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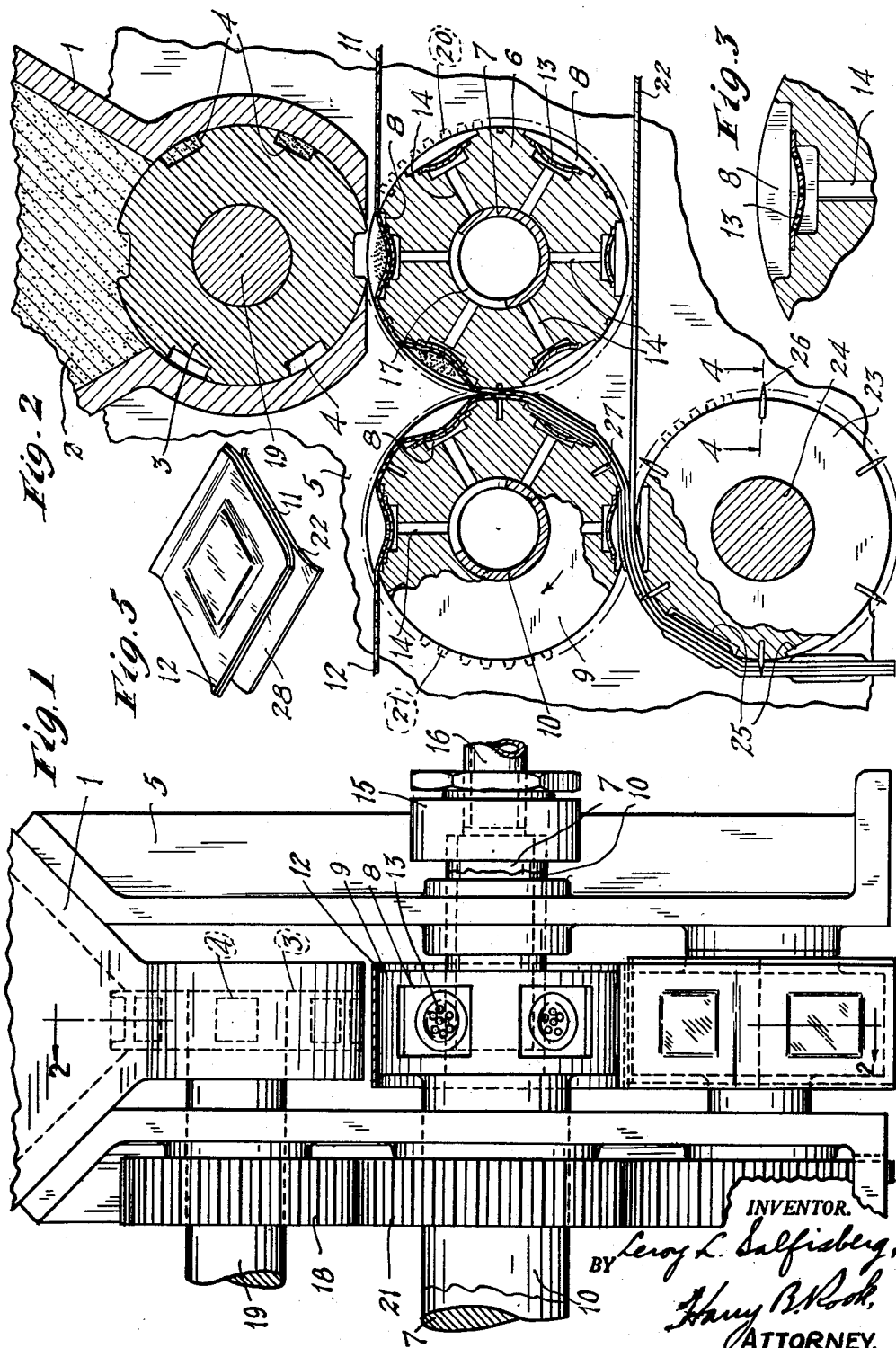
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2,472,440

