Feb. 9, 1960 A. L. HENRIKSEN 2,924,196

METHOD AND APPARATUS FOR SEALING BAGS

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FIG. 1.

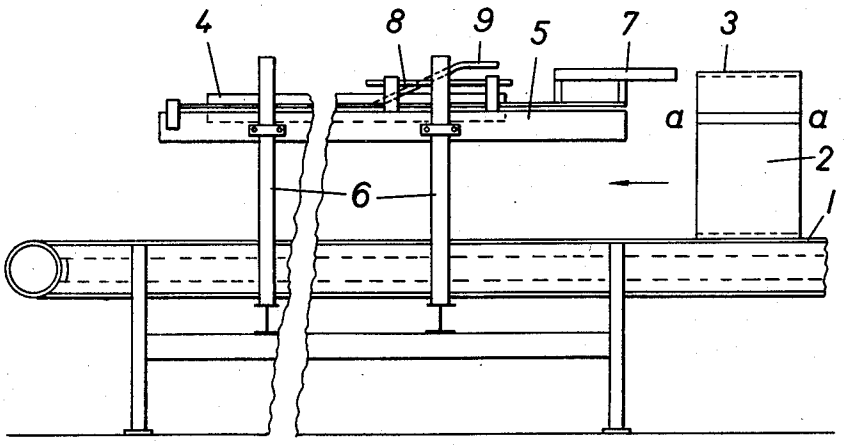
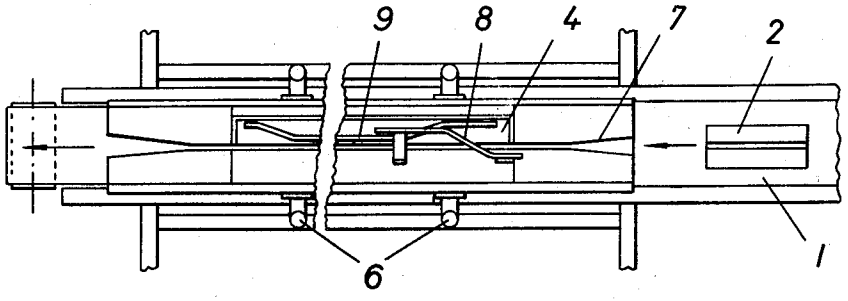


FIG. 2.



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FIG. 3.

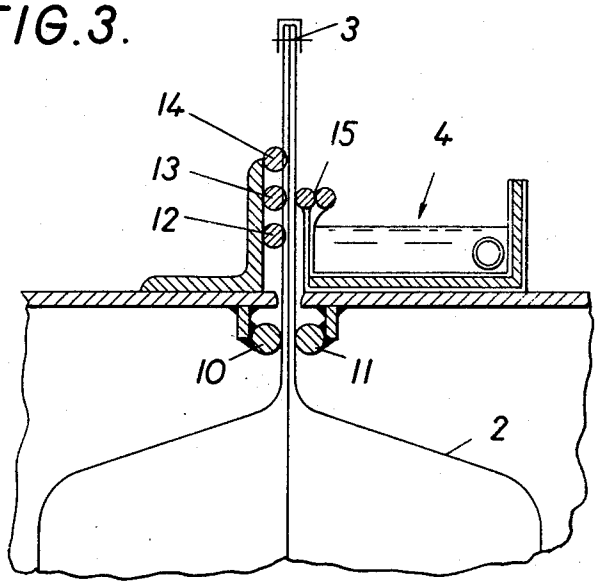
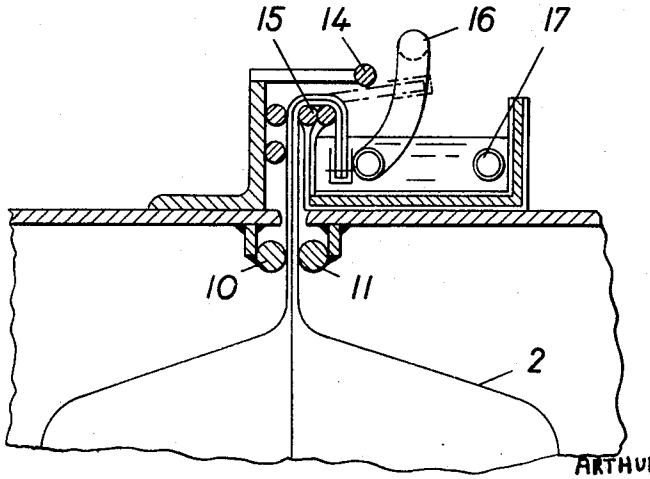


FIG. 4.



