

Dec. 15, 1942.

