Oct. 7, 1969 M. J. G. TIPPER 3,470,673

APPARATUS FOR EVACUATING AND SEALING FLEXIBLE CONTAINERS

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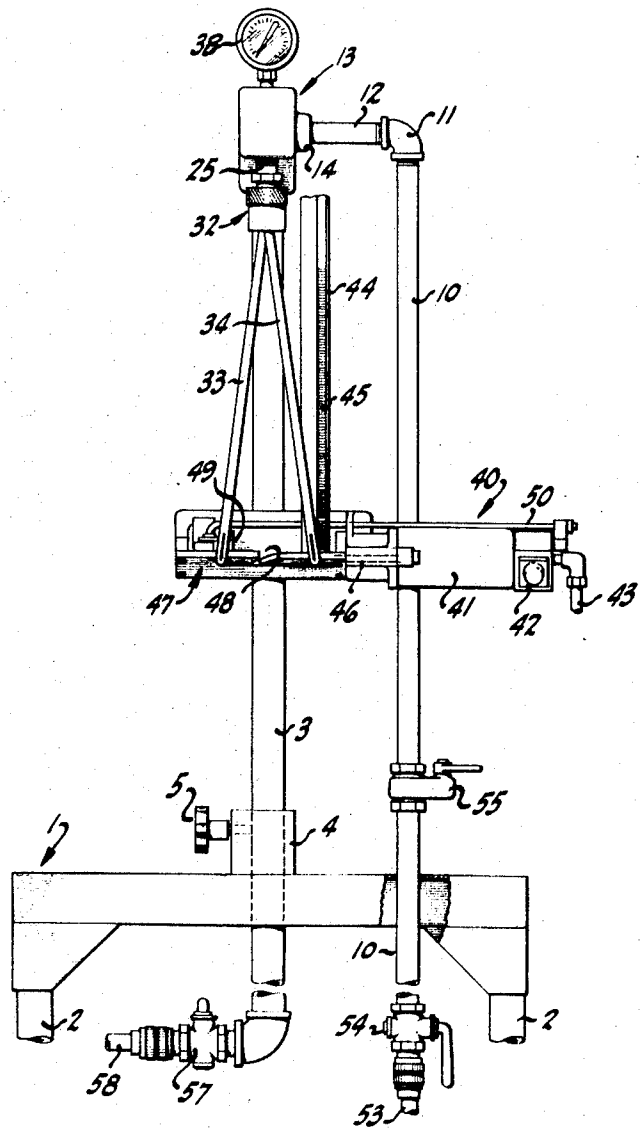

