

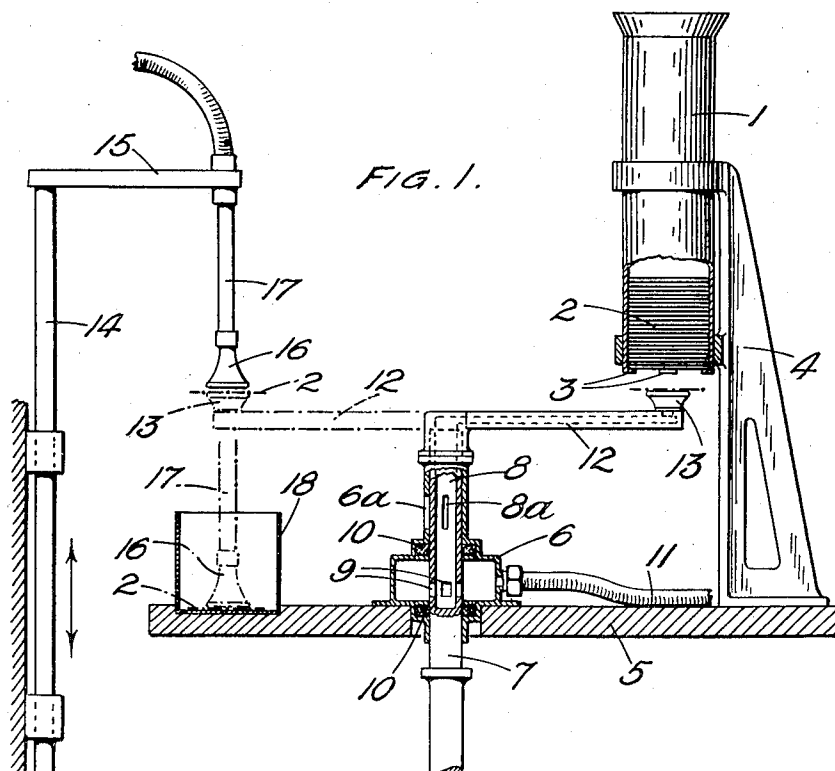
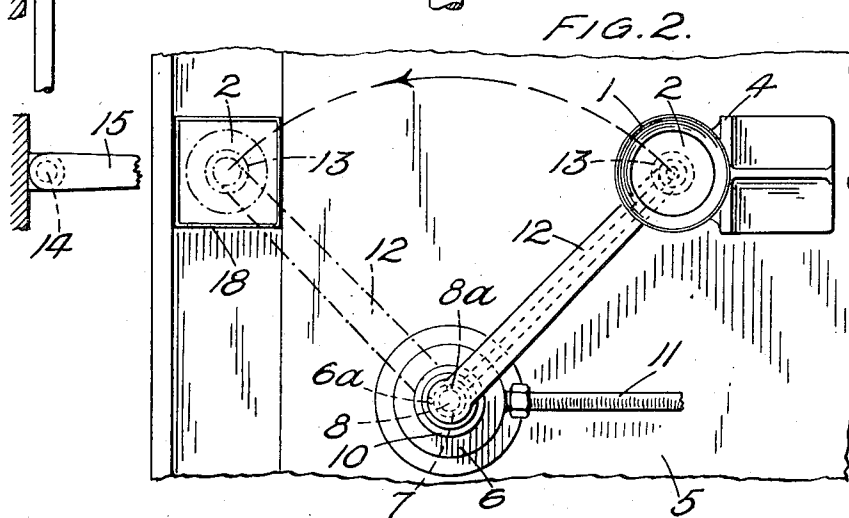
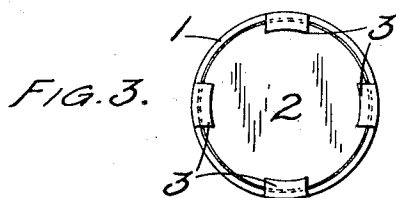
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FEEDING FLEXIBLE DISKS

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FEEDING FLEXIBLE DISKS

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10 Claims. (Cl. 271—5)

This invention relates to the feeding of flexible disk-shaped articles such as labels, gaskets and the like, for use more particularly in conjunction with machines in which such articles are required to be supplied singly in continuous succession to a certain point or position in the course of a manufacturing or manipulating process.

It has already been proposed to feed disk-shaped articles one at a time with the aid of suction means adapted to carry out a repeated cycle of operation in the course of which said means pick up the uppermost article from the top of a stack of disk-shaped articles and transfer the same to a desired position where it is released by the cutting off of the vacuum from the suction means.

Such arrangements have however two main drawbacks. In the first place means must be provided for maintaining the level of the top of the stack substantially constant, which implies lifting the stack progressively as the articles are withdrawn. In the second place, replenishing of the stack can only be effected when the apparatus is at a standstill and may therefore necessitate frequent interruptions of working.

According to the present invention these drawbacks are obviated by withdrawing the articles singly from the bottom of a stack by one set of suction means and transferring the withdrawn article to a second set of such means for deposition where required.

