Dec. 27, 1960 A. GRAFINGHOLT 2,966,019

APPARATUS USED IN FILLING AND CLOSING MACHINES FOR EVACUATION OF GAS TREATMENT

Filed Dec. 24, 1958

2 Sheets-Sheet 1

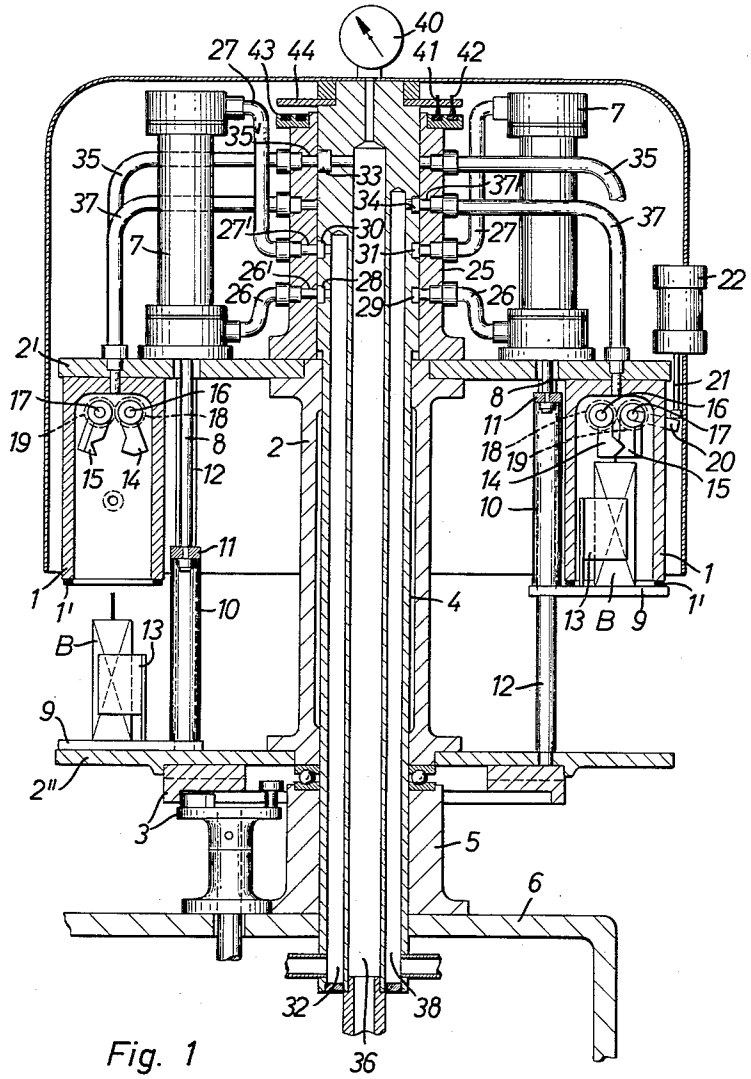


Fig. 1

Dec. 27, 1960 A. GRAFINGHOLT 2,966,019

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2 Sheets-Sheet 2

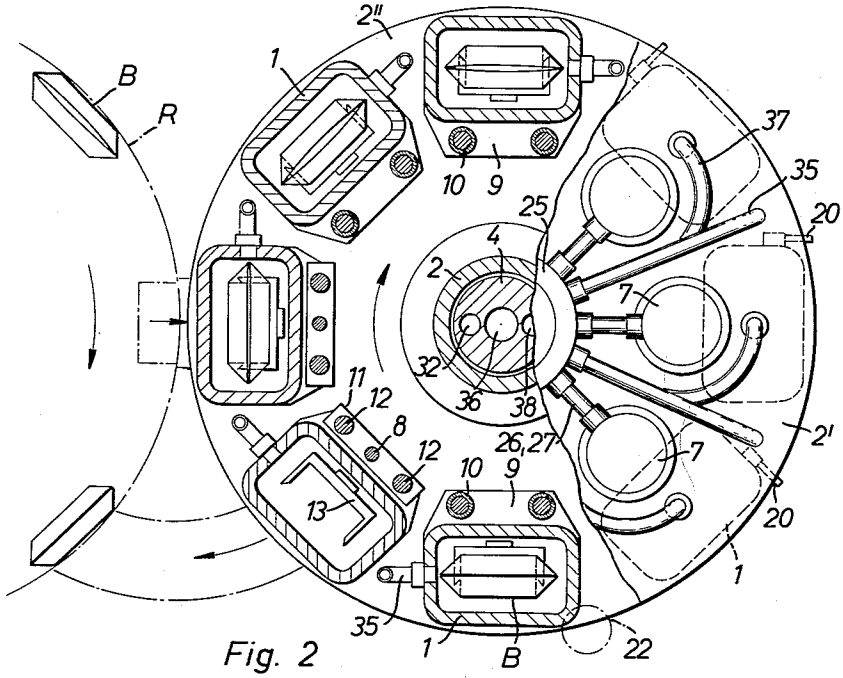


Fig. 2

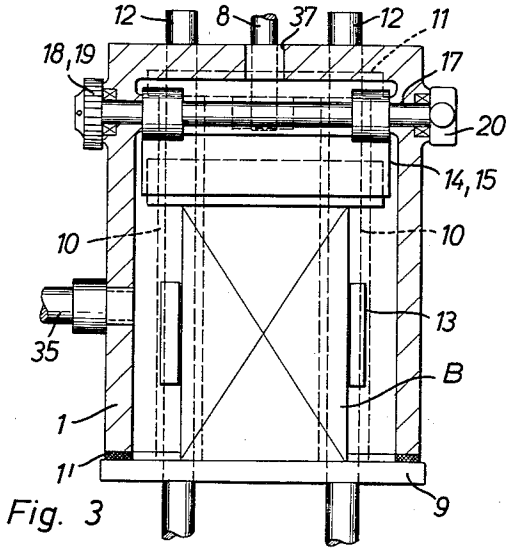


Fig. 3

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APPARATUS USED IN FILLING AND CLOSING MACHINES FOR EVACUATION OF GAS TREATMENT

Alfred Grafingholt, Stuttgart-Bad Cannstatt, Germany, assignor to Firma Fr. Hesser, Maschinenfabrik-Aktiengesellschaft, Stuttgart-Bad Cannstatt, Germany, a corporation of Germany

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1 Claim. (Cl. 53—86)

This invention relates to an apparatus for evacuating and gas treating bag packages charged with fillings of all kinds, and with or without an outer carton.

The evacuation and gas treatment represents an operating step additional to those of filling and closing the packages, so that it is difficult to apply the apparatus required for this purpose to standard machines without impairing the output of the latter or making them such that they require much more space.

To solve this problem, in accordance with the present invention it is proposed to arrange in a filling and closing machine an apparatus which comprises a plurality of downwardly-open chambers which are arranged in known fashion on a drum, a disc or the like which rotates in timed relationship with the machine, and each of which is equipped with a pair of closing jaws of tong-like form, the packages which have been filled by the filling and closing machine, and have their mouths prefolded, being introduced serially from below into these chambers by means of bottom plates which are arranged beneath each chamber and are adapted to be raised and to be lowered to the plane of the conveyor device of the filling and closing machine, and these bottom plates also effecting the airtight closure of the chambers during the evacuating and gas treating process.

This apparatus, which can be installed in very compact form is arranged directly beside the conveyor device, for example the so-called closing wheel of the filling and closing machine, so that the packages are pushed on to the apparatus at one station and, after one rotation, are pushed back on to the next station of the closing wheel.

To afford a smooth and quiet operation of the apparatus, in accordance with further features of the invention the stroke of each of the bottom plates is produced by a compressed-air or compressed-oil cylinder which is arranged on the drum or the like, the supply of the pressure fluid into the cylinders being controlled by a common control head which is disposed at the upper end of a column carrying the drum and which controls both the application of suction and the supply of gas to the chambers. This arrangement, moreover, enables all the gas conduits, and where appropriate liquid conduits, to be installed in the stationary, hollow part.

