June 20, 1967 R. S. ESTABROOKS 3,326,415

METHOD AND APPARATUS FOR MELTING SOLID MATERIAL AND FOR DISPENSING THE MELT

Original Filed March 15, 1965

3 Sheets-Sheet 1

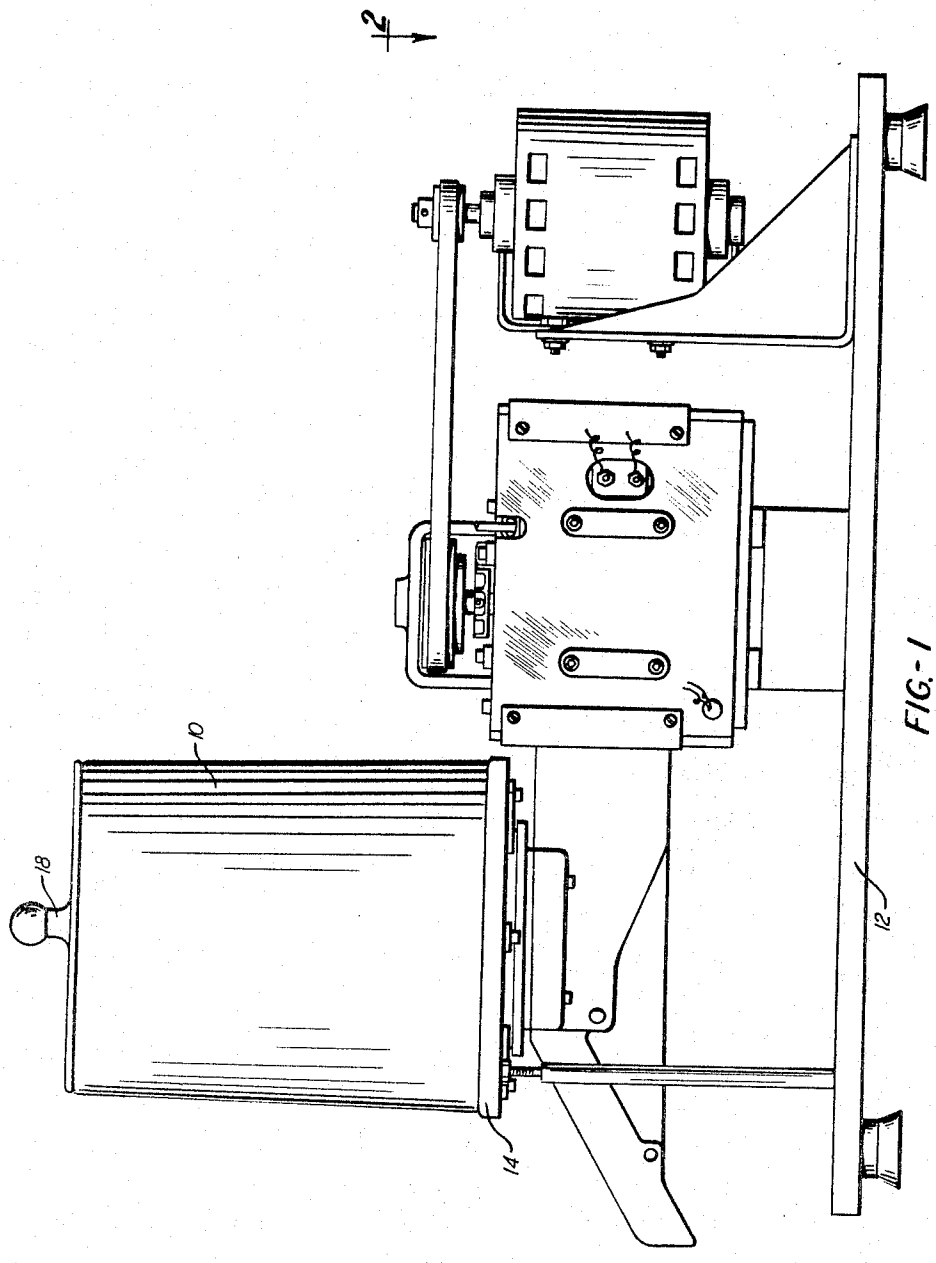


FIG. - 1

