June 11, 1935. A. VORMS 2,004,882

APPARATUS FOR DELIVERING FLAT ELEMENTS ONE AT A TIME, MORE ESPECIALLY FOR DELIVERING ENVELOPES TO AN OBLITERATING MACHINE

Filed Jan. 30, 1933 2 Sheets-Sheet 1

Fig.1.

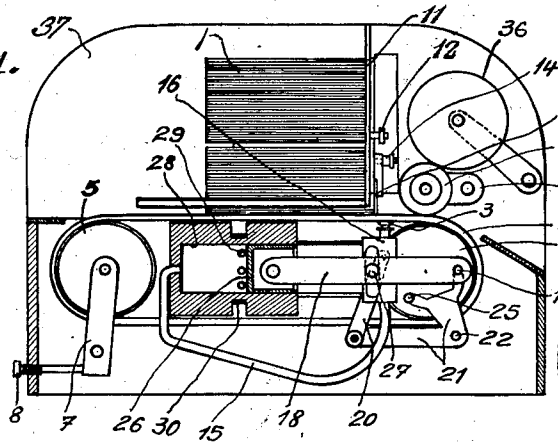
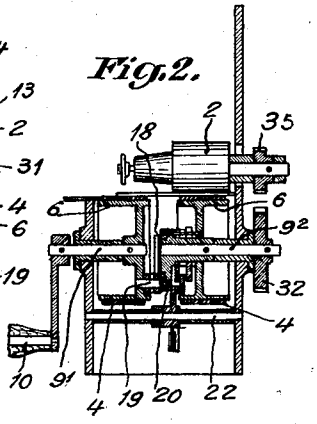


Fig.2.



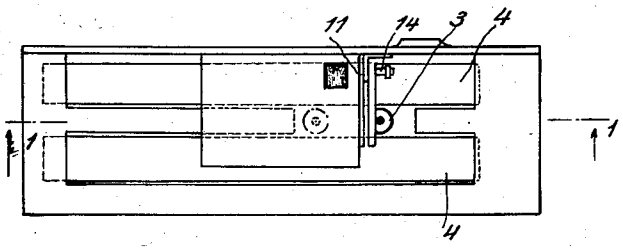


Fig.3

Fig.4

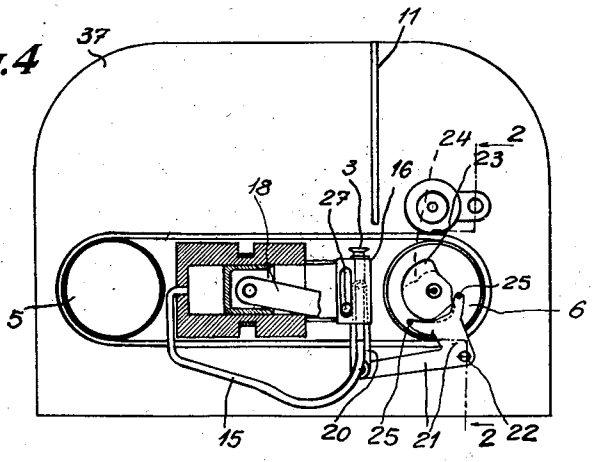
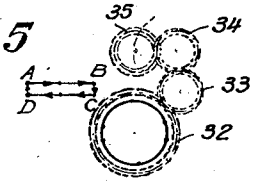


Fig.5



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Fig. 6

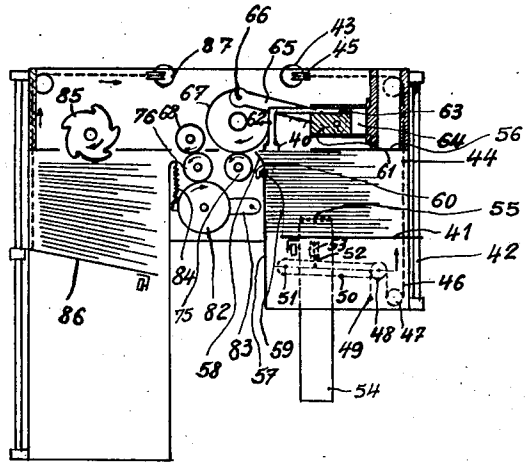
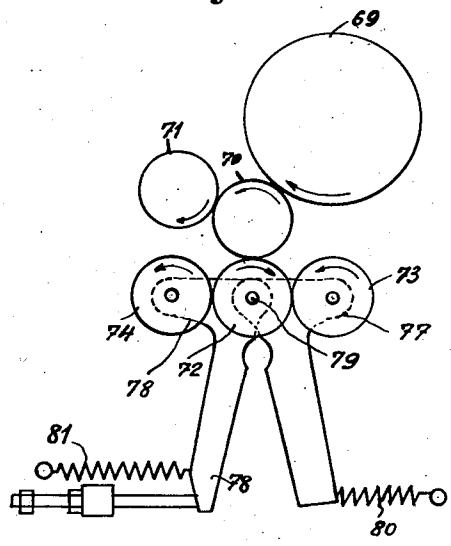