An embodiment of the invention is illustrated in the accompanying drawing, in which:

Figure 1 is a cross section through the apparatus,

Figure 2 is a plan view of the apparatus,

Figure 3 is a cross section through an evacuating chamber.

The apparatus includes, for example, eight evacuating chambers 1 which are attached to, and depend from, a drum 2 comprising two discs 2' and 2''. This drum 2, which is driven intermittently in sympathy with the associated packaging machine by means of a Maltese cross gearing 3, rotates about a vertical, fixed column 4 and is mounted, axially, on a flange 5 attached to the machine frame 6 and accommodating the column 4.

Compression cylinders 7, corresponding in number to the chambers 1 and preferably pneumatically-operated are arranged in a ring around the upper side of the drum 2, the piston rods 8 in these cylinders engaging the bottom plates 9 which convey the bags B into the chambers 1 and seal these chambers. Each bottom plate 9 is guided by two sleeves 10 which slide on two guide rods 12 secured to the bottom disc 2'' of the drum 2 and are interconnected at their upper ends by a cross piece 11 which is mounted on the corresponding piston rod 8.

To secure an airtight closure of chambers 1, each of these is provided at its lower end with a resilient packing 1', against which the corresponding bottom plate 9 bears flush, when the plate is in its upper position. A U-shaped clip 13, fastened to each bottom plate 9, serves to retain the bag B on this plate 9.

The bags B are closed in the chambers, in each case by a pair of jaws 14, 15, preferably electrically heated, which are arranged in the upper part of the chamber 1, these jaws being rockably mounted in the wall of the chambers on two shafts 16, 17. The shafts 16, 17 are coupled together by toothed pinions 18, 19 so that the jaws 14 and 15 can be pressed simultaneously against one another by operation of a lever 20 fastened to the shaft 17, and the mouth of the bag lying between the jaws 14, 15 thus sealed by a pressure and heating effect. The two jaws 14, 15 are shaped at their confronting sides in such a way that the mouth of the bag is folded in zig zag fashion at the same time that it is sealed, thereby to facilitate subsequent closure folding of the bag.

The jaws 14, 15 can be moved in their closure direction by means of a compression cylinder 22 which is hydraulically —or pneumatically— operated, is stationary and the piston rod 21 of which depresses the lever 20 secured to the shaft 17 at the appropriate time (see Figure 1, right-hand side).

This separate operation of the closing jaws 14, 15, which is independent of the dwell in the movement of the drum 2, has the advantage that the period of closure of the jaws can be adjusted in a manner best suited to the particular material of the bags or the adhesive.

The upward and downward movement of the bottom plates 9 under the impulsion of the compression cylinders 7, and the control of the application of the suction and the protective gas to the chambers 1, are governed by a control head which is located at the upper end of the column 4. This head embraces the upper part of the column 4, which latter has slots 28, 29, 30, 31, 33, 34 arranged at predetermined angular distances therein, and connected to axial ducts 32, 36, 38 in the column 4 for the admission of compressed air, suction air and protective gas, and a control sleeve 25 which rotates with the drum 2 around this upper part of the column 4 and has radial ducts 26', 27', 35', 37' which correspond to the slots 28, 29, 30, 31, 33, 34 and are connected to the compression cylinder 7 and chambers 1 through conduits 26, 27, 35, 37.

The compressed air required to raise and lower the bottom plates 9 is admitted through the duct 32 which opens into the slots 28, 30. To produce the stroke of the bottom plates 9, the appropriate ducts 26 of the control sleeve 25 comes into register with the slot 28. As a result compression air flows, through the conduit 26 connected to the duct 26' and the corresponding compression cylinder 7, into the lower part of this compression cylinder 7 and thus produces the forward stroke. When the bottom plates are lowered, the associated duct 27' registers with the slot 30, and, in consequence, compressed air passes through the conduit 27 connected to the duct 27' and the compression cylinder 7, into the upper part of this cylinder.

