bent condition they have assumed.

As the sippers are carried beyond the hottest end of the resistance coil of the heat-producing element **20** the opposite ends of said sippers, which extend beyond the sipper-receiving members as shown in Figs. 4 and 5, move into the oppositely disposed guiding elements **26** and are fed longitudinally of said guiding elements by sippers which follow them into the guiding elements. Eventually each sipper reaches the outer ends of the guiding elements when its opposite ends pass into the downwardly extended portions **28** of said guiding elements and said sipper is guided by said portions **28** downwardly for discharge into a receptacle arranged beneath said downwardly extended portions **28**.

One manner of packaging the bent sippers as they are discharged from the machine A is illustrated in Fig. 1, wherein the receptacle adapted to receive the bent sippers is designated by the reference character **35**. The receptacle **35** may be formed of cardboard or other suitable material and be provided with a cover or lid **36** having a flap **36'**. The receptacle **35** has associated with it, when it is receiving sippers from the machine A, a frame **37** which comprises an upper rectangular flange **37***a* to which is secured a plurality of plates **37***b*. The plates **37***b* are arranged in spaced relation to provide a plurality of spaces **37***c* between adjacent plates each of which is only slightly wider than the diameter of the sippers to be received by the receptacle **35**. When the frame **37** is associated with the receptacle **35** the spaced plates are disposed within the receptacle to divide its interior into a plurality of compartments and the rectangular flange **37***a* rests upon the top edge of the body portion of the receptacle.

When the machine A is in operation the receptacle **35** with the frame **37** associated therewith is disposed so that the first compartment provided at a wall of the box is located beneath the open bottoms of the downwardly extended portions **28** of the guiding elements **26**. The sippers being discharged from the lower ends of the portions **28** of the guiding elements will fall into the compartment in position to receive them, in the nested arrangement illustrated by dotted lines in Fig. 8, and when the proper number of sippers have been discharged into the compartment the receptacle **35** is shifted to bring the next compartment into position to receive the sippers discharged from the portions **28** of the guiding elements **26**. This is continued until each compartment within the receptacle **35** has received its supply of sippers at which time the frame **37** is withdrawn from the receptacle and the cover of the receptacle is closed and sealed, a new receptacle having a frame **37** assembled therewith having in the meantime been arranged in position to receive sippers discharged from the machine.

I claim:

1. A machine for producing bent sippers comprising a traveling conveyor, a heat-producing element disposed above said traveling conveyor in vertically spaced relation with respect thereto, and sipper-receiving members carried by said traveling conveyor for traveling movement therewith, said sipper-receiving members including spaced sipper-supporting portions between which unsupported portions of thermo-plastic sippers carried by the sipper-receiving members are suspended, said suspended portions of the sippers being carried by said sipper-receiving members beneath and in proximity to said heat-producing element whereby heat applied to said suspended sipper portions by said heat-producing element will cause the sippers to sag to a bent condition, and said heat-producing element being so disposed with relation to said suspended portions of said thermo-plastic sippers that heat produced thereby is concentrated at a predeter-

mined portion only of the suspended portion of each thermo-plastic sipper as it passes beneath said heat-producing element.

2. A machine for producing bent sippers comprising a traveling conveyor, a heat-producing element disposed above said traveling conveyor in vertically spaced relation with respect thereto, and sipper-receiving members carried by said traveling conveyor for traveling movement therewith, said sipper-receiving members including spaced sipper-supporting portions between which unsupported portions of thermo-plastic sippers carried by the sipper-receiving members are suspended, said suspended portions of the sippers being carried by said sipper-receiving members beneath and in proximity to said heat-producing element whereby heat applied to said suspended sipper portions by said heat-producing element will cause the sippers to sag to a bent condition, said sipper-receiving members being provided with angular surfaces into contact with which the sippers sag as a result of the application of heat thereto to establish the bent shapes of the sippers.

3. A machine for producing bent sippers comprising a traveling conveyor, a heat-producing element disposed above said traveling conveyor in vertically spaced relation with respect thereto, and sipper-receiving members carried by said traveling conveyor for traveling movement therewith, said sipper-receiving members comprising each an angular plate portion provided with sipper supporting portions adjacent to opposite ends thereof between which unsupported portions of thermo-plastic sippers carried by the sipper-receiving member are suspended, said suspended portions of the sippers being carried by said sipper-receiving member beneath and in proximity to said heat-producing element whereby heat applied to said suspended sipper portions by said heat-producing element will cause the sippers to sag to a bent condition in contact with a surface of said angular plate portion of the sipper-receiving member.