The invention therefore consists broadly of a method of transferring flexible disks singly from a stack according to which the lowermost disk of the stack is withdrawn by a suction device and transferred to a second suction device and thence deposited in a desired position.

According to a further feature of the invention, the articles to be fed are stacked in a relatively close fitted tubular hopper which is open at both ends, the stack being prevented from dropping out of the hopper by means of a plurality of lugs extending inwards from the lower edge of the hopper. I have found that if these lugs be of sufficiently small dimensions, particularly in a radial direction it is possible to withdraw sufficiently flexible disk articles reliably one at a time with the aid of a suction head which is caused to carry out a short upward butting movement against the middle of the base of the stack with vacuum established, followed by a downward movement. The inherent flexibility of the article enables it to be drawn down past

the retaining abutments which arrest the remainder of the stack.

The invention further comprises apparatus by which the method is carried into effect.

In the accompanying drawing the invention is illustrated purely diagrammatically, Figure 1 being an elevational diagram, Figure 2 a plan thereof and Figure 3 an underside view of the container for the disk articles being dealt with.

Referring to the drawing, the numeral 1 designates a container for a pack of disk shaped articles 2, such as labels, gaskets and the like. The stack of disks are retained in position in the container by means of inturned lugs 3, which may be four in number, equally spaced one from the other, as shown in Figure 3.

This container is suitably supported, for example by means of a bracket 4 from a table 5. Attached to this table is a vacuum chest 6 and through this chest a rod 7 is adapted to slide vertically and also partially rotate. The upper end of this rod is hollow, as indicated at 8, and slots 9 in its wall ensure that this hollow end is open to the vacuum chest. The vacuum chest is provided with air tight glands 10 and the position of the slots 9 is such that they always remain in the vacuum system in spite of the vertical reciprocating movement of the rod 7. The vacuum chest is connected to a source of vacuum by way of a flexible pipe 11 and a timed valve of any known form is provided in the vacuum pipe line by means of which the chest 6 is placed under vacuum and the vacuum broken to accord with the desired sequence of operations hereafter to be described. At the top of the hollow end 8 of the rod 7, a hollow arm 12 is provided which terminates in a suction head or cup 13.

Adjacent the container 1 and the adjuncts before described is a second vacuum system which consists of a pipe system 14 and 15, provided with a suction head or cup 16 and the pipe 17 to which this suction head or cup is attached is capable of vertical up and down movement either bodily with the pipe system 14 and 15 or by itself by sliding through packing glands of a suitable vacuum chest, for example, as previously described with relation to the hollow ended rod 7.

The suction head of cup 16 is of fixed position angularly and is located above the position where it is desired that a disk taken from the container 1 should be deposited. This position is indicated, in Figure 1 of the drawing as a container 18.

Timed valve means of common form will be provided to ensure the establishing and breaking of the vacuum in the system the operation of which is as follows:

Starting with the position shown in the drawing a valve in the vacuum system will be in position to establish a vacuum in the vacuum chest 6 and by means of a rotating cam or any other suitable device the suction cup 13 is moved into abutment with the centre of the lowermost of the disks 2 in the open ended hopper or container 1. The hollow ended rod 8 now moves down carrying with it the arm 12 and the suction cup 13 and this movement serves to flick the lowermost disk, which is firmly held at its centre on the suction cup, out of the hopper and carry it clear of obstruction by the hopper. The arm 12 now swings from the position shown in full lines in Figures 1 and 2 to the position indicated by the dotted lines carrying the disk 2 to its position immediately beneath the suction head or cup 16.

This suction head or cup 16 is maintained under vacuum and thus sucks up the disk from the suction cup 13. The valve timing is such that at this instant the vacuum in the system terminating in the cup 13 is broken by the port 8a registering with the port 6a the latter opening to atmosphere and the disk is picked up by the suction cup 16 without any opposition from the suction cup 13. The arm 12 now swings back to its position with the suction cup 13 beneath the hopper 1 and vacuum is again established and at the same time the cup 16 descends into the container 13, the vacuum in the system constituted by the pipes 14, 15 and 17 is broken and the disk is deposited in the bottom of the container. The suction cup 16 returns to its upper position ready to receive the next disk and the cycle is repeated. It will be understood that the foregoing is given by way of example only, the details of construction can obviously be designed in many different ways so long as the desired timed movements of the elements and corresponding valve operations result in the proper functioning of the apparatus.

Although the invention is applicable to a large number of uses, it is particularly suitable for use in conjunction with the packing method and apparatus described in my co-pending application Serial No. 405,632, filed August 6, 1941, for feeding labels into the bottom of containers made of transparent material or for applying seals to finished packed units.