MACHINE FOR FABRICATING PACKAGES

Filed March 7, 1946

2 Sheets-Sheet 1



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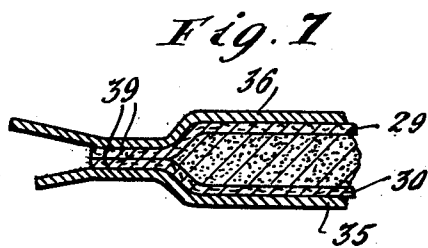
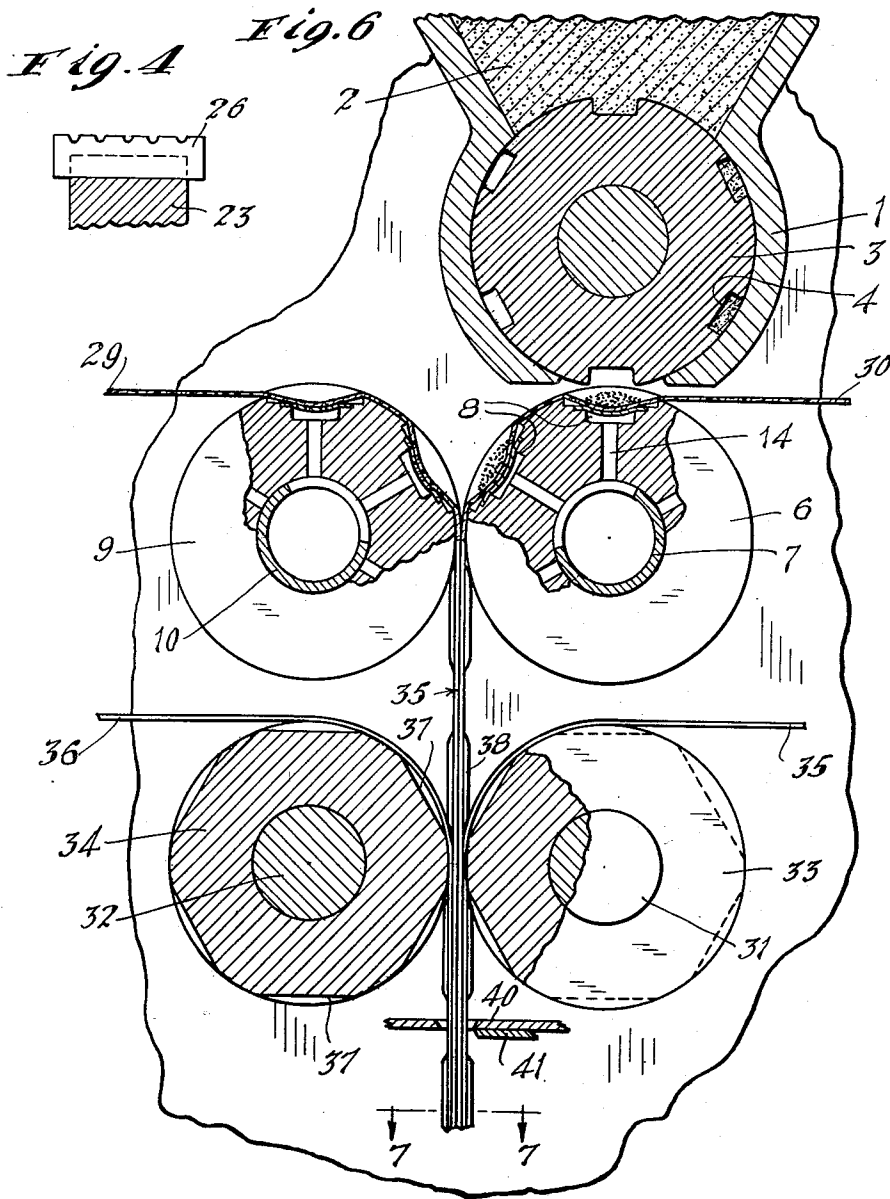
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MACHINE FOR FABRICATING PACKAGES

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2 Sheets-Sheet 2



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MACHINE FOR FABRICATING PACKAGES

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6 Claims. (Cl. 93—3)

1

This invention relates in general to machines for packaging powders, granulated materials or small articles, and is particularly directed toward the manufacture of infusion packages, especially tea bags.