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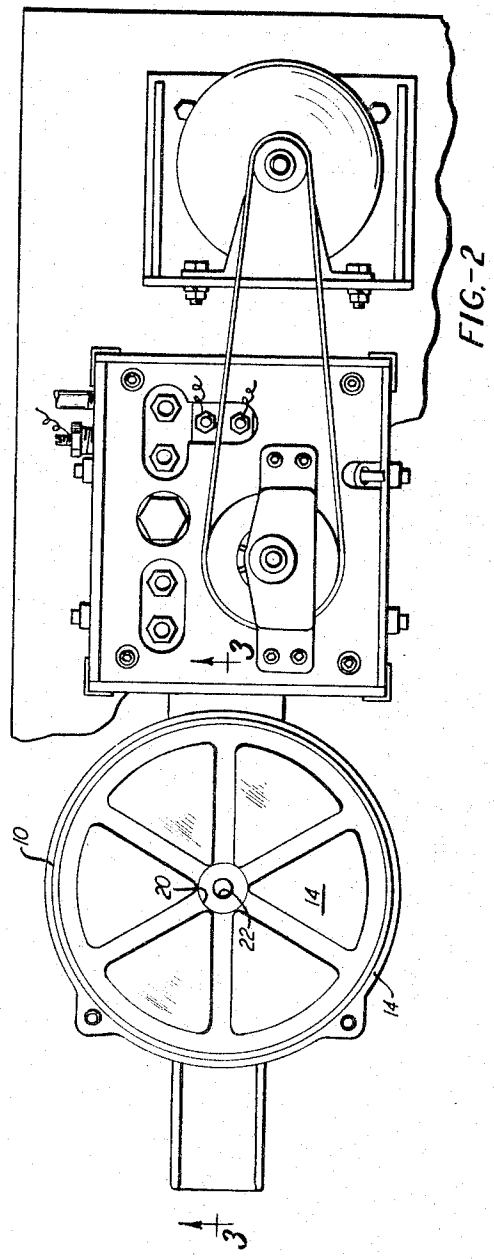


FIG.-2

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METHOD AND APPARATUS FOR MELTING SOLID MATERIAL AND FOR DISPENSING THE MELT