Fig. 7



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APPARATUS FOR DELIVERING FLAT ELEMENTS ONE AT A TIME, MORE ESPECIALLY FOR DELIVERING ENVELOPES TO AN OBLITERATING MACHINE

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In Luxemburg February 2, 1932

2 Claims. (Cl. 271—32)

This invention relates to an apparatus designed to deliver one at a time flat elements or objects previously stacked, such as envelopes and it has also for its object the combination of an apparatus of that kind with an obliterating machine.

This apparatus according to the present invention is essentially characterized by the arrangement of at least one air suction valve having a reciprocating motion which when in its first position engages the first envelope of the pile and which is connected with a vacuum source in such a manner that a suction is produced at the valve mouth during the forward stroke so that during said stroke the envelope which adheres to the air suction valve is carried along by same.

According to a first mode of execution in which a resilient air suction valve of rubber for instance, is used, another characteristic of the invention consists in that the alternate movement of said valve is combined with two movements taking place transversely to the first at the end of every forward and return stroke, in such a manner that the air suction valve first engages itself the first envelope of the pile and effectively disengages itself from same when it has carried it to the desired point.

According to another mode of construction in which a rigid air suction valve, a metal valve for instance, is used, the latter effects a rectilinear reciprocating movement only and in the case when the envelopes are placed on edge, another feature of the present invention consists in that the whole of the envelopes are pressed towards the air suction valve by means of a movable wall or shutter continuously acted upon by a weight or the like, a return device which may be actuated at will by the operator being provided to move said shutter backwards when all the envelopes have been delivered.

Another feature of the invention consists in the fact that the pile of envelopes is supported against a movable or a stationary slide provided with a longitudinal opening designed to allow the free movements of the air suction valve.

In the case of a movable slide the same consists in two movable endless bands which support the envelope during its travel under the action of the air suction valve or valves.

Concerning the feeding of the air suction valve by a vacuum source, according to a preferred mode of execution, an important feature of the present invention consists in that the valve support is coupled with a piston reciprocating in a cylinder in communication with the air suction valve so that the necessary suction is produced simultaneously with the forward stroke of the air suction valve.

In the case of an air suction valve which accomplishes the compound movement as above indicated, the cylinder is connected at its lower part with the air suction valve by means of a flexible pipe.

In the case of an air suction valve which accomplishes merely an alternate rectilinear movement, said valve is advantageously connected with the inside of the cylinder through a passage formed in the piston and extended by a rigid pipe acting as support for the valve.

In order to assist in separating the air suction valve from the envelope at the end of the stroke, there may be formed in the cylinder wall, according to the present invention openings communicating with the atmosphere which are closed by the piston at the end of the forward stroke.

In the case of the combination of the above delivery apparatus with a machine for obliterating envelopes, an essential feature of the present invention consists in that the path of the envelope ends at a point which is located beyond the feeding elements of the machine, in order to facilitate the separation from the air suction valve, this allowing the use of a metal air suction valve moving simply in a straight line without the necessity of providing in the cylinder the "orifices" of communication with the atmosphere at the end of the stroke of the piston which moves jointly with the air suction valve.

The obliterating drum itself may constitute one of the feed devices of the machine the other one being constituted by the endless band carrier.

Other characteristic details of the invention will appear as this specification proceeds with reference to the accompanying drawings which illustrate by way of example two practical constructional forms of the delivery apparatus according to my invention.

Figs. 1 to 5 illustrate a first mode of execution.

Fig. 1 is a front view, some parts being shown in section on line 3—3, Fig. 3.

Fig. 2 is a sectional view made along the broken line 2—2, in Fig. 4.

Fig. 3 is a plan view, certain parts being omitted.

Fig. 4 is another front elevation corresponding to an operative position different from that shown in Fig. 1, some parts being omitted.

Fig. 5 is a diagram which illustrates the operation of certain parts of the machine.

Fig. 6 is a diagrammatic plan view of a modified construction.

Fig. 7 is a diagrammatic detail view of the gear wheels drawn on a larger scale.

Referring now to Figs. 1 to 4, in the first mode of construction, the envelopes **1** are for example laid flat one upon the others. They could also be placed vertically in contact with one another at any desired angle.

The envelopes are designed to be obliterated as they pass between two devices the first being constituted by a printing drum **2** and the other by another drum or as shown by two bands **4** having a translating motion.

The device provided for delivering one by one the envelopes to be obliterated comprises one air suction valve **3** at least, made of india rubber for instance and having a reciprocating movement as will be hereinafter explained.

In the case when the envelopes are stacked in a vertical pile as shown in Fig. 1, the air suction valve **3** is placed under the last envelope in the pile that rests upon the two bands **4** already mentioned which are carried upon two sets of pulleys **5**, **6** with a clearance between them to allow the free movements of the air suction valve.

It will be evident that in the case of the feeding drum being arranged to co-operate with the obliterating drum **2** the bands being consequently omitted, the pile of envelopes may be supported upon a smooth table provided with a slot to allow the passage of the air suction valve.

The air suction valve may also be placed above the uppermost envelope, the pile of envelopes being then supported upon a movable bottom devised in such a manner that the said uppermost envelope always remains sensibly on the same level.

When the envelopes are put in juxtaposition vertically for instance, the air suction valve would be placed upon one or the other end surface of the pile. Fig. 1 then corresponds to a plan view of this arrangement.

The bands **4** are preferably made of resilient material and one set of pulleys **5** is advantageously mounted upon a movable frame **7**, preferably pivoted so as to allow of adjusting the tension of the bands by means of a screw **8**.

The two remaining pulleys **6** are secured either upon a common shaft or upon two shafts placed in alignment and capable of being driven either manually by means of a hand lever **10** or by a motor, the common axis of said shafts being advantageously below that of the printing drum **2**.

The magazine in which the envelopes to be obliterated are contained is advantageously provided on the delivery side with a movable wall **11** the vertical movements of which may be controlled by means of a screw **12** so as to allow of adjusting the space between the lower edge of said wall and the bands **4** according to the thickness of the envelopes. The said edge is preferably provided with a flexible band **13** of india rubber for example, which may itself be displaced vertically upon the wall **11** by means of a screw **14**.

The magazine may be constituted by the wall **11** only and another wall **37** perpendicular to the first and integral with the machine frame. It will be advantageous in that case to give a slight inclination to the bands **4**, or to the whole of the machine in such a way that the corresponding edges of the envelopes may always bear upon the walls **11** and **37**.

The air suction valve **3** which is connected with a vacuum source hereinafter described, by means of a flexible pipe **15** for example is carried upon a guide **16** driven by a connecting rod **18** drawn by a crank pin **19** which rotates with the pulleys **6** to effect a sliding reciprocating movement. The crank pin **19** is secured for example upon the pulley **6** which is secured upon the shaft 9^1 on the one part, and upon a part **20** secured upon shaft 9^2 on the other part. In this manner the shafts 9^1 and 9^2 are connected together while allowing the movements of the connecting rod **18**.

The air suction valve **3** is slidingly mounted in the guide **16** so as to be able to move away from its operative plane, by the intermediary of suitable driving means and to return at the end of its return stroke.

To this end the air suction valve rod may be pivotally mounted for example upon a lever **20** itself pivoted to one end of a bent arm **21** which may oscillate around a stationary shaft **22**. The arm **21** is provided beyond its axis **22** with a fork like extension carrying two rollers **25** which may be moved by means of cams **23**, **24** drawn in the rotary movement of the shaft 9^2 and suitably shaped to produce the one the sinking of the air suction valve and the other its rising.

It will easily be seen that the rotation of the shafts 9^1, 9^2, by means of the hand lever **10** produces on the one part the feeding of the bands **4** and, on the other part, the alternate movements of the air suction valve along a path A B C D in Fig. 5, A and B corresponding respectively to the moment when the said air suction valve engages the envelope to be delivered and to the moment when it frees it, and the path C D corresponding to the return stroke of said air suction valve.

During the stroke A B the air suction valve is fed from a vacuum source which may be separate from the apparatus and in that case clap valves suitably actuated at both ends of the stroke are provided, but it will be preferable to make use of the following device.

The connecting rod **18** which actuates the air suction valve guide **16** by means of a spur **27** sliding in a slot in said guide is connected with a piston **26** mounted in a stationary cylinder **28** the inside of which is put in communication through the flexible pipe **15** with the air suction valve **3**. This cylinder is provided with orifices **29** connecting it with the atmosphere, and which are designed to be uncovered when the piston comes in the position corresponding to the moment when the air suction valve reaches point B. The orifices **29** may eventually be controlled by means of an annular perforated shutter **30**. They may be if necessary connected with an air compressor in order to cause the vacuum effect to cease very rapidly at this end of the air suction valve course.

It will easily be seen that the last envelope in the pile is engaged by the valve through the vacuum effect created by the movement of the piston when said valve itself moves from A to B. At the end of the stroke the orifices **29** are uncovered and the vacuum effect ceases so that the air suction valve is instantaneously set free. At that instant however the front edge of the envelope is gripped between the obliterating drum **2** and the bands **4**, and the obliteration takes place while the air suction valve moves from C to D and then from D to A where it engages another envelope and so on.

During the return stroke C D, the air driven by the piston is freely exhausted through the flexible pipe and the air suction valve.

As they leave the obliterating drum the en-

velopes may be received in baskets or taken up by suitable transporting means.

It will be evident that in this mode of execution the movements of the air suction valve may be produced in such a manner that during the path A B the translating speed of the air suction valve is equal to that of the bands 4 and it will also be evident that several air suction valves may be utilized.

In the mode of construction shown in Figs. 6 and 7 the envelopes are placed on edge against each other, and the whole is pressed in the direction of the air suction valve 40 by means of a wall or shutter 41 which is guided upon a bar 42 and is drawn gradually by a weight 43 by the intermediary of a rope 44 which passes upon a pulley 45.

A second rope 46 is attached to the shutter 41, it passes upon a stationary pulley 47 and then upon a loose pulley 48 forming two substantially parallel strands and it is lastly secured at a fixed point 49. The pulley 48 is carried upon a lever 50, pivoted at 51 upon which is attached, between said pulley and said pivot a rope 52 which passing upon a return pulley 53 is secured at its other end to a foot lever 54 pivoted at 55.

It will be understood that when it is desired to move back the shutter 41 for adding new envelopes to the pile or to replace the pile by another, it will be sufficient to lower the foot lever 54. There will thus be produced, with a large multiplication, a backward movement of the end of the rope 46, that is secured to the shutter and consequently the backward movement of same which puts the weight under tension.

The air suction valve against which the pile of envelopes comes to rest is slightly in front of a vertical plate extending along the whole front of the machine the first envelope in the pile being moved by the air suction valve in parallel with said bar.

The vertical edges of all the prepared envelopes bear upon a wall 57 perpendicular to the plate 56 and ending in a small metal shutter 58 pivoted at 59 acted upon by a spring 60 designed to resiliently press it against said plate so that only the envelope which is guided by the air suction valve may pass beyond this obstacle.

In this mode of execution the air suction valve is preferably made of metal and is rigidly connected to a piston 61,—having its axis in parallel with the plate 56—, by means of a conduit 62 which ending in a passage 63 in said piston connects said valve with the inside of the stationary cylinder in which the piston moves.

The piston 61 is connected by means of a connecting rod 65 with a crank pin 66 secured upon a hand wheel 67 acting as a roller which is designed to move the envelope fed by the air suction valve towards the obliterating device, said roller being rotated for example by means of a hand lever or by a motor.

The plate 56 is cut out in order to allow the movements of the air suction valve which in the present case accomplishes merely a reciprocating rectilinear movement. It is moreover cut out to provide for the forward movement of the roller 67 and of a second roller 68.

The roller 67 is integral with a gear 69 which drives a gear wheel 70 driving in its turn another toothed wheel 71 integral with the stationary roller 68. The middle wheel 70 drives also another toothed wheel 72 which drives two wheels 73 and 74 placed one on either side. These toothed wheels 73, 74 which are integral respectively with a roller 75 and with the printing drum 76 are carried as well as both said roller and drum upon two frames 77, 78 pivotally mounted upon the axis 79 of the wheel 72. These frames are preferably acted upon by a spring 80, 81 which tends to press the roller 75 and the printing drum 76 respectively upon the roller 67 and upon the roller 68 while allowing the envelopes to come between said parts, whatever their thickness may be. The printing drum 76 is fed by the hollow drum 82 which is carried upon a pivoted support 83 drawn by a spring 84 to ensure the engagement with the said drum 76.

The mode of operation is as follows;

When the air suction valve is in its starting position the first envelope in the pile is pressed against the opening of the said valve by means of the shutter 41 and as soon as the roller 67 begins to rotate, the piston 61 actuated by the connecting rod 63 causes the air suction valve which is drawing along the envelope to move forward owing to the fact that the piston 61 produces in the cylinder 64 a suction which ensures the close engagement of the air suction valve and the envelope.

The envelope passes beyond the small shutter 58 and comes between the rollers 67 and 75. At that instant, the forward stroke of the piston being ended, the envelope continues its movement under the action of the said rollers which rotate at the same circumferential speed and consequently comes off the air suction valve which will henceforth accomplish its return stroke to take a new envelope.

It will be observed that owing to the fact that the air suction valve is metallic, it does not stick of itself to the envelope and that consequently the traction exerted by the rollers 75—67 upon the envelope easily produces a slight loosening which instantaneously causes a total disengagement due to the vacuum space 40—62—63—64 being put in communication with the atmosphere. It will therefore be seen that the operation takes place in the same satisfactory manner as in the first instance without utilizing the movement B C and C D of the air suction valve or the cylinder orifices 29.

The enevelope on leaving the rollers 67—75 enters between the roller 68 and the drum 76 where it is obliterated.

The roller 68 and the drum 76 cause the envelope to advance, it then comes in front of the pile of obliterated envelopes under a rotary wheel 85 similar to a ratchet wheel against which the said pile of envelopes is pressed by means of a shutter 86 under the action of a weight 87 in the same manner as the shutter 41.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention I therefore do not wish to be limited to the precise details of construction set forth but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

What I claim and desire to secure by Letters Patent of the United States is:

1. A device to distribute previously stacked envelopes to an obliterating machine which comprises: a cylinder provided with only one end, a piston alternately movable in said cylinder, a suction cup connected rigidly to this piston and establishing communication thereof, through a continuous passage, with the interior of the cyl-

inder behind the piston, a shutter disposed behind the stack of envelopes, said shutter being movable parallel with the plane of the opening of the suction cup and toward said opening through the action of a cable drawn by a counterweight, a second cable attached to this shutter, in opposition to the first-mentioned cable, said second cable being attached at the other end to a fixed point after having passed over a pulley mounted on an oscillating lever, and a pedal connected by a transmission to said lever to oscillate the latter in a direction which produces traction on the second cable through the movement of the pulley carried by this lever, so as to bring the shutter to the rear for placing a new stack of envelopes in position.

2. In an obliterating machine: a roller (67), integral with a rotary gear (69), a second gear (70) actuated by the preceding gear, a third gear (71) actuated by the second and integral with a second roller (68), a fourth gear (72) actuated by the second, a shaft (79) for this gear, two supports (77, 78) pivoted on said shaft, a fifth gear (73) and a sixth gear (74) each mounted on one of these supports and meshing with the fourth gear (72), a third roller (75) integral with the fifth gear (73) and a spring (80) exerting traction on the support (77) of the latter in the direction of contact with this roller (73) with the first roller (67), a printing cylinder (76) integral with the sixth gear (74) and a spring (81) exerting traction on the support (78) of this gear in the direction of contact of this printing cylinder (76) with the second roller (68), a cylinder provided with a single end, a piston in said cylinder, a rod connecting an eccentric point of the first roller to this piston, a suction cup, said suction cup in contact with the first envelope of a stack of envelopes and rigidly connected to the piston, and communicating through a continuous passage with the interior of the cylinder behind the piston.

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