4. A machine for producing bent sippers comprising a traveling conveyor, a heat-producing element disposed above said traveling conveyor in vertically spaced relation with respect thereto, and sipper-receiving members carried by said traveling conveyor for traveling movement therewith, said sipper-receiving members comprising each an angular plate portion provided with notched sipper supporting portions adjacent to opposite ends thereof between which unsupported portions of thermo-plastic sippers carried by the sipper-receiving member are suspended, said suspended portions of the sippers being carried by said sipper-receiving member beneath and in proximity to said heat-producing element whereby heat applied to said suspended sipper portions by said heat-producing element will cause the sippers to sag to a bent condition in contact with a surface of said angular plate portion of the sipper-receiving member.

5. A machine for producing bent sippers comprising a traveling conveyor, a heat-producing element disposed above said traveling conveyor in vertically spaced relation with respect thereto, sipper-receiving members carried by said traveling conveyor for traveling movement therewith, said sipper-receiving members comprising each an angular plate portion provided with sipper supporting portions adjacent to opposite ends thereof between which unsupported portions of thermo-plastic sippers carried by the sipper-receiving member are suspended, said suspended portions of the sippers being carried by said sipper-receiving member beneath and in proximity to said heat-producing element whereby heat applied to said suspended sipper portions by said heat-producing element will cause the sippers to sag to a bent condition in contact with a surface of said angular plate portion of the sipper-receiving member, and a hopper from which sippers are fed to said sipper-receiving members as said sipper-receiving members move in proximity to said hopper.

6. A machine for producing bent sippers comprising a traveling conveyor, a heat-producing element disposed above said traveling conveyor in vertically spaced relation with respect thereto, sipper-receiving members carried by said traveling conveyor for traveling movement therewith, said sipper-receiving members comprising each an angular plate portion provided with sipper supporting portions adjacent to opposite ends thereof between which unsupported portions of thermo-plastic sippers carried by the sipper-receiving member are suspended, said suspended portions of the sippers being carried by said sipper-receiving member beneath and in proximity to said heat-producing element whereby heat applied to said suspended sipper portions by said heat-producing element will cause the sippers to sag to a bent condition in contact with a surface of said angular plate portion of the sipper-receiving member, a hopper from which sippers are fed to said sipper-receiving members as said sipper-receiving members move in proximity to said hopper, and guiding means to which the bent sippers are delivered by said sipper-receiving members for discharge from the machine.

7. A machine for producing bent sippers comprising a traveling conveyor, a heat-producing element disposed above said traveling conveyor in vertically spaced relation with respect thereto, sipper-receiving members carried by said traveling conveyor for traveling movement therewith, said sipper-receiving members comprising each an angular plate portion provided with sipper supporting portions adjacent to opposite ends thereof between which unsupported portions of thermo-plastic sippers carried by the sipper-receiving member are suspended, said suspended portions of the sippers being carried by said sipper-receiving member beneath and in proximity to said heat-producing element whereby heat applied to said suspended sipper portions by said heat-producing element will cause the sippers to sag to a bent condition in contact with a surface of said angular plate portion of the sipper-receiving member, a hopper from which sippers are fed to said sipper-receiving members as said sipper-receiving members move in proximity to said hopper, and guiding means to which the bent sippers are delivered by said sipper-receiving members for discharge from the machine, said guiding means comprising spaced elongated guiding elements longitudinally of which the opposite end portions of the sippers are subjected to sliding movement.

8. A machine for producing bent sippers comprising a traveling conveyor, a heat-producing element disposed above said traveling conveyor in vertically spaced relation with respect thereto, sipper-receiving members carried by said traveling conveyor for traveling movement therewith, said sipper-receiving members comprising each an angular plate portion provided with sipper supporting portions adjacent to opposite ends

thereof between which unsupported portions of thermo-plastic sippers carried by the sipper-receiving member are suspended, said suspended portions of the sippers being carried by said sipper-receiving member beneath and in proximity to said heat-producing element whereby heat applied to said suspended sipper portions by said heat-producing element will cause the sippers to sag to a bent condition in contact with a surface of said angular plate portion of the sipper-receiving member, a hopper from which sippers are fed to said sipper-receiving members as said sipper-receiving members move in proximity to said hopper, and guiding means to which the bent sippers are delivered by said sipper-receiving members for discharge from the machine, said guiding means comprising spaced elongated guiding elements of channel shaped cross-section longitudinally of which the opposite end portions of the sippers are subjected to sliding movement.