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FIG. 5.

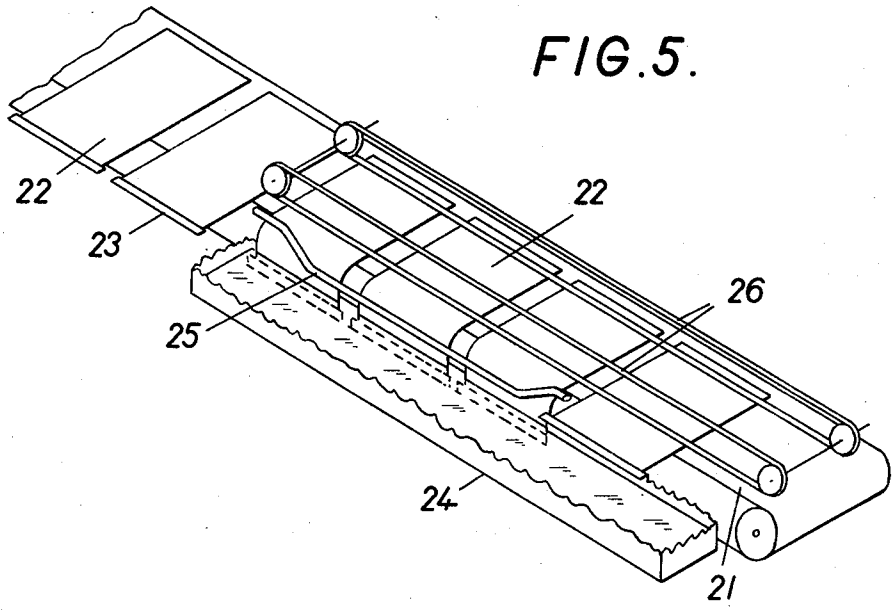
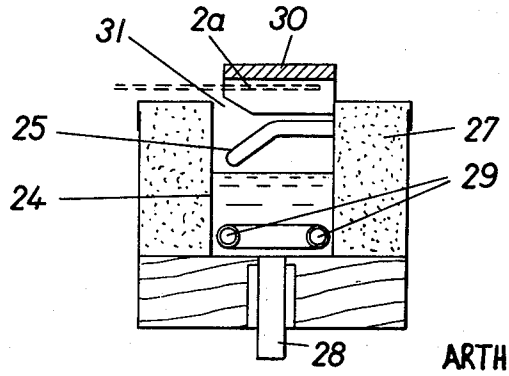


FIG. 6.



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METHOD AND APPARATUS FOR SEALING BAGS

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3 Claims. (Cl. 118—423)

When using bags as containers for powdered and granulated materials, it is known to make the bag impermeable against vapour or/and moisture and to prevent the escaping of fine powder through the seam perforations by sealing or impregnating one or more edges of said bag, after they have been sewn together. Wax is preferably used as sealing medium and the sealing process is often designated as "waxing." This designation will be used in the following description and the appended claims, but it must be clearly understood that the present invention is not limited to using wax as an impregnating or sealing medium.

The sealing medium can be applied by different means, as for instance by coating or by dipping the edge portion of the bag into a bath of said impregnating or sealing medium.

When waxing the bottom seams of empty bags, it is known to dip the bags manually or mechanically into a bath of melted wax. Such a procedure can be difficult, however, when waxing the top seam of filled bags.

The present invention has for an object the provision of methods and apparatus for "waxing" the seams of both empty and filled bags in a simple way and by a continuous operation. According to the invention this object is attained by conducting the bag upon a conveyor in a horizontal path along an elongated wax bath and by bending downwardly the edge to be waxed into the bath and upwardly out of the bath.

If the present method is to be used for waxing of the top seam of a filled bag, the bag is being suitably conducted in vertical position along a wax bath, the upper edge of the bag being bent over at an angle of approximately 180°. It is hereby assumed that the bag has enough "free space" to make such a bending possible. By free space we understand the space contained between the top seam and the surface of the bag contents.

If the invention is to be used for waxing of a seam, e.g. a bottom seam, in an empty bag, the bag is being suitably conducted along the wax bath in a horizontal position, the edge to be waxed being bent approximately at an angle of 90°.

The method is being performed by means of an apparatus comprising substantially an elongated bath, a conveyor conducting the bags along said bath and one or several cam grooves adapted to bend an edge of the bag downwardly into the bath and thereafter out of it.

In order to avoid heat losses, the bath of molten wax may be suitably locked at its top with the exception of an elongated aperture or slot through which the edge of the bag may pass.

In order to wax the top seam in filled bags it is possible to use a device by means of which during the wax operation the bags are conducted in upright position on a conveyor, there being in such a case arranged a guiding device for the bag which is suitably spaced below the cam grooves and positioned directly above the material in the bag.

Such a guiding device may for instance consist of a

pair of horizontal endless belts resting against opposite sides of the bag or of rollers arranged in two parallel, horizontal lines.

In order to wax seams in empty bags, a device may be suitably used, said device comprising a conveyor upon which the bag rests in such a manner that the seam to be waxed is situated somewhat at one side of the conveyor, one or several endless belts, bands or the like which rest against the upper side of the bag being adapted to retain the bag during bending of the edge which is to be waxed.

The method and the apparatus according to this invention have the remarkable advantage that waxing may be conducted in a continuous operation whereby it is possible to wax the seams in direct connection with the sewing operation of the respective seams. A common conveyor transporting the bags along the sewing machine and the wax bath may be eventually used at this occasion.

With regard to the waxing of top seams in filled bags, the method and the apparatus according to this invention may be profitably combined with a machine for filling of the bags. However, it is obvious that the present invention is not limited to such a combination.

For a more complete understanding of the invention reference should now be had to the following detailed description of some embodiments of the invention in connection with the accompanying drawings, in which:

Fig. 1 is a purely diagrammatic, fragmentary view of a device for waxing of the top seams in filled bags.

Fig. 2 is a similar plan view.

Fig. 3 is an enlarged fragmentary sectional view through the waxing device of Figs. 1 and 2 in a perpendicular plane to said figures, taken near the charging end of the wax bath at a place where the top of the bag is not yet bent over.

Fig. 4 is a sectional view similar to Fig. 3 taken at a distance from the charging end and with the top of the bag being bent over and dipped into the wax bath.

Fig. 5 is a diagrammatic perspective view of a waxing device for the seams in empty bags.

Fig. 6 is a sectional view of a waxing tank for a device shown in Fig. 5.

Referring now to Figs. 1 and 2, a conveyor **1** conducts filled bags **2** in a straight horizontal path. It is being assumed that the bags, one of which only is being shown in the drawings, are filled to a level *a—a* and are at their upper edge provided with a top seam **3** which should be waxed. A wax bath **4** is formed as an elongated, groove-shaped, above opened container or trough. Below the wax bath is located a guiding device **5** for the bag. The guiding device and the wax bath are supported by columns or uprights **6, 7** is a wedge-shaped or funnel-shaped unmoveable charging device which centers the top of the bag, when the bag is being conducted to the wax bath, **8** and **9** are cam grooves for bending over the top of the bag.

Said cam grooves are to be described now in more detail in connection with Figs. 3 and 4. In these figures 10 and 11 indicate two ledges adapted to support the bag, while the top of the bag is being bent over. Instead of ledges it is possible to use e.g. endless belts, two lines of rollers etc. **12, 13** and **14** indicates cam grooves for the bending of the top of the bag and they are made for instance of round iron and arranged at the side of the bag which turns away from the wax bath **4. 15** is a fourth double cam groove arranged on the other side of the bag. The cam grooves **12, 13** and **15** may be disposed rectilinearly in their entire length, while the cam groove **14** above the wax bath is bent inwardly from the position shown in Fig. 3 to the position shown in Fig. 4. The bar **14** will thereby during the movement of the

bag along the wax bath, bend the top of the bag above the wax bath at an approximately right angle into the position shown by the dotted line in Fig. 4. An additional cam groove **16** is arranged in such a manner that the top of the bag **3** arrives below the groove after it is bent into said horizontal position shown by the dotted line in Fig. 4. The cam groove **16** extends from this point downwardly into the wax bath and outwardly against the bag, so that the top of the bag during the continued advance of the bag along the wax bath will be entirely bent into this bath at an approximate angle of 180°, into the position shown by the unbroken line in Fig. 4.

The cam groove **16** may also consist of round iron, but as shown in Fig. 4 it may consist of a tube, said tube simultaneously serving as a heating tube for the wax bath. Another heating tube or another branch of the heating tube **16** is indicated by the numeral **17**.

The wax bath can communicate with a larger wax container provided with a suitable heating device, arrangements being made to circulate the wax from the storage tank to the wax bath and from said bath back into the storage tank.

Fig. 5 shows a waxing device according to this invention, adapted for waxing of a bottom seam, e.g. in empty bags. In this figure, **21** indicates a conveyor on which the bags **22** are conducted from the left to the right being arranged in a horizontal position and in such a way that the bottom seam **23** somewhat protrudes to the side of the conveyor. **24** is an elongated wax bath, opened at the top, the upper portion of said bath being removed in this figure. Above this wax bath is located a cam groove **25** adapted to bend down the bottom seam **23** into the wax bath. **26** indicates two endless belts resting against the bag at its upper edge in order to retain them against the conveyor **21** during the bending operation of the bottom seam in the wax bath. The bags can arrive to the waxing device directly from a sewing machine in which the bottom seam is being sewn. The same arrangement may be used eventually for the waxing of a lateral seam.

A section through the wax bath **24** with surrounding insulation **27** is shown in Fig. 6. **28** is a pipe by which wax is being fed from a storage container (not shown). The wax bath is at its other end provided with a corresponding outlet, not shown in the drawings. **29** is a heating tube and **25** is a cam groove adapted for bending of the top of a bag down into the bath.

The wax bath is provided with a lid or cover **30** covering the top of the wax bath with the exception of a narrow slit-shaped aperture **31** through which the bag may protrude. If it is intended to wax filled bags arriving to the wax bath in upright position, the top of the bag must be bent at an angle of 90° by a cam groove (not shown) corresponding to cam groove **14** in Figs. 3 and 4, prior to its arriving at the wax bath, so that the top of the bag **2***a* will be conducted below the cover **30**. If on the other hand the waxing bath is being used for waxing of a seam in an empty bag conducted to said bath in horizontal position, as it is diagramatically shown in Fig. 5, no cam groove is necessary prior to the wax bath.

In all the embodiments of this invention the cam grooves may be constructed in such a way that they are able to lift likewise the top of the bag from the wax bath, or one or several separate cam grooves may be used to this aim. However, in many cases the elasticity of the bag material is sufficient to lift the top of the bag from the wax bath as soon as it no longer is kept within the bath by the cam grooves which bend the top of the bag.

In the above named embodiments of this invention the bag rests on a conveyor during the waxing operation. However, other transporting devices may be used instead of the conveyor, e.g. a transporting device comprising several interconnected trucks provided with clamps in which the bags are suspended. If such a transporting device is being used, the guiding device **5** may be dispensed with, the waxing device being constructed in a similar manner as is shown in Figs. 1–4 or 6.

I claim:

1. Apparatus for sealing a filled bag with a seam top thereon by dipping the seamed top into a bath of molten sealing material comprising a moving conveyor adapted to support the filled bags and to move them in a horizontal direction, cam means mounted beside said conveyor and at a level relative thereto between a level which is just below the level of the conveyor to a level above the level of the conveyor, said cam means extending lengthwise in the direction of the movement of said conveyor and transversely downwardly and inwardly relative to said conveyor for engaging the tops of the bags and bending them downwardly, and a bath of molten sealing material beside said conveyor and beneath said cam means into which the tops of the bags are bent by said cam means into which the outwardly extending tops of the bags are bent by said cam means.

2. Apparatus for sealing a filled bag having an upstanding top with a seam therein by dipping the seamed top into a bath of molten sealing material comprising a moving conveyor adapted to support the filled bags in a vertical position and to move them in a horizontal direction, spaced parallel guide means mounted above said conveyor, first cam means mounted above the conveyor and extending lengthwise in the direction of movement of said conveyor and transversely in a direction transverse to the conveyor for engaging the upstanding tops of bags and bending them to a horizontal position over one of said guide means, second cam means mounted above and beside said conveyor at substantially the level of said first cam means and extending lengthwise in the direction of the movement of said conveyor and transversely downwardly and inwardly toward said conveyor for engaging the horizontally bent over tops of bags and bending them downwardly over said one guide means, and a bath of molten sealing material above and beside said conveyor and beneath said second cam means into which the upstanding tops of the bag are bent by said cam means.

3. Apparatus for sealing a filled bag with a seam top thereon by dipping the seamed top into a bath of molten sealing material comprising a moving conveyor adapted to support the filled bags in a horizontal position with the tops extending out over the side of the conveyor and to move them in a horizontal direction, cam means mounted beside and just below the level of said conveyor and extending lengthwise in the direction of the movement of said conveyor and transversely in a direction downwardly and inwardly toward said conveyor for engaging the tops of the bags extending out over the edge of said conveyor and bending them downwardly, and a bath of molten sealing material beside said conveyor and beneath said cam means.

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