FIG-1

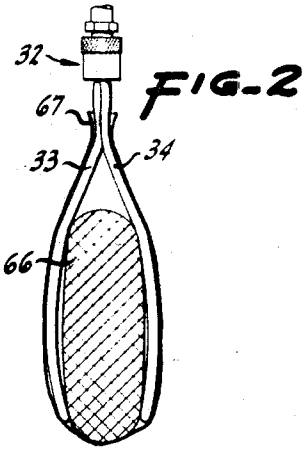

FIG-2

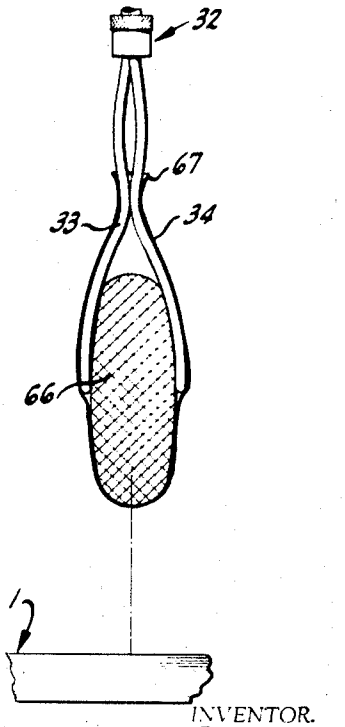

FIG-3

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FIG. 4

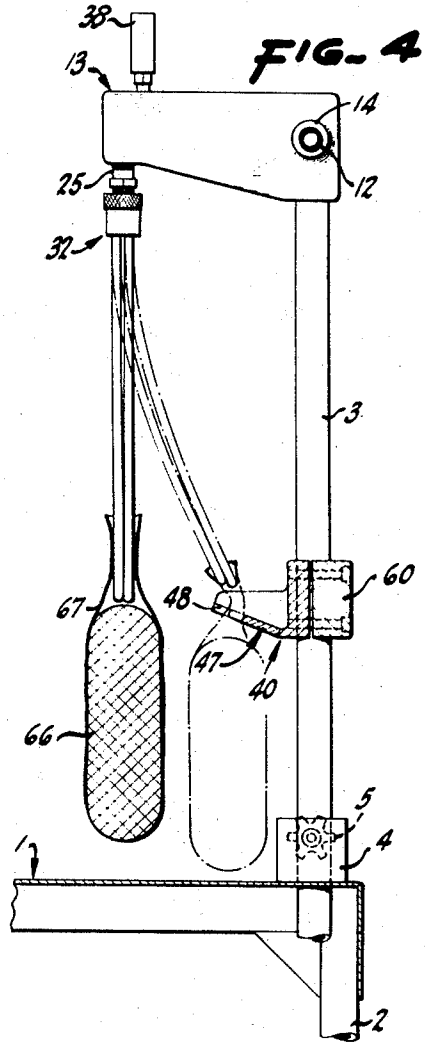
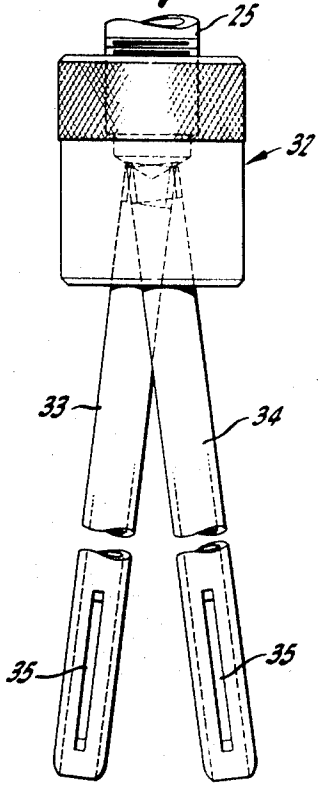


FIG. 6



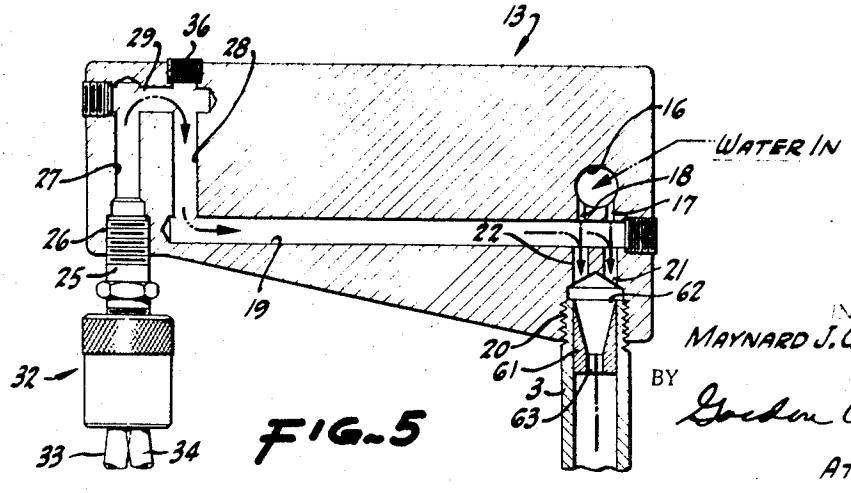


FIG. 5

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United States Patent Office 3,470,673 Patented Oct. 7, 1969

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APPARATUS FOR EVACUATING AND SEALING FLEXIBLE CONTAINERS

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Filed Jan. 19, 1966, Ser. No. 534,264
Int. Cl. B65b 31/04
U.S. Cl. 53—112 7 Claims

ABSTRACT OF THE DISCLOSURE

Evacuating apparatus operated by water under pressure for removing air from packages prior to sealing and including sealing means for applying a sealing clip to the mouth of the package after evacuation. Flexible conduits are connected to the source of vacuum in a manner to facilitate complete removal of the air.

This invention relates to an apparatus for evacuating the air from a flexible container such as a plastic bag and for sealing such container after the air has been withdrawn therefrom.

In the packaging of various products such as meat it is desirable to wrap the meat in a plastic bag from which the air has been extracted prior to hermatically sealing the bag.

The main object of the present invention is the provision of a relatively inexpensive apparatus for performing the steps tf evacuating and sealing a flexible bag or the like containing a product.