A primary object of the invention is to provide a method of and machine for packaging materials of the nature described whereby the material being packaged shall be deposited from a hopper into proper relation to strips of packaging material with a minimum of possibility of loss of material or formation of dust in the vicinity of the machine.

Another object of the invention is to provide such a machine wherein negative pressure or partial vacuum shall be utilized in a novel and improved manner to temporarily hold the powdered or granular material on a packaging strip while the material is being enclosed between said strip and another packaging strip to produce a complete package.

A further object is to provide a novel and improved method of and machine for producing a package which shall comprise two opposed layers of porous packaging material, such as filter paper, between which the substance being packaged is enclosed, and a substantially air- and moisture-tight cover overlying said layers of porous material for completely enclosing the porous envelope containing the packaged material, so that the cover shall serve to protect the porous layers from contamination and injury, and shall be capable of receiving advertising, directions for use or the like, and can be easily detached from the porous envelope when desired, for example, when the envelope is a tea bag which is to be immersed in water for making tea.

Other objects, advantages and results of the invention will be brought out by the following description in conjunction with the accompanying drawings in which:

Figure 1 is a schematic front elevational view of a machine embodying the invention, portions being broken away for clearness in illustration.

Figure 2 is a vertical longitudinal sectional view on the line 2—2 of Figure 1, with portions shown in elevation.

Figure 3 is an enlarged fragmentary sectional view of one of the packaging and sealing rolls, particularly illustrating the recess in which the material being packaged is deposited.

Figure 4 is a fragmentary horizontal sectional view on the line 4—4 of Figure 2.

Figure 5 is a detached perspective view of one

2

form of package produced by the machine and method.

Figure 6 is a view similar to Figure 2 showing a modification of the machine.

Figure 7 is an enlarged fragmentary sectional view of one type of package produced in the machine of Figure 6.

Specifically describing the embodiment of the invention illustrated in Figures 1 to 5 inclusive, the reference character 1 designates a suitable hopper for the material 2 to be packaged from which the material flows by gravity under the control of a depositing roll 3 which is horizontally rotatable in the discharge mouth of the hopper, and has a plurality of circumferentially spaced measuring pockets 4 in its periphery for depositing successively measured quantities of the substance 2 from the hopper. The hopper is mounted on a suitable frame 5 in which the depositing roll 3 is journaled.

Beneath the mouth of the hopper is a sealing roll 6 that is rotatable on a horizontal shaft 7 journaled in the frame 5 of the machine. The sealing roll 6 has a plurality of recesses 8 in its periphery corresponding in number to the measuring pockets 4 of the depositing roll 3, and circumferentially spaced so that during simultaneous rotation of the depositing roll and the sealing roll, each pocket 4 will move in to register above one of the recesses 8 as best shown in Figure 2. Journaled in juxtaposed and parallel relation to the sealing roll 6, is a second sealing roll 9 substantially identical in construction with the roll 6 and rotatable on a shaft 10 which is journaled in the frame 5. These rolls are so spaced that they receive and press between them two strips of packaging material 11 and 12, one of which is fed inwardly over each of the sealing rolls, and one of which passes beneath the discharge mouth of the hopper 1. The packaging strips may be of any suitable material such as filter paper, "cellophane," "Pliofilm," metal foil and the like, although the strip 11 on which the material from the hopper is deposited must be porous or perforate for a reason to be described.

At least the sealing roll 6 has each of its recesses 8 adapted to communicate with a suction pump or other source of negative pressure and the bottom of each recess is perforate; for example, it comprises a perforated plate 13 which may be of any suitable shape, depending upon the desired shape of the package. A plurality of radial ducts 14 are formed in the roll 6, one leading from the base of each recess 8 to the periphery of the shaft 7, at least a portion of which within the roll is

3

hollow or tubular as shown in Figure 2 and communicates with the suction pump or source of negative pressure through a packing gland 15 and pipe 16.

Throughout a portion of the periphery of the hollow portion of the shaft 7, the shaft is formed with a slot 17 to establish communication between the ducts 14 and the suction pump, and as shown in Figure 2, the slot is of such length that each recess 8 will be in communication with the negative pressure during its movement from the top of the roll or its position immediately beneath the depositing roll 3 to the position at which said recess registers with or comes into juxtaposition to one of the recesses 8 of the other sealing roll 9.

