Jan. 2, 1951 H. A. MULVANY 2,536,387

HYDRAULIC PROCESS FOR PACKING FOODSTUFFS

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FIG_1_

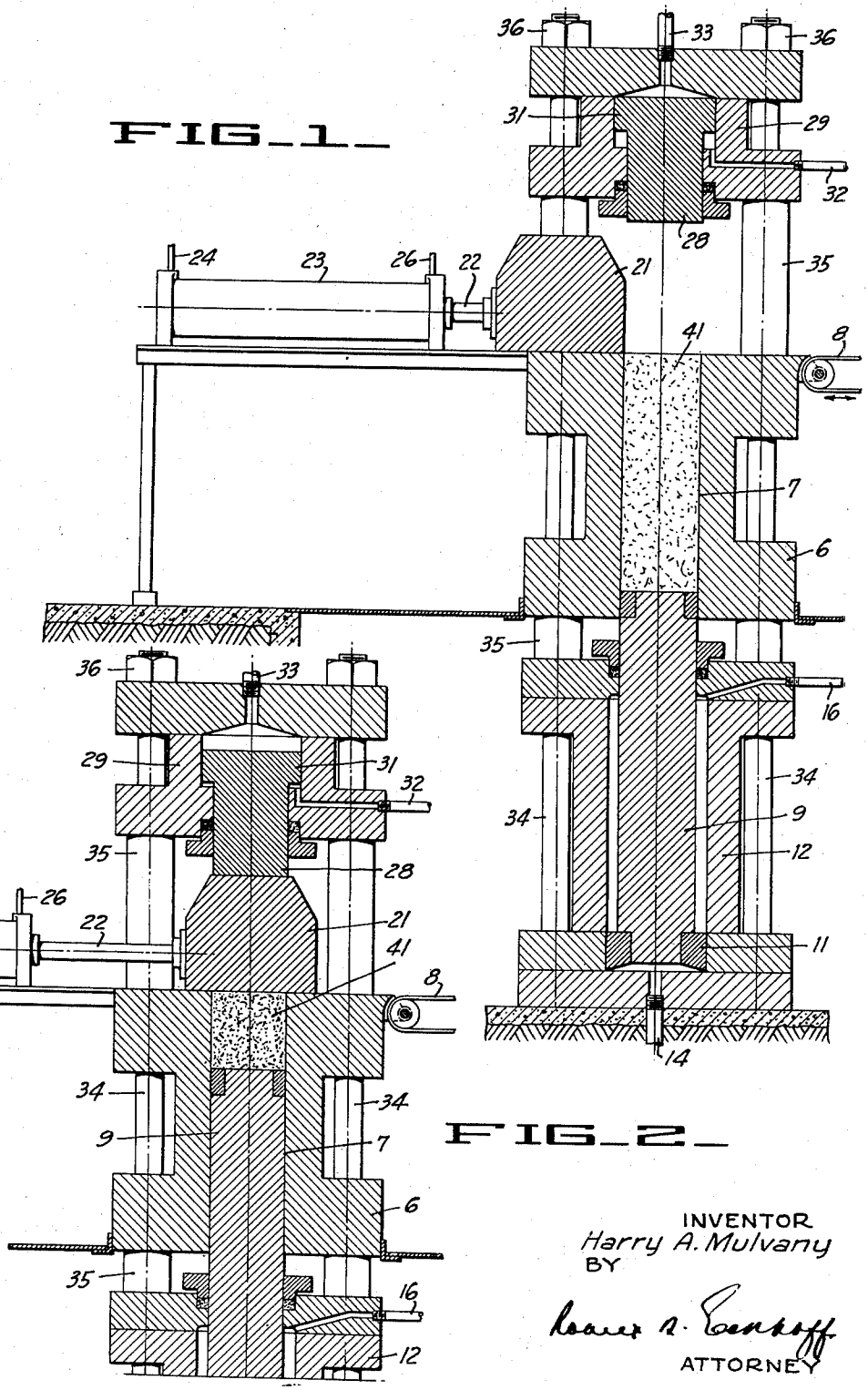


FIG_2_

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HYDRAULIC PROCESS FOR PACKING FOODSTUFFS

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1 Claim. (Cl. 99—8)

1

This invention relates to an improved method and an apparatus for the preparation of alfalfa for storage.

The value of alfalfa as a feed material depends upon its nutrient content. Because it cannot be fed continuously from a fresh supply, it is necessary to process the alfalfa in an effort to preserve it for an extended period. Various drying and dehydration methods have been proposed, including field and artificial dehydration. These have proven to be objectionable because of their destructive effect upon various of the nutrients present and upon which the ultimate value of the alfalfa depends. In addition, it is usual to handle the dried material in sacks. This not only requires a sizeable investment in the sacks, such as to necessitate their return, but it also gives rise to another problem in that diseases from an infested area may be and are, in fact, at times transmitted into other areas previously free of such diseases, because of the re-use of the sacks in commerce between such areas.

