Jan. 23, 1962 R. G. BROWN 3,017,829

COMBINED VACUUM PICK UP AND PRINTER

Filed June 17, 1960

FIG. 1

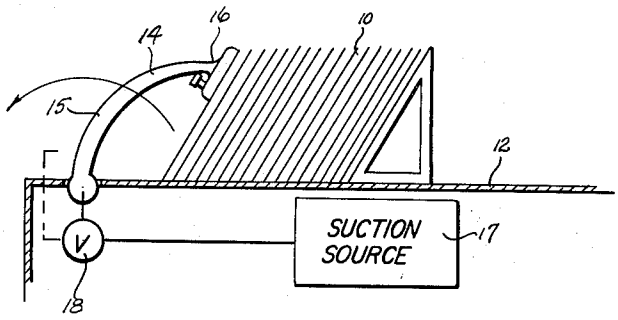


FIG. 2

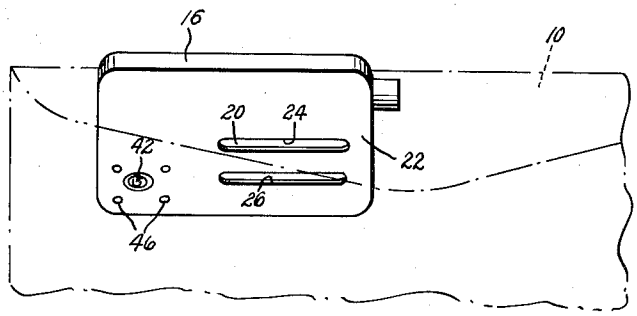


FIG. 4

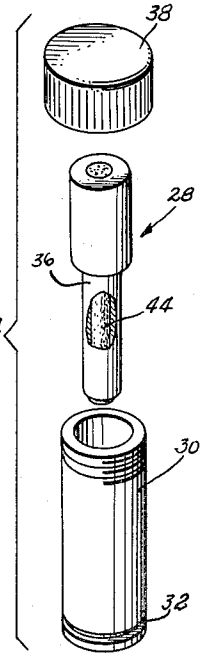
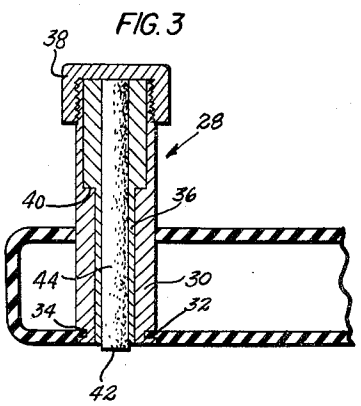


FIG. 3



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United States Patent Office 3,017,829 Patented Jan. 23, 1962

3,017,829

COMBINED VACUUM PICK UP AND PRINTER

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Filed June 17, 1960, Ser. No. 36,804
10 Claims. (Cl. 101—327)

This invention relates to article transport devices and particularly to pick up devices provided with means to surface code the articles handled thereby.

There are numerous article handling procedures and equipment where individual articles must be displaced. More specifically, the articles may be fed into a machine by mechanical transport devices, removed from a machine, or be handled as an intermediate step within the operation of a machine or group of machines. It is often necessary or desirable to apply a mark of one kind or another on the articles. Such marks may be for coding, identification, or for other purposes.

Accordingly, an object of this invention is to provide a transport device with means for marking the articles as they are being handled by the transport device.

U.S. Patent No. 2,792,219 issued to F. Van Marle discloses mail handling equipment having a pickup which pneumatically retains a letter on the face of a head as it is being displaced from one position to another. Under some operating conditions, it is desirable to mark the letters somewhere along the line of travel from the input to the output of the machine.

Rabinow Patent No. 2,912,925 discloses a code printing and sorting station for mail wherein a pneumatic pickup transport moves letters from a pickup position to a printing station, at which a separate printer makes an impression on the letters prior to directing them to individual pockets. The Rabinow patent requires separate sequential transport and printing procedures.