Another object of the invention is the provision of an evacuating apparatus that lends itself to operation by water under pressure thus reducing the cost of operation to a minimum without impairing the efficiency. In this connection it will be understood that in most meat processing installations water is employed to a substantial extent and there is no problem of disposing of the waste water and any materials carried therewith.

Still another object of the invention is the provision of an economical evacuating and sealing apparatus wherein means is provided for insuring complete evacuation of the container despite the tendency of the flexible container to adhere to the product and form air pockets to which access of the vacuum nozzle is ordinarily difficult.

Yet another object of the invention is the prtvision of an evacuating and sealing apparatus wherein optimum advantage is taken of the essential elements of the evacuator to provide means for economically supporting the bag sealing apparatus and at the same time yielding ample adjustability of both the evacuator means and the sealing device.

Other objects and advantages will be apparent from the following specification and drawings.

FIG. 1 is a front elevation of the apparatus of the present invention.

FIG. 2 is a fragmentary front elevation of the apparatus showing the container in a raised position permitting access of the vacuum tubes to the spaces on opposite sides of the product.

FIG. 3 is a view similar to FIG. 2 but with the container partly evacuated and in a lower position.

FIG. 4 is a side elevation of the apparatus showing by dotted lines the mouth of the completely evacuated container swung into the clipping position.

FIG. 5 is a longitudinal cross sectitn of the vacuum head.

FIG. 6 is an enlarged fragmentary side elevation of the vacuum tubes.

First with reference to FIG. 1, the apparatus comprises

a table top generally designated 1 provided with legs 2 for supporting the tablt top at any desired elevation from the floor. The table is adapted to support the product which, for purposes of the present disclosure, will be assumed to be a brisket of corned beef or like meat article which is to be stored in an evacuated bag.

The table top 1 is apertured to slidably receive therethrough a vertically extending discharge pipe 3. Secured to the table top 1 is a block 4 which is bored to also receive the pipe 3 therethrough and which is provided with a handle 5 threadedly engaging the block and having a shank adapted to frictionally engage the pipe 3 for fixedly but adjustably securing the pipe 3 relative to the table 1.

A supply pipe 10 also extends through a suitable aperture in the table top and is provided at its upper end with an elbow 11 to which is connected a relatively short length of horizontally extending pipe 12. Both the upper end of the vertically extending discharge pipe 3 and the adjacent end of the horizontally extending supply pipe 12 are threaded for threaded engagement with a vacuum head generally designated 13. This vacuum head, which is best seen in FIG. 5, comprises a relatively thin elongated block of suitable material such as aluminum. Block 13 constituting the vacuum head is provided with a boss 14 on one side which is internally threaded to receive therein the supply pipe 12. Similarly the lower side of block 13 is threaded to receive the upper end of discharge pipe 3. The supply pipe 12 communicates with a short horizontally extending bore 16 which in turn communicates with a pair of short downwardly extending bores 17, 18 which are of relatively small diameter thus forming jets for the passage of water therethrough at relatively high velocity. The jets 17, 18 communicate at their lower ends with a longitudinally extending bore 19 in the vacuum head formed by block 13.

Communicating between the bore 19 and the discharge port 20 in block 13 are a pair of vertically extending bores 21, 22 which are in alignment with jets 17, 18 respectively. At this point it will be noted that the flow of water through jets 17 and 18 into the somewhat larger bores 21, 22 creates a low pressure in the bore 19 which is traversed by the water jets.

The block 13 is preferably tapered from the end to which the supply and discharge pipes are connected toward its other end at which a downwardly opening vacuum inlet generally designated 26 is provided. This vacuum inlet 26 is connected to the horizontal longitudinally extending bore 19 by means of horizontally spaced apart vertically extending bores 27, 28 and a short horizontally extending connecting bore 29 as best seen in FIG. 5. At this point it will be noted that the inverted U-shaped trap formed by the bores 27, 28, 29 prevents any water that may be in bore 19 from leaking through the vacuum inlet 26 by gravity. This is an important feature in most processes since the addition of water to many products must be avoided.

Vacuum inlet 26 is interally threaded for threaded securement thereto of a threaded pipe nipple 25 to which in turn is secured a generally cylindrical vacuum fitting generally designated 32. Fitting 32 is bored to provide communication between the vacuum inlet 26 and a pair of generally downwardly extending vacum tubes 33, 34 (FIG. 6) which are preferably formed of a resilient plastic permitting moderate flexure of said tubes. It will be noted that tubes 33, 34 are connected to fitting 32 at closely spaced apart points on the latter and are secured within said fitting so as to extend divergently downwardly so that their lower ends are spaced apart a substantial distance compared to their spacing at the fitting 32. Adjacent the lower ends of tubes 33, 34 the same are provided with a plurality of elongated slots 35 to facilitate removal of air. If de-

sired, a vacuum gage **38** (FIG. 1) may be secured in the uper end of bore **28** or, as shown in FIG. 5, a pipe plug **36** may be employed to close said upper end.