In accordance with the present invention, I have found that one can preserve alfalfa successfully by subjecting the alfalfa to a relatively heavy pressure, compressing it into the form of relatively small blocks; the pressure is so extreme, being of the order of 3,000–5,000 pounds per square inch, that a binder is not required. These are then suitably wrapped, as in paper. Because the alfalfa is compressed to such a compact and relatively small volume, light and air cannot enter into the alfalfa and so the nutrient content is preserved and is not subject to deterioration by these agencies. In addition, the use of a paper wrapping obviates the use of sacks, thus making the packaging less expensive and reducing any liability of disease transmission from one area to the other because the paper wrapping cannot be reused. In addition, the relatively small volume of the alfalfa enables it to be stored economically under refrigeration so that nutrients subject to deterioration by normal atmospheric temperatures can be further preserved in this manner.

To enable the invention to be practiced in a ready and simple manner, I provide a novel form of apparatus enabling the invention to be practiced readily.

In general it is the broad object of the present invention to provide a novel and improved method for the treatment of alfalfa to the end that the nutrient value of the alfalfa can be preserved under storage conditions.

Another object of the present invention is to

2

provide a novel, simple and improved form of apparatus for the treatment of alfalfa.

Referring particularly to the drawings,

Figure 1 is a side elevation partly in section showing one step in the method of preparation in the handling of the alfalfa in accordance with the present invention.

Figure 2 is a view similar to Figure 1, but showing an advanced step in the handling of the alfalfa in accordance with the present invention.

Referring to the drawings, I have there shown an apparatus particularly suited to the practice of the present invention and in which I have provided a mold member 6 having a cavity 7 into which alfalfa is delivered as by the conveyor 8. Cooperatively associated with the mold cavity 7 is a plunger 9, having a piston 11 at one end thereof, the piston and plunger being moveable in a cylinder block structure generally indicated at 12. To move the plunger 9 upwardly, fluid is supplied to the underside of the piston 11 as from conduit 14, while to move the plunger downwardly, fluid is applied to the other side of the piston 11 through line 16.

To close the mold cavity 7, a moveable block 21 is provided, the latter being mounted upon an end of a piston rod 22, moveable by a piston (not shown) slidably mounted in a cylinder structure 23 and adapted to be moved selectively upon fluid being supplied to one side or the other of the piston in cylinder 23 from conduits 24 and 26. To enable block 21 to be retained in position, a plunger 28 is mounted in a second cylinder block structure, generally indicated by numeral 29, the plunger having a piston 31 at one end thereof and being moveable upwardly upon the supply of fluid to the underside of the piston, as from conduit 32 and downwardly upon a supply of fluid under pressure from conduit 33 to the upper side of the piston. The cylinder block 29, the mold block 6 and the cylinder structure 12 are mounted in a spaced aligned relation by suitable tie rods 34, spacer 35 and nuts 36.

In operating the apparatus and practicing the process of the present invention, alfalfa which has been previously suitably dehydrated so that it has the correct moisture content, preferably between 10 and 12 per cent, is delivered as a loose mass into the mold cavity by conveyor 8, the alfalfa being indicated therein at 41. When the cavity is suitably filled, block 21 is moved from that position in which it appears in Figure 1, to that position in which it appears in Figure 2, so that it closes the cavity. Plunger 28 is then

lowered into position to retain block 21 in sealing position over the end of the mold cavity, whereupon fluid is applied to the underside of the piston 11 and plunger 9 is caused to move upwardly to compress the alfalfa in the mold cavity until the latter is formed into a block of a desired size; a pressure of between 3,000 and 5,000 pounds per square inch should be applied. The pressure on piston 11 is then released slightly and plunger 28 is raised to permit block 21 to be moved into that position in which it appears in Figure 1. Plunger 9 is then raised to eject the finished block of compressed alfalfa, the ejected block then being moved by plunger 21 on to the conveyor 8 for removal for wrapping and cold storage, if this be desired. For use, it is only necessary to remove the wrapping and break up the block into a desired size of material.

By utilizing a pressure of at least 3,000 pounds per square inch and preferably between 3,000 and 5,000 pounds, I have found that it is possible to retain the alfalfa in cold storage for four months with substantially no reduction in the carotene content, while a substantial reduction occurred in a control sample otherwise identical but stored during the same period at 70° F. Specifically, the carotene content of the two samples at the start of the test was 27 milligrams per 100 grams. At the end of the four months period, the compressed block in cold storage contained 26 milligrams per 100 grams, while that which was otherwise identical but which had been subjected to a temperature of 70° F. had fallen to 19 milligrams.

From the foregoing, I believe it will be apparent that I have provided a novel and highly advantageous process for the preservation of alfalfa and an apparatus which can be readily utilized for this.

I claim:

A process for positively preserving the carotene content of alfalfa against deterioration during storage, said process consisting essentially of the following steps in the order named: dehydrating alfalfa to a point where the moisture content is of the order of 10% to 12% by weight, compressing a loose mass of said dehydrated alfalfa into solid form under an applied pressure of the order of 3,000 to 5,000 lbs. per square inch, wrapping the block with a wrapper and retaining it under cold storage conditions.

HARRY ALFRED MULVANY.

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