The recesses 8 of the sealing roll 9 may or may not be connected to a source of negative pressure, depending upon the result desired, although preferably the shaft 10 will be constructed in the same manner as the shaft 7 and the roll 9 will have ducts 14 for the same purpose as the roll 6.

In the operation of the machine so far described, depositing roll 3 and the two sealing rolls 6 and 9 are rotated in synchronism through any suitable means such as a train of gears including the gear 18 on the shaft 19 of the depositing roll which meshes with a gear 20 of the shaft of the sealing roll 6 which, in turn, meshes with a gear 21 on the shaft of the sealing roll 9. Suction is applied to the pipe 16 and the negative pressure draws the package strip 11 into the recesses 8 of the roll 6 tightly against the perforate bottoms of the recesses so as to form a cup-like receptacle into which the substance 2 from one of the measuring pockets 4 is deposited by gravity. The measured quantity of the substance thus deposited is held firmly in the cup-like recess and in contact with the packaging strip by the suction which also carries off any dust that might have been raised by the depositing operation.

This holding action of the vacuum on the substance 2 continues until the substance 2 is moved through rotation of the roll 6 into juxtaposition to one of the recesses in the roll 9. Simultaneously with this rotation of the roll 6, the roll 9 is rotated and the two packaging strips 11 and 12 are sealed together in zones bounding or surrounding recesses 8 so as to form a compartment between the packaging strips for each measured quantity of the substance 2. Either or both of the strips 11 may have a suitable thermo-plastic or adhesive coating for sealing the strips together and, of course, where the coating is thermo-plastic, at least one of the rolls 6 and 9 will be heated in known manner. If desired, the periphery of the rolls may be serrated or crimped in the zones surrounding the recesses 8 so as to crimp or interdigitate the packaging strips to enhance the seal.

This action continues during rotation of the rolls and in accordance with this form of the invention the strip 12 is preferably impervious and another packaging strip 22 is applied over the strip 11 at the side thereof opposite the strip 12, the strip 22 also preferably being impermeate "cellophane" or metal foil. This strip 22 is fed into the apparatus over a third sealing roll 23 which is rotatably mounted on a shaft 24 in the frame 5 in parallelism with and beneath the roll 9 so that the chain of packages comprising the strips 11 having the substance 2 enclosed in compartments therebetween is carried by the roll 9 away from the roll 6, and said package chain is passed between the roll 9 and the roll 23 in such manner that the strip 22 is tightly pressed against

4

the strip 11. It will be understood that suitable adhesive or thermo-plastic coating may be applied to either or both of the strips 11 and 22 for causing proper sealing of the strip 22 to the strip 11, and if desired the roll 23 may be heated.

To provide a clearance for the compartments in the package chain, the roll 23 has recesses 25 in its periphery to register with the recesses 8 in the roll 9.

Where it is desired to sever the package chain into sections, the roll 23 may have radially projecting blades 26 on its periphery to register with slots 27 in the periphery of the roll 9, and these blades may be so constructed as to either actually shear the package strips or merely to score or form a line of perforations in the strip for subsequent division.

Figure 5 illustrates one of the individual packages severed from the package strip, and the various layers are designated with the same reference characters as the corresponding strips 11, 12 and 22 of which the layers form parts respectively. It will be observed that the package substance is sealed between two impervious strips 12 and 22 so as to be protected against moisture, and the porous strip 11 is protected against damage during handling. The package may be entirely opened or torn apart by simply stripping the layer 12 from the layers 11 and 22, and if desired, the sealing of the layer 22 to the layer 11 may be of such nature as to permit the removal of the layer 22 without injury to the layer 11, for example where it might be desired to utilize the layer 11 as an applicator for a powder in the package compartment.

To facilitate the removal of the layer 22, the various strips may be run together in the machine with one edge of the strip 22 extending beyond the corresponding edges of the strips 11 and 12 to provide a flap 28 as a finger grip.