The apparatus for sealing the evacuated container is generally designed **40**. This clipping device is not described in detail herein since its exact structure is not critical insofar as the present invention is concerned. However, the device comprises generally a pneumatic cylinder **41** to one end of which is connected a switch **42** for regulating the introduction of air under pressure from air line **43** to said cylinder **41**. The device **40** also includes a clip supply magazine **44** along which clips **45** are conducted to the clipper **40**. A punch **46** is provided in clipper **40** for forcibly urging a clip toward a die structure generally designated **47**.

Clipper **40** is formed with a mouth **48** through which the mouth of the bag or other container to be sealed may be introduced by the operator to a position at which the punch **46** distorts a clip **45** around said mouth by engagement with die structure **47**.

In the particular device disclosed actuation of the clipper **40** is accomplished through a lever **49** which is connected by an operating rod **50** with switch **42**. Thus, when the mouth of the bag to be closed is in clipping position adjacent the die structure **47** the operator presses on the lever **49**, actuating the switch **42** and causing the punch **46** to be driven along the length of its supporting channel by the air pressure within cylinder **41**. Upon release of lever **49** switch **42** closes off the air supply from line **43** and vents cylinder **41** permitting the punch to be retracted by spring means (not shown) and allowing withdrawal of the sealed mouth of the bag. Other means may be employed for actuating the clipper **40** and no claim is made herein to the structure of the clipper **40** except in combination with the remainder of the apparatus disclosed herein.

Preferably a flexible hose **53** (FIG. 1) from a source of water under pressure is connected to supply pipe **10** through a valve **54** which may be adjusted to control the amount of vacuum created in head **13**. Above the table **1** there is also provided in supply pipe **10** a valve **55** which may conveniently be opened or closed by the operator for turning the vacuum on or shutting it off.

The lower end of discharge pipe **3** is also preferably connected to a flexible discharge hose **58** which may be led to the vicinity of a suitable drain (not shown). The flexibility of supply hose **53** and drain hose **58** permits the entire apparatus above described to be adjustably positioned vertically with reference to the table top **1** so that the lower ends of vacuum tubes **33, 34** may be appropriately positioned to suit the size of the bag to be processed. The clipper base is also conveniently adjustable through the use of a bracket **60** (FIG. 4) secured to discharge pipe **3** and to which bracket the base of the clipper **40** is secured. By releasing the bolts which secure bracket **60** to pipe **3** the clipper **40** may be moved to different distances above the table top **1** as desired.

The operation of the above described apparatus may now be set forth. Referring particularly to FIGS. 2, 3 and 4, a product such as meat **66** is inserted in a flexible plastic bag **67** and the lower ends of vacuum tubes **33, 34** are inserted through the mouth of bag **67** with the vacuum turned on by opening valve **55**. The operator may raise the bag from table **1** and manipulate the same and its contents as required to insure that the lower ends of tubes **33, 34** reach all of the air pockets that exist between the product and the inner walls of bag **67**. From FIG. 2 the importance of the diverging tubes **33, 34** will be seen. By applying the vacuum to both sides of the meat at the same time the possibility of a pocket of air being formed between the product and the bag is subsantially reduced. Furthermore, the diverging tubes **33, 34** facilitate the manipulation by the operator to insure that all such air pockets are removed.

When evacuation is substantially completed the bag

with its contents may be lowered to the position of FIG. 3 with the hand of the operator grasping and contracting the mouth of the bag around the tubes **33, 34** so that the vacuum is retained in the bag. While the vacuum is so retained by the evacuating effect of tubes **33, 34** the bag may be swung at its upper end to the dotted line position shown in FIG. 4 and the clipping operation performed thereon as above described. It is important to note that the evacuation process is continuing during the time the clipping operation is performed so that it is impossible for the vacuum to be destroyed by the leakage of air into the bag until the mouth of the bag has been effectively sealed.