9. A machine for producing bent sippers comprising a traveling conveyor, a heat-producing element disposed above said traveling conveyor in vertically spaced relation with respect thereto, sipper-receiving members carried by said traveling conveyor for traveling movement therewith, said sipper-receiving members comprising each an angular plate portion provided with sipper supporting portions adjacent to opposite ends thereof between which unsupported portions of thermo-plastic sippers carried by the sipper-receiving member are suspended, said suspended portions of the sippers being carried by said sipper-receiving member beneath and in proximity to said heat-producing element whereby heat applied to said suspended sipper portions by said heat-producing element will cause the sippers to sag to a bent condition in contact with a surface of said angular plate portion of the sipper-receiving member, a hopper from which sippers are fed to said sipper-receiving members as said sipper-receiving members move in proximity to said hopper, and guiding means to which the bent sippers are delivered by said sipper-receiving members for discharge from the machine, said guiding means comprising elongated guiding elements disposed horizontally and spaced transversely of the machine, longitudinally of which the opposite end portions of the sippers are subjected to sliding movement, and downwardly extended portions at the discharge ends of said guiding elements through which the opposite end portions of said sippers pass for discharge of the sippers from said guiding means.

10. A machine for producing bent sippers comprising a traveling conveyor, a heat-producing element disposed above said traveling conveyor in vertically spaced relation with respect thereto, and sipper-receiving members carried by said traveling conveyor for traveling movement therewith, said sipper-receiving members including spaced sipper-supporting portions between which unsupported portions of thermo-plastic sippers carried by the sipper-receiving members are suspended, said suspended portions of the sippers being carried by said sipper-receiving members beneath and in proximity to said heat-producing element whereby heat applied to said suspended sipper portions by said heat-producing element will cause the sippers to sag to a bent condition, said heat-producing element being so disposed with relation to said suspended portions of said thermo-plastic sippers that heat produced thereby is concentrated at a predetermined portion only of the suspended portion of each thermo-plastic sipper as it passes beneath said heat-producing element, and said heat-producing element being elongated in the direction of the path of travel of said conveyor and being characterized by the ability to apply heat of gradually increased intensity to sippers carried by the sipper-receiving members as said sippers are moved longitudinally of the heat-producing element by said sipper-receiving members.

11. A machine for producing bent sippers comprising a traveling conveyor, a heat-producing element disposed above said traveling conveyor in vertically spaced relation with respect thereto, and sipper-receiving members carried by said traveling conveyor for traveling movement therewith, said sipper-receiving members comprising each an angular plate portion provided with sipper supporting portions adjacent to opposite ends thereof between which unsupported portions of thermo-plastic sippers carried by the sipper-receiving member are suspended, said suspended portions of the sippers being carried by said sipper-receiving member beneath and in proximity to said heat-producing element whereby heat applied to said suspended sipper portions by said heat-producing element will cause the sippers to sag to a bent condition in contact with a surface of said angular plate portion of the sipper-receiving member, said heat-producing element including an electrical heat resistance coil elongated in the direction of the path of travel of said conveyor, said resistance coil being so produced as to apply heat of gradually increased intensity to the sippers carried by the sipper receiving members as said sippers are moved longitudinally of the heat-producing element by said sipper-receiving members.

12. A machine for producing bent sippers comprising a traveling conveyor, a heat-producing element disposed above said traveling conveyor in vertically spaced relation with respect thereto, and sipper-receiving members carried by said traveling conveyor for traveling movement therewith, said sipper-receiving members comprising each an angular plate portion provided with sipper supporting portions adjacent to opposite ends thereof between which unsupported portions of thermo-plastic sippers carried by the sipper-receiving member are suspended, said suspended portions of the sippers being carried by said sipper-receiving member beneath and in proximity to said heat-producing element whereby heat applied to said suspended sipper portions by said heat-producing element will cause the sippers to sag to a bent condition in contact with a surface of said angular plate portion of the sipper-receiving member, said heat-producing element including an electrical heat resistance coil elongated in the direction of the path of travel of said conveyor, said resistance coil being so produced as to apply heat of gradually increased intensity to the sippers carried by the sipper receiving members as said sippers are moved longitudinally of the heat-producing element by said sipper-receiving members, and the electrical heat resistance coil of the heat-producing element being inclined toward the sipper receiving members to position the end thereof at which heat of greater intensity is produced closer to the path of travel of said sipper-receiving members than is the opposite end of said electrical heat resistance coil.

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