Original Filed March 15, 1965 3 Sheets-Sheet 3

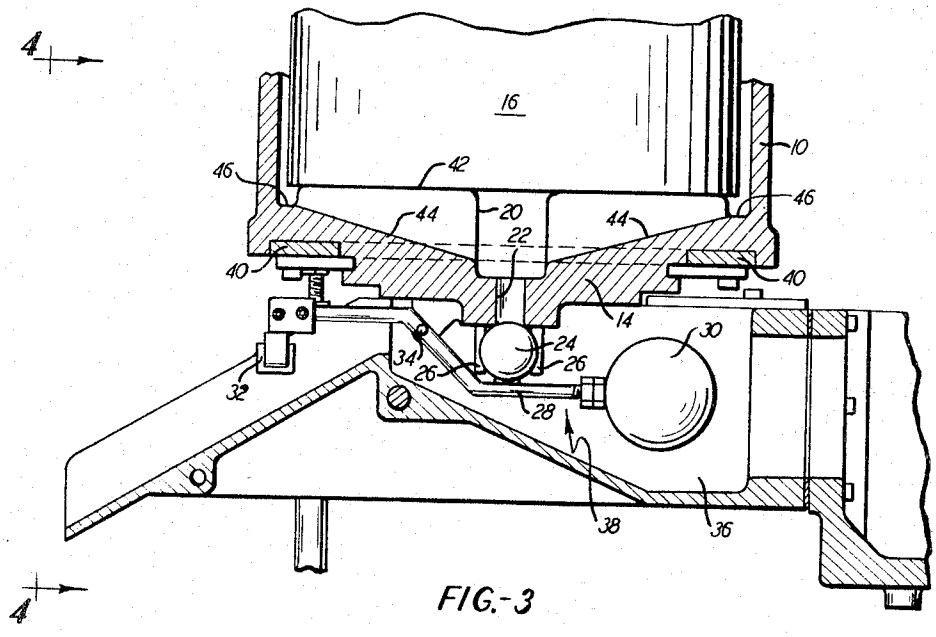


FIG.-3

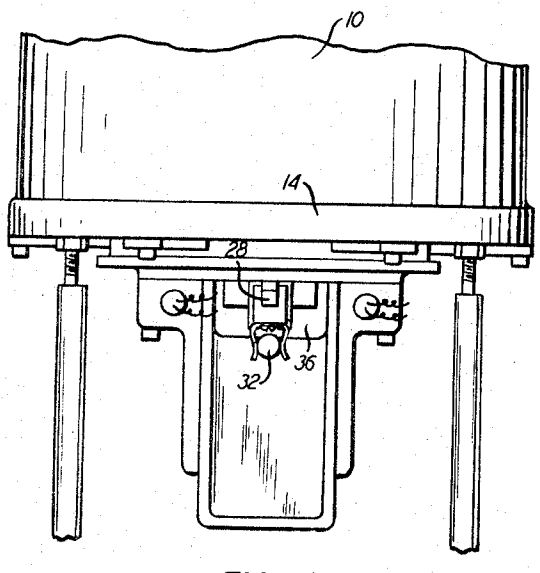


FIG.-4

United States Patent Office 3,326,415
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3,326,415

METHOD AND APPARATUS FOR MELTING SOLID MATERIAL AND FOR DISPENSING THE MELT

Roger S. Estabrooks, North Quincy, Mass., assignor to International Shoe Machine Corporation, Boston, Mass., a corporation of Massachusetts

Original application Mar. 15, 1965, Ser. No. 439,661. Divided and this application July 25, 1966, Ser. No. 567,476

4 Claims. (Cl. 222—1)

This invention relates to method and apparatus for melting a solid material and thereafter dispensing it. The instant application is a division of pending United States application Ser. No. 439,661 filed Mar. 15, 1965.

Among the objects of this invention is to provide an improved method and apparatus for melting thermoplastic or other meltable material, other objects and advantages being apparent from the foregoing specification.

In practicing this invention, solid thermoplastic adhesive or similar material capable of being rendered fluid by means of application of heat is loaded into a melting tank where a heating element at the base of the tank causes the adhesive to liquefy. The surface of the base of the tank has grooves and troughs formed therein which serve to increase the effective heat transfer area of the interior of the melting tank and direct the flow of the molten adhesive to an outlet formed on the tank.

In the accompanying drawings:

FIGURE 1 is a front elevation of the apparatus incorporating the instant invention;

FIGURE 2 is a plan view of the apparatus incorporating the instant invention as seen from line 2—2 of FIGURE 1;

FIGURE 3 is a sectional view of the melting tank taken along the line 3—3 of FIGURE 2; and

FIGURE 4 is a side elevation of the melting tank as seen from line 4—4 of FIGURE 3.