When the double acting compression cylinders 7 are to

be exhausted, the ducts **26** and **27'** register with slots, **29** and **31** respectively, provided at the upper part of the column **4** and opening to atmosphere through ducts (not shown).

The duct **36**, communicating with the slot **33**, is used to educt the air from the chambers **1**. When the evacuating procedure is initiated, registration with this slot **33** is made by ducts **35'** which are connected to the chambers **1** through conduits **35**. The conduits **35** open laterally into the chambers **1** so that the commodity in the latter is not exposed to the direct draught of the exhausting air. The slot **33** is so arranged in the column **4** that the evacuation is not commenced until the bottom plates **9** have positively closed the chambers **1** in airtight fashion.

To achieve a very high degree of reduced pressure in the chambers **1**, the slot **33** in the control head may be divided up and each of the subdivisions be connected through appropriate ducts in the column **4** to one stage of a multi-stage suction pump. Generally, however, the insertion of an air chamber between the pump and the control head is adequate.

The suction process extends over a plurality, for example, three, stations.

Directly following thereon the evacuated chamber **1** is filled through the slot **34** and the duct **37'** with a protective gas which is admitted through the duct **38** in the column **4**. For this purpose the ducts **37'** are connected to the chambers **1** through conduits **37**. The conduits **37** are arranged to open into the chambers **1** in such a way that inflowing protective gas passes between the jaws **14**, **15** into the bag B before the rest of the space in the chamber **1** is filled with this gas. This prevents the mouth of the bag being prematurely closed by the action of the gas pressure.

The current for the closure jaws **14**, **15**, as required for heat sealing, is supplied through a slip ring **43** arranged above the control head and having contact brushes **41**, **42** sliding thereover in known fashion, these brushes being connected to a fixed insulated disc **44** or the like.

The apparatus described above may, for example, be arranged directly beside the closing wheel R of a packaging machine. The bags B are transferred from the closing wheel R to the evacuating apparatus in known fashion by means of slides or the like, as is also the return of the gas-treated and closed bags B to the conveying holder of the closing wheel R which has been emptied at the preceding station. Before the filled bag B is transferred to the evacuating apparatus, the mouth of the bag is spread flat and, optionally, the lips are attached together in this position by heating jaws or the like in such a way as to leave a sufficiently large opening for the evacuation and gas treatment.

A manometer **40** connected to the duct **36** is advantageously provided above the column **4** to allow the reduced pressure in the chambers **1** to be supervised. This manometer may advantageously be a contact manometer which, should there be a defective low pressure in the chambers **1**, emits an optical or accoustical signal through electrical means and/or stops the machine. If it is not desired to stop the machine, the contact manometer **40** is electrically connected to a rejection device which removes the inadequately-evacuated bag B from the machine.

What is claimed is:

Apparatus, for evacuating and gas treating filled bags comprising a drum, a plurality of means on said drum defining downwardly open chambers, support means coupled to and intermittently rotating said drum about a fixed axis, bag supporting bottom plates underlying each of said chambers, control means coupled to and adapted to effect a lifting of each of said bottom plates to position bags in the chambers and to seal said chambers and lower said plates to remove the bags from the chambers, a pair of bag closing jaws in each of said chambers, and operating means coupled to and adapted to operate said jaws, said control means comprising hydraulic cylinders coupled to and adapted to operate the bottom plates, said cylinders being mounted in a circle around said axis, said support means includes a fixed column extending through and supporting said drum, said apparatus further comprising a control head on the fixed column, said column having axial ducts and further having slots arranged at predetermined angular distances therein and connected to said axial ducts and adapted for exhaust and to pass compressed air and a gas, a control sleeve fixed on said drum and provided with radial ducts corresponding to the said slots, and conduits connecting said slots via said radial ducts to the cylinders and chambers.

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