Another object of this invention is to simplify and unify the transporting and printing procedures on articles which are displaced by a pneumatic pickup. This is accomplished by having a marking device, for instance a printer, incorporated as a part of, or attached to, the pneumatic pickup. An inherent advantage flowing from such an arrangement is that the same suction to hold the article adhered to the face of the pickup head, is used to draw the article against the face of the printing device so that a clear impression is made during transit time.

Although the Rabinow patent is referred to as one instance wherein a separate printing operation may be combined with a transport procedure, another problem is solved by the invention. Some equipment is manually controlled, and it is desirable to know the identity of the operator of the equipment handling specific work. In one form of the invention the printing face is made easily removable and replaceable so that the operator of the equipment may insert his identifying printing face in the pickup when the operator begins to use the machine.

One of the features of the invention is that the technique disclosed herein may be successfully used with letter mail. Many envelopes are of different textures, configuration, and degree of multilation. By relying on suction to pull at least the outer layer of the envelope firmly against the face of the head, the region of the envelope immediately adjacent to the printing face is drawn tightly against the printing face, thereby obtaining a good impression even if the envelope is wrinkled or otherwise multilated. Furthermore, if there is an object of considerable thickness in the envelope, for instance a coin or key, the front layer of the envelope is pulled against the printing face from the front of the envelope to obtain a full impression regardless of the presence of the coin which may be directly behind the printing face.

Other objects and features of importance will become apparent in following the description of the illustrated form of the invention.

FIGURE 1 is a diagrammatic view showing the article transport and printer in a typical application.

FIGURE 2 is a bottom perspective view of the head of the transport and printer.

FIGURE 3 is a fragmentary sectional view showing the printer installed in the head.

FIGURE 4 is an exploded perspective view of the printer.

In the accompanying drawing, attention is invited to FIG. 1 showing a group of articles 10, e.g. letters, on a supporting surface 12. A pneumatically operative and mechanically moved article transport 14 is shown operatively related to the articles 10. The transport is a pick up device such as referred to in the Rabinow patent and disclosed in the Van Marle patent, and is composed of a swinging arm 15 having a suction passageway registered with head 16 at the outer end of the arm. A source 17 of suction is communicated with the passageway in the arm. Articles 10 are removed from the head 16 by being stripped therefrom as disclosed in the Van Marle patent either or without momentarily relieving the vacuum, or by momentarily opening a vent valve such as valve 18 interposed in the suction line between the source and the transport. If a valve is used, it may be mechanically or electrically operated by or with movement of arm 15, as shown by the dotted line in FIG. 1.

Head 16 has a suction chamber 20, and the head is preferably made of rubber or some other resilient substance. The head has a wall 22 whose outer surface is an article engaging surface which is provided with openings 24 and 26 communicating with chamber 20. My invention provides a marking unit 28 which is preferably a printing unit. The unit is carried directly by the head 16 and consists of casing 30 having a groove 32 near the lower open end thereof and into which a circular key 34 is fitted. The key may be an integral part of the head, and its purpose is to attach the casing 30 to the head. A support member such as sleeve 36, is separably mounted in the casing 30 and is held in place suitably, for instance by cap 38 threaded or otherwise secured to the casing 30. Shoulder 40 on sleeve 36 seats upon another shoulder in casing 30 to cooperate with cap 38 in holding the sleeve in a fixed position with respect to the casing 30.

Printing face 42 is formed at one end of the sleeve 36 and is located at approximately the same level as surface 22, protruding only slightly therefrom. The printing face is at one end of a unique printing substance 44 contained in sleeve 36. Substance 44 has served the purpose for which it is intended very well although other forms of a coding material supply may be resorted to. I prefer to use a product known as "Porelon" which is the trademark of S. C. Johnson & Co., Inc., for a micro-porous, micro-reticulated plastic composition made under U.S. Patent No. 2,777,824. This substance, when used in accordance with the suggestions of the manufacturer, provides a self-contained reservoir of printing material, and may be molded to a specific shape to form a printing face such as face 42. In use, the liquid in the substance feeds to the printing face by capillary action. Although a numeral has been shown as the face, it is evident that any kind of a mark may be used.