What I claim and desire to secure by Letters Patent is:

1. Apparatus for transferring single flexible disk like elements singly from a stack comprising an open ended hopper or container into which a stack of disks is introduced and supported in position by lugs intumed from the periphery of the hopper, a first suction cup or head adapted to be moved up into abutment with the centre of the lowermost disk of said stack and attach itself thereto by suction and then to move down and draw or flex said lowermost disk past the supporting intumed lugs, means for moving said suction cup carrying the disk to a second position beneath a second suction cup, means for breaking the vacuum operating the first suction cup and establishing vacuum to the second suction cup to release the disk from said first suction cup and permit its transfer to said second suction cup and means for enabling said

second suction cup to move to transfer said disk to a desired location and release it.

2. Apparatus according to claim 1, wherein the suction cup for withdrawing the lowermost disk from the hopper is carried by an arm capable of moving vertically to carry the cup into and out of contact with the lowermost disk in the hopper and also angularly to transfer the extracted disk to a second position beneath a second suction cup, while the vacuum to the first mentioned suction cup is maintained.

3. Apparatus according to claim 1 having means whereby when the disk carried by the first suction cup reaches its secondary position with the disk carried by it beneath the second suction cup, the vacuum operating the first suction cup is broken and the vacuum operating the second suction cup is established, whereby the disk is released from the first suction cup and picked up by the second suction cup.

4. Apparatus according to claim 1, wherein the second suction cup is capable of being moved to its position ready to receive the disk from the front suction cup and vacuum condition to ensure operation of the said second suction cup established and then moved to the position where the disk is to be deposited and the vacuum broken to release the disk.

5. Apparatus for transferring single flexible disk-like elements singly from a stack comprising an open ended hopper or container into which a stack of disks is introduced and supported in position by lugs intumed from the perimeter of the bottom of the hopper, said lugs being of such dimensions as to support the stack of disks in the hopper but permit of their being withdrawn one by one from the bottom of the stack by flexure past the supporting lugs, a front suction cup or head adapted to be moved up into abutment with the centre of the lowermost disk of the stack and attach itself thereto by suction and, then to move down and draw or flex said lowermost disk past the supporting intumed lugs, means for moving the suction cup carrying the disk to a second position beneath a second suction cup, means for breaking the vacuum operating the first suction cup and establishing vacuum to the second suction cup to release the disk from the first suction cup and permit its transfer to the second suction cup and means for enabling the second suction cup to move to transfer the disk to a desired location and release it.

6. Apparatus for transferring single flexible disk like elements singly from a stack comprising an open ended hopper or container into which a stack of disks is introduced and supported in position by lugs intumed from the periphery of the hopper, a front suction cup or head adapted to be moved up into abutment with the centre of the lowermost disk of the stack and attach itself thereto by suction and then to move down and draw or flex said lowermost disk past the supporting intumed lugs, means for moving the suction cup carrying the disk to a second position, means for removing the disk from said suction cup after the same had moved into said second position and means for moving said suction cup after removal of said disk back into operative position under said hopper or container.

7. Apparatus for transferring single flexible disk like elements singly from a stack comprising an open ended hopper or container into which a stack of disks is introduced and supported in position by lugs intumed from the periphery of the hopper, a front suction cup or

head adapted to be moved up into abutment with the centre of the lowermost disk of the stack and attach itself thereto by suction and then to move down and draw or flex said lowermost disk past the supporting inturned lugs, means for moving the suction cup carrying the disk to a second position, means for breaking the vacuum operating said suction cup, means for removing the disk from said suction cup after said vacuum has been broken, and means for moving said suction cup after removal of the disk back into operative position under said hopper or container.

8. Apparatus for transferring single flexible disk elements singly from a stack comprising means for supporting a stack of disks, a first suction cup or head adapted to be moved into abutment with the lowermost disk of said stack and attach itself thereto by suction, a second suction cup, means for moving said first suction cup with said lowermost disk attached thereto to said second suction cup, means for releasing said disk from said first suction cup and permitting its transfer to said second suction cup, and means for enabling said second suction cup to transfer said disk to a desired location and release it.

9. Apparatus for transferring single flexible disk like elements singly from a stack comprising an open ended hopper or container into which a stack of disks is introduced and supported in position by lugs inturned from the periphery of

the hopper, a first suction cup or head adapted to be moved up into abutment with the centre of the lowermost disk of said stack and attach itself thereto by suction and then to move down and draw or flex said lowermost disk past the supporting inturned lugs, a second suction cup, an arm carrying said first suction cup, means adapted to move said arm vertically to carry said first suction cup into and out of contact with the lowermost disk in the hopper and also angularly to transfer said first suction cup with the extracted disk to a second position beneath said second suction cup while the vacuum to said first suction cup is maintained, means for breaking the vacuum operating said first suction cup and establishing vacuum to said second suction cup to release said disk from said first suction cup and permit its transfer to said second suction cup, and means for enabling said second suction cup to move to transfer said disk to a desired location and release it.

10. Process of transporting disks singly from a stack of disks, comprising removing the lowermost disk of said stack by suction means, moving said suction means with said disk into such a position that said disk is coming into contact with other suction means, and transferring said disk to said other suction means by which latter said disk is deposited where required.

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