Referring to FIGURE 1 a melting tank **10** is mounted on a platform **12** the melting tank being fabricated from aluminum or other heat conductive material. The melting tank **10** has a base **14** upon which the solid thermoplastic adhesive **16** rests as indicated in FIGURE 3. The tank **10** may be provided with a cover **18**. Centrally located in the base **14** is an orifice **20** which leads into another concentric orifice **22** of a smaller diameter, the bottom of the smaller orifice forming a valve seat which accommodates a ball check valve **24** (see FIGURE 3). The ball **24** is restricted to substantially vertical motion by four pins **26** which are mounted on the underside of the base **14** and lie on the circumference of a circle which is concentric with the orifice and the base **14**. The vertical movement of the ball **24** is accomplished by means of a float arm **28** upon which the ball freely rests, the float arm being pivotally mounted with a float **30** being attached to one extremity of the float arm **28** and a counter weight **32** being slidably connected to the other extremity. The bottom of the ball **24** rests on the float arm at a point intermediate the float arm pivot **34** and the float **30**. A float chamber **36** located underneath the melting tank base **14** houses the float valve mechanism **38** and receives the molten adhesive as it flows through the orifii **20** and **22** past the ball check valve **24**. As the level of adhesive rises within the float chamber the float **30** will similarly rise causing the float arm **28** to swing about the float arm pivot **34** thereby imparting an upward movement to the ball check valve **24** to thereby obstruct the orifice **22** and preclude further flow of adhesive therethrough. The level of adhesive at which the ball check valve **24** may obstruct the orifice **22** may be varied by varying the position of the counter weight **32** on the float arm **28**.

Heat is supplied to the melting tank by means of an annular electric heating element **40** embedded in the melting tank base **14**. The upper surface **42** of the melting tank base upon which the solid adhesive rests is flat with the exception of a plurality of radial troughs **44** which are inclined downwardly from the periphery of the melting tank base **14** to the center of the melting tank base **14** where the troughs terminate in the larger orifice **20**. There is also an annular trough **46** at the periphery of the melting tank base **14** which is in communication with the radial troughs **44**.

These troughs **44** and **46** serve a dual purpose in that they facilitate the gravitation of the molten adhesive to and through the orifii **20** and **22** and that they cause a more rapid rate of melting of the solid adhesive due to the increased surface area of the melting tank base **14**.

I claim:

1. A method of melting a solid material and dispensing the resulting melt comprising:

placing the solid material directly upon a heat conductive platform having a centrally located orifice, a peripheral trough disposed below the level of the upper surface of said platform and a plurality of radial troughs interconnecting said peripheral trough and said orifice, said radial troughs being inclined downwardly from said peripheral trough to said orifice;

and applying heat to said platform whereby said heat may be transferred to said solid material, thereby melting it, said melted material gravitating to and through said orifice by means of said troughs.

2. A method of melting a solid material and dispensing the resulting melt comprising:

placing the solid material directly upon a heat conductive platform having a centrally located orifice and a plurality of radial troughs, each of said radial troughs being in communication with said orifice and inclined downwardly from the periphery of said platform to said orifice;

and applying heat to said platform whereby said heat may be transferred to said solid material, thereby melting it, said melted material gravitating to and through said orifice by means of said troughs.

3. An apparatus for melting a solid material comprising:

a melting tank having a base in which is formed a centrally located orifice, a trough located at the periphery of said base and being disposed below the level of said base and a plurality of radial troughs interconnecting said peripheral trough with said orifice, said radial troughs being inclined downwardy from said peripheral trough to said orifice whereby said solid material may be placed directly upon said base and thus be melted, said melted material gravitating towards and through said orifice by means of said troughs;

and means for heating said base.

4. An apparatus for melting and dispensing a solid material comprising:

a melting tank having a base in which is formed a centrally located orifice, a trough located at the periphery of said base and a plurality of radial troughs interconnecting said peripheral trough with said orifice, said radial troughs being inclined downwardly from said peripheral trough to said orifice whereby said solid material may be placed directly on said base and thus be melted, said molten material gravitating towards and through said orifice by means of said troughs;

means for heating said base;

a chamber disposed below said base so as to form a receptacle for said molten material as it flows through said orifice;

a float located within said chamber and having a portion thereof disposed below said orifice, said float being moveable heightwise in response to a change of level of molten material within said chamber; and

a valve member supported on said portion of said float and being moveable heightwise therewith so as to be engageable with said orifice in blocking and unblocking relation therewith whereby as the level of molten material rises within said chamber said heightwise movement of said float may bring said valve member into blocking relation with said orifice to thereby preclude the flow of molten material therethrough until the level of said material within said chamber recedes.

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RAPHAEL M. LUPO, *Primary Examiner.*