In Figure 6 is shown a modification of the method and machine for producing a different form of package. This machine has identically the same construction and arrangement of the hopper 1, depositing roll 3 and the pockets 4, the sealing rolls 6 and 9 having the recesses 8, and geared together for synchronous operation in identically the same manner as described in connection with the machine shown in Figures 1 to 4 inclusive. However, this machine contemplates the initial two packaging strips 29 and 30 being of porous or perforate material, for example filter paper. The substance 2 to be packaged is deposited on the strip 30 and the strips 29 and 30 are sealed together in exactly the same manner that the substance is deposited on the strip 11, and the strips 11 and 12 are sealed together.

Below the respective sealing rolls 6 and 9, and journaled on the respective shafts 31 and 32, are other sealing rolls 33 and 34 which receive between them the package chain 35 from the rolls 6 and 9. Over the sealing rolls 33 and 34, are led the respective cover strips 35 and 36 formed of impervious material such as metal foil or "Pliofilm." These strips are led over the rolls 33 and 34 at opposite sides of the package chain 35 and are pressed into tight contact with the respective strips 30 and 29, the peripheries of the rolls 33 and 34 being formed with flat portions or recesses 37 to provide clearance for the package compartments 38 in the chain 35.

The contacting surfaces of the strips 35 and 30 and the strips 36 and 29 will be joined by a suitable binding material such as adhesive or thermo-plastic coating, and the zones of the peripheries

5

of the rolls 33 and 34 bounding the flat portions or recesses 37 will firmly seal the strips 35 and 36 to the respective porous strips 30 and 29 in bounding relation to the compartments 38. It will be understood that such binding material or adhesive must be of such nature and quantity as to permeate the edge portions 39 of the porous strips 29 and 30 that lie in the sealed zones of the layers as shown in Figure 7 so as to prevent the entrance of moisture or other foreign matter through the exposed edges of the porous material.

The package chain 35 may be divided into sections in any suitable manner, for example with blades and slots in the rolls 33 and 34, like the blades 26 and slots 27 in the rolls 23 and 9; or by suitable shearing blades 40 and 41 beneath the rolls 33 and 34.

While I have shown and described the invention as embodied in certain details of construction and method steps, it should be understood that this is primarily for explaining the principles of the invention and the now preferred form of the machine, and that the steps of the method and the structural details of the machine may be widely varied by those skilled in the art within the spirit and scope of the invention.

What I claim is:

1. A packaging machine, including two parallel rotatable sealing rolls to receive and press layers of packaging material between them for sealing such layers together, one of said rolls having a plurality of circumferentially spaced recesses opening through its periphery, means for connecting said recesses to a source of vacuum whereby a layer of porous packaging material passing around said roll will be drawn by suction into said recesses, means for rotating said rolls in opposite directions, and means for depositing predetermined quantities of a commodity on the zones of the exposed side of such a layer of packaging material that overlie said recesses, whereby said commodity quantities will be drawn and held upon said layer of packaging material by suction in the respective recesses and will be enclosed between said layers.

2. The packaging machine as defined in claim 1 with the addition of means for securing a third layer of packaging material to the other side of the first-named layer.

3. A packaging machine including a rotatable roll over the periphery of which a layer of packaging material is to run as the roll rotates, said roll having a plurality of circumferentially spaced recesses opening through its periphery and means

6

for connecting said recesses to a source of negative pressure whereby such a layer of material will be drawn by suction into said recesses to form pockets, and means operable in timed relation to rotation of said roll for depositing quantities of a commodity upon such a layer of packaging material, each quantity in one of said pockets.

4. The packaging machine as defined in claim 3 with the addition of means for securing a second layer of packaging material to the first-named layer to inclose said commodity quantities between them.

5. A packaging machine, including means for supporting a layer of porous packaging material to receive a commodity to be packaged, means for applying suction to draw and hold a commodity on such a layer of porous packaging material, means for securing a second layer of packaging material to the first-named layer to enclose such commodity between said layers, and means for securing a third layer of packaging material to the side of said first-named layer opposite the second-named layer.

6. A packaging machine, including means for supporting a layer of porous packaging material to receive on one side thereof a commodity to be packaged, said means including a suction chamber at the opposite side of said layer for drawing and holding a commodity on such layer of material, means for securing a second layer of packaging material to the first-named layer to enclose such commodity between said layers, and means for securing a third layer of packaging material to the side of said first-named layer opposite the second-named layer.

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