One of the most important features of the present invention is the fact that the above described evacuating apparatus may readily be cleaned out from time to time as required. The preferable cleaning procedure of back flushing the vacuum head and tubes may be carried out simply by blocking flow through the discharge pipe **3** as by closing a normally open gate valve or cock **57** in pipe **3** (FIG. 1) or simply by kinking the flexible discharge hose **58**.

By the present invention the drawing of a strong suction in the vacuum tubes **33, 34** is insured under all conditions by the provision of an internally tapered sleeve **61** fixedly secured within the upper end of discharge pipe **3**. Sleeve **61** is formed with a large diameter inlet end **62** and tapers inwardly to a reduced diameter outlet end **63**. By this structure the downward flow of the mixed air and water tends to fill the reduced area at **63** preventing a reverse flow of air upwardly through discharge pipe **3**.

It should be noted in this connection that when a reduced pressure is created by jets **17, 18** such reduced pressure tends to cause a reverse flow of air upwardly through discharge line **3** as well as a flow along bore **19**. Such a reverse flow would, of course, defeat the purpose of the device and it is therefore necessary to provide a water "trap" to prevent such reverse flow. The internally tapered sleeve **61** constitutes such a trap by insuring a solid flow of liquid and entrained air from bore **19**.

It will be seen that the herein described apparatus obviates the heretofore customary procedure of twisting the neck of the bag after the evacuation of the same has been carried out in order to reduce the likelihood of air leakage into the bag. By the present invention such twisting operation is eliminated.

The ease with which the above described device may be flushed is an important feature of the invention since the apparatus lends itself to use with products that contain an amount of brine, animal fats, animal acids, blood etc. Such products are readily sucked into the vacuum conduits and it is important that they be removed with ease, preferably by back flushing.

The above detailed description of the preferred form of the invention should not be taken as restrictive as it will be apparent that various modifications in design may be resorted to by those skilled in the art without departing from the scope of the following claims.

I claim:

1. In a device for evacuating a flexible container containing a produce preparatory to vacuum sealing said container:

a source of vacuum,

a pair of generally vertically disposed resilient conduits connected at their upper ends to said source and adapted at their lower ends to be introduced through the mouth of said container,

said conduits normally diverging at their lower ends to spaced apart relationship to facilitate introduction of said ends to the spaces in said container on opposite sides of said product,

whereby said conduits and said container may be relatively moved vertically away from each other for removing said ends from said mouth while said mouth is restricted and said ends are urged into

closely adjoining relationship against the resiliency of said conduits.

2. A device according to claim 1 wherein said source of vacuum is fixed and said conduits are formed of semi-rigid plastic tubing connected at their upper ends at closely adjacent points to said source and diverging downwardly with their lower ends normally spaced apart a substantial distance.

3. Fluid operated evacuator means for evacuating a flexible container containing a product preparatory to vacuum sealing said container:

a vacuum head,

said head including a water inlet and a discharge outlet,

jet means interposed between said inlet and outlet for creating a reduced pressure at a point in said head,

a suction conduit comunicating at one end with said point and adapted at its other end for introduction through the mouth of said container,

said conduit including an inverted U-shaped portion between said other end and said point for preventing leakage of water through said suction conduit by gravity.

4. A device according to claim 3 wherein a clipping device is supported in close proximity to said other end of said conduit for sealing the mouth of said container while vacuum is applied thereto.

5. In apparatus for evacuating and vacuum sealing a flexible bag having a mouth and containing a product:

a horizontally extending table for supporting said bag,

a supply pipe and a discharge pipe extending upwardly from said table,

a vacuum head spaced upwardly from said table and having an inlet connected with said supply pipe and an outlet connected with said discharge pipe,

jet means interposed between said inlet and outlet and creating a reduced pressure at a point in said head,

a vacuum passageway formed in said head and communicating at one end with said point and at its other end with a vacuum inlet,

said head comprising an elongated block supported at one end on said pipes and overhanging said table at its other end to provide clearance for positioning said container on said support beneath said vacuum inlet,

a flexible tube extending downwardly from said vacuum inlet and adapted at its lower end to be inserted through said mouth of said bag, and

a sealing device for hermetically sealing said mouth of said bag.

6. A device according to claim 5 wherein said supply pipe and discharge pipe are in substantially the same vertical plane and said vacuum inlet is spaced a substantial distance therefrom.

7. A device according to claim 6 wherein said pipes and said vacuum head are adjustably secured to said table for movement of said vacuum head to different distances above said table, and said sealing device is adjustably secured to one of said pipes for positioning said sealing device at different positions along the length of said one pipe.

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