There are one or more suction openings 46 (FIGURE 2) provided in wall 22 adjacent to face 42. The openings 46 register with chamber 20 so that there is a localized region of high suction near the printing face. The purpose is to make certain that the part of the letter envelope adjacent to the printing face is tenaciously drawn against the printing face 42 to obtain a good impression on the

envelope. The number and configuration of openings **46** may be varied.

The use and operation of the article transport and printer has already been discussed. However, it is to be understood that even though letters are identified as the articles handled by the pickup, other articles may be handled such as sheets, panels, packages, etc. Further, unit **28** is shown installed as a separate component in the head **16**. This is unnecessary in that the head may be molded or otherwise constructed with a holder as an integral part thereof, and only the face assembly made of substance **44** and its sleeve **36** made removable. Numerous other variations and uses falling within the scope of the following claims may be resorted to. For instance, it is common to date and/or batch code labels for medicines, vitamins, etc., before they are applied to the ampules, bottles or other containers. My invention materially facilitates this procedure by coding the labels while they are being transported in the course of machine handling.

I claim:

1. In combination, a pneumatic transfer device having a flat surface for article contact, a suction passageway opening through said surface to provide a suction opening, and a self-contained printing unit including a printing substance supply secured to said device and having a printing face held immovable with respect to said surface, and said face being disposed near said surface to be engaged by the article attracted to the surface.

2. The combination of claim 1 wherein there is an additional suction opening in said head near said face to provide a localized region of high suction attraction on the article.

3. In a movable device to pick up an article from a suppply and to transfer the article from one location to another, a pickup head having an article contacting surface providing an essentially flat area for the article, said head having an article attracting suction opening in said surface for article pick up, suction producing means communicating with said opening through said head to attract the article to said surface, and hold the article flush against the surface during pick up and transfer, a self-contained ink supply and printing face, and means supporting said face approximately flush with said surface so that when an article is picked up by suction and adhered to said surface by the same suction to be displaced by movement of said device, the article is pressed against said face by the said suction.

4. The device of claim 3 wherein said means supporting said face include a support attached to said head, and

a member separably connected to said support and containing a printing substance, said face being composed of a portion of said printing substance protruding beyond a part of said member.

5. The device of claim 4 wherein the portion of said head defining said surface is resilient, and said surface has a suction opening adjacent to said printing face to provide a localized region of high attraction on the article to press the article against said printing face.

6. In a machine to transfer articles of mail having flexible portions from one position to another wherein the machine has a movable pneumatic pickup provided with a suction head, the improvement comprising a printing unit connected to said suction head and capable of thousands of impressions without servicing said unit, said unit constituting the entire printing means and having a support, a printing face secured to said support and held approximately flush with the article retention surface of said head so that the head suction draws a flexible portion of he article against said face for making a printing impression on the article while it is in transit, and a substance in said support containing a copious supply of ink, said face being made of a part of said substance.

7. The subject matter of claim 6 wherein said substance is micro-porous and micro-reticulated with the ink flow achieved by capillary action.

8. The subject matter of claim 7 wherein said support has a member containing said substance, and said member is removable from the head for replacement with another member having a different face.

9. In a pneumatic device to pick up and transfer articles from one place to another by the suction of a suction source, a pick up head connected with said source and having walls defining a suction chamber, one of said walls being resilient and essentially flat to provide a contact area for an article, a self-contained printing unit, and means securing said self-contained unit to said head for movement therewith, said unit having a face approximately flush with said contact area, and said resilient wall having a suction opening therein to attract and hold the article during pick up and transfer.

10. The device of claim 9 wherein said resilient wall has means, additional to said suction opening, near said unit face to draw the portion of the article at said face against the face to assure a good printing impression.

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