Feb. 6, 1962

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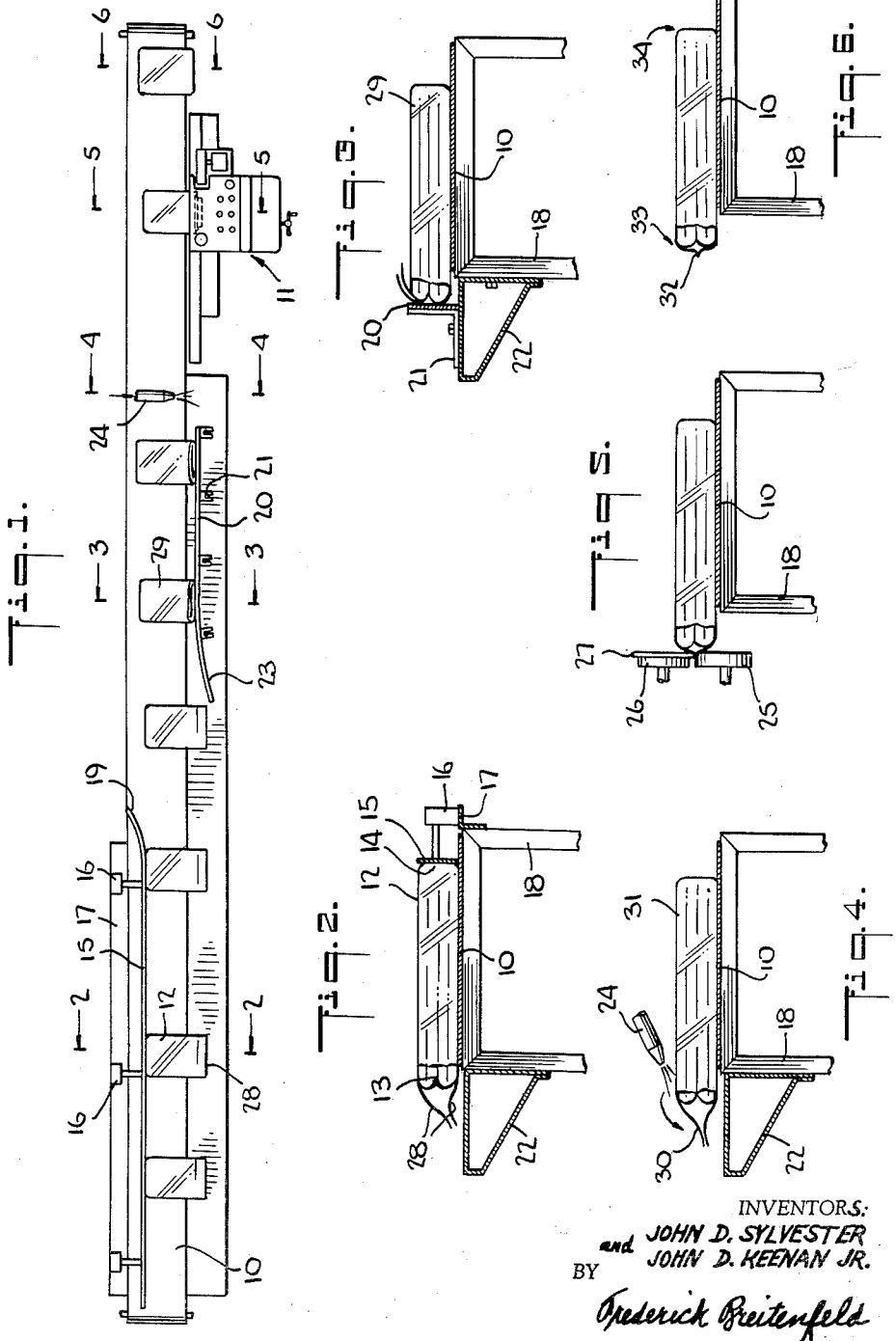
3,019,583

HEAT-SEALING MACHINE FOR BAGS, PROVIDED WITH BAG LOCATING MEANS

Filed March 4, 1959



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United States Patent Office 3,019,583 Patented Feb. 6, 1962

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HEAT-SEALING MACHINE FOR BAGS, PROVIDED WITH BAG LOCATING MEANS

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Filed Mar. 4, 1959, Ser. No. 797,202
2 Claims. (Cl. 53—373)

This invention relates generally to heat-sealing apparatus, and has particular reference to a machine for sealing the mouth of a bag containing merchandise.

The type of bag to which the invention is primarily directed is composed of heat-sealable material such as polyethylene or the like, provided along one edge with an opening or mouth and having a closed rear edge opposite to the mouth edge. Usually the bag is substantially rectangular. It is sealed by subjecting the superposed walls of the bag mouth to the fusing action of a heat-applying element adapted to seal the bag along a line adjacent to the enclosed merchandise. One type of sealing machine that can be used for this purpose comprises a pair of tangentially arranged rollers at least one of which has a heated edge. A moving conveyor can be employed to convey the bags from a relatively remote bag-loading station to the heat-sealing station where the superposed walls of the bag mouth are subjected to the action of the heat-applying element. For example, the bag mouth walls may be directed to and through the nip of tangential rollers of the character mentioned.

It is a general object of the invention to provide an improved sealing machine of this kind, whereby bags of the character referred to may be more effectively and reliably sealed in commercial quantities to produce uniformly good neat-appearing merchandise packages at rapid speed.

For the sake of appearance, and for other reasons, it is often desirable that the bag mouth be sealed along a line which lies as close as possible to the merchandise within the bag. Where bags contain products which have been folded, or which for other reasons vary in dimensions, such as sheets or other drygoods, the formation of seals which are uniformly close to the enclosed products presents a problem. For example, if the conveyor moves along a direction parallel to the sealing line, and if the bags to be sealed are laid successively on the conveyor at a bag-loading station with their rear edges along a longitudinal guide line, the bag mouth will be sealed close to the merchandise only in the case of the longest item; and for shorter items the seal will lie correspondingly away from the enclosed merchandise. Folded items such as sheets often vary in dimensions by as much as an inch or so, as a result of which uniformly made packages cannot be produced with conventional apparatus.

Even with a guide line, a further difficulty is encountered in the sealing of bags containing articles such as men's shirts that are not straight along opposite edges. For example, if the collar end of a shirt lies adjacent to the rear edge of the bag, it is difficult to set this rear edge against a guide line in such a way that the bag will lie absolutely straight. As a result, the seal that is ultimately formed along the mouth edge of the bag is frequently askew, with consequent lack of uniformity in the merchandise packages produced.

It is an object of this invention to provide a practical solution for these problems. More particularly, it is an objective of the invention to provide an improved heat-sealing apparatus in which a plurality of merchandise-filled bags, ready for sealing, may be advanced by a moving conveyor and may be automatically straightened, shifted crosswise on the conveyor, and otherwise conditioned to bring the walls of the bag mouth in each case into optimum relation to the heat-sealing element so as to form a heat-seal in close adjacence to the enclosed merchandise regardless of its dimensional deviation from a standard average.

These desirable results are achieved, in accordance with this invention, by a special arrangement of guide rails which cooperate with each other and with the succession of bags on the conveyor in an unusually effective and novel manner. The improved structure is relatively simple and inexpensive, easy to install and use, and reliable in operation.

A preferred way of achieving these objects and advantages, and such other advantages as may hereinafter be pointed out, is illustrated in the accompanying drawings, in which—

FIGURE 1 is a plan view of a sealing machine installation embodying the features of this invention; and

FIGURES 2—6 inclusive are enlarged cross-sectional views taken substantially along the correspondingly-numbered planes indicated in FIGURE 1.

A flat belt-like conveyor **10** moving from left to right in FIGURE 1, is adapted to receive merchandise-filled bags in a loading region at the left end of FIGURE 1, and to convey the bags successively to and beyond a sealing apparatus generally designated **11**. The sealed merchandise packages are removed from or discharged at the right end of the conveyor.

It is to be understood that the representation of bags, and of parts of the apparatus, is in many respects schematic and exaggerated in the accompanying drawings for the purpose of simplifying the illustration and better explaining the nature of the invention.

The bags chosen for illustration are substantially rectangular, and are depicted as containing merchandise in the nature of folded sheets or other drygoods. The bag **12** shown in FIGURE 2 has been filled at the loading station with a product **13**, and has been laid upon the convevor **10** with its rear closed edge **14** against a guide rail **15**. This rail is supported upon bracket **16** mounted on an element **17**, which is rigidly secured to the framework **18** of the conveyor. The guide rail **15** is substantially parallel to the direction of movement of the conveyor. It is positioned slightly above the level of the conveyor adjacent to the conveyor edge shown uppermost in FIGURE 1. At its terminal end it is curved outwardly as indicated at **19**.

Mounted alongside the conveyor **10** in a region closer to the sealing machine **11** is another guide rail **20**. This guide rail lies adjacent to the opposite edge of the conveyor, and beyond the latter. It is supported upon brackets **21** carried on a shelf-like structure **22** secured to the framework **18** (see FIGURE 3). It is to be noted that the guide rail **15** terminates at a point prior to that at which the guide rail **20** commences. Also, where the guide rail **20** commences, it may be curved outwardly as indicated at **23**.

Between the guide rail **20** and the sealing machine **11** a blower nozzle **24** is mounted above the level of the conveyor, as best indicated at FIGURE 4. The function of this blower will be explained presently.

The sealing machine **11** chosen for illustration is of the rotary type. Its details have not been shown, since this kind of machine is known per se. It includes a pair of tangentially arranged rollers or wheels **25** and **26** (FIGURE 5), at least one of which (in this case, the roller **26**) has an attenuated edge **27**. Also, at least one of the wheels (preferably the roller **26**) is heated by suitable electrical means (not shown). The effect of these rollers is to fuse together and thus heat-seal the bag mouth walls that move between the rollers and are pinched between the heated attenuated edge **27** and the anvil roller **25**.

As has been stated, other types of heat-applying elements may be employed to produce substantially the same result.

The conveyor moves from left to right as viewed in FIGURE 1, along a direction parallel to the line of the seal formed at the heating station. The filled bags at the loading station are all placed upon the conveyor with their rear edges against the guide rail **15**, as shown by the bag **12** in FIGURE 2. The two walls **28** of the mouth of the bag project outwardly beyond the adjacent edge of the enclosed product **13**. The guide rail **15** is so located with respect to the location of the guide rail **20** that all bags placed against the guide rail **15** will be so positioned that their mouth edges will inevitably encounter the guide rail **20**. The latter guide rail is in turn so located with respect to the heat-sealing elements **25**, **26** that the bags encountering and moving past the guide rail **20** are straightened and shifted crosswise on the conveyor **10**, thus bringing them into proper pre-determined relation to the heating elements presently to be encountered. The engagement of the mouth edge of a bag **29** with the guide rail **20** is shown in FIGURE 3.

During the sliding contact between the bag mouth and the guide rail **20** the walls of the bag mouth may become crumpled or turned back, as indicated in FIGURE 3. To restore them to proper disposition, the blast of air emanating from the blower nozzle **24** serves as a means for laying the walls of the bag mouth into smoothly extending relation for engagement by the rollers **25**, **26**. This is best indicated in FIGURE 4 in which the bag-mouth walls **30** of a bag **31** are being blown into the desired extended condition.

The bag-mouth walls presently enter the nip of the heating rollers, where they are subjected to the pinching action represented in FIGURE 5. Because of the prior proper positioning of the bag by the guide rail **20**, the rollers create a seal line **32** (see FIGURE 6) which lies as closely adjacent to the enclosed product as may be desired. This result is achieved regardless of the distance between the front edge **33** and the rear edge **34** of the item within the bag (see FIGURE 6). The finished merchandise packages are thus uniformly compact, neatly sealed, and of good appearance.

The improved apparatus solves also the problem of straightening bags that may have been placed against the guide rail **15** in positions not accurately straight. Provided the bags are not drastically askew in the first place, slight irregularities are corrected as the bags encounter and slide along the guide rail **20**.

It is of advantage that the guide rails be mounted in adjustable fashion, to accommodate products of greater or lesser dimensions, and to bring the bags in each case successively into such a position as may be desired with respect to the sealing element or wheels.

It is to be understood that many of the details herein described and illustrated, for the purpose of explaining the nature and purpose of the invention, may be modified by those skilled in the art without necessarily departing from the spirit and scope of the invention as expressed in the appended claims.

What is claimed is:

1. In a machine for heat-sealing the mouth of a bag composed of limp non-form-sustaining material and containing merchandise, said mouth lying along one edge of the bag and said bag having a rear edge opposite to the mouth edge: a heat-applying element adapted to seal the bag mouth along a line closely adjacent to the enclosed merchandise, a moving conveyor arranged to convey a bag along the direction of said seal line toward and past said heat-applying element, a first guide rail alongside one transverse edge of the conveyor and arranged above and parallel to the direction of travel of said conveyor, said guide rail being positioned to be encountered by the mouthward edge of the merchandise-filled region of an approaching bag and serving to shift the bag on the conveyor in a crosswise direction to a predetermined position relative to said heat-applying element, a second guide rail alongside the opposite transverse edge of the conveyor in a region farther from said element, said second guide rail being arranged above said conveyor and so located that the minimum crosswise distance between said rails is less than any bag dimension lying crosswise of the conveyor, whereby a bag whose rear edge contacts said second rail will, regardless of the crosswise merchandise dimension, have the mouthward edge of its merchandise-filled region positioned to encounter said first guide rails, and means between said first guide rail and said heat-applying element for laying the walls of the bag mouth into smoothly extending relation for engagement by said element.

2. In a heat-sealing machine, the combination of elements defined in claim 1, in which said last-named means comprises a blower for directing a blast of air against said bag mouth walls in a direction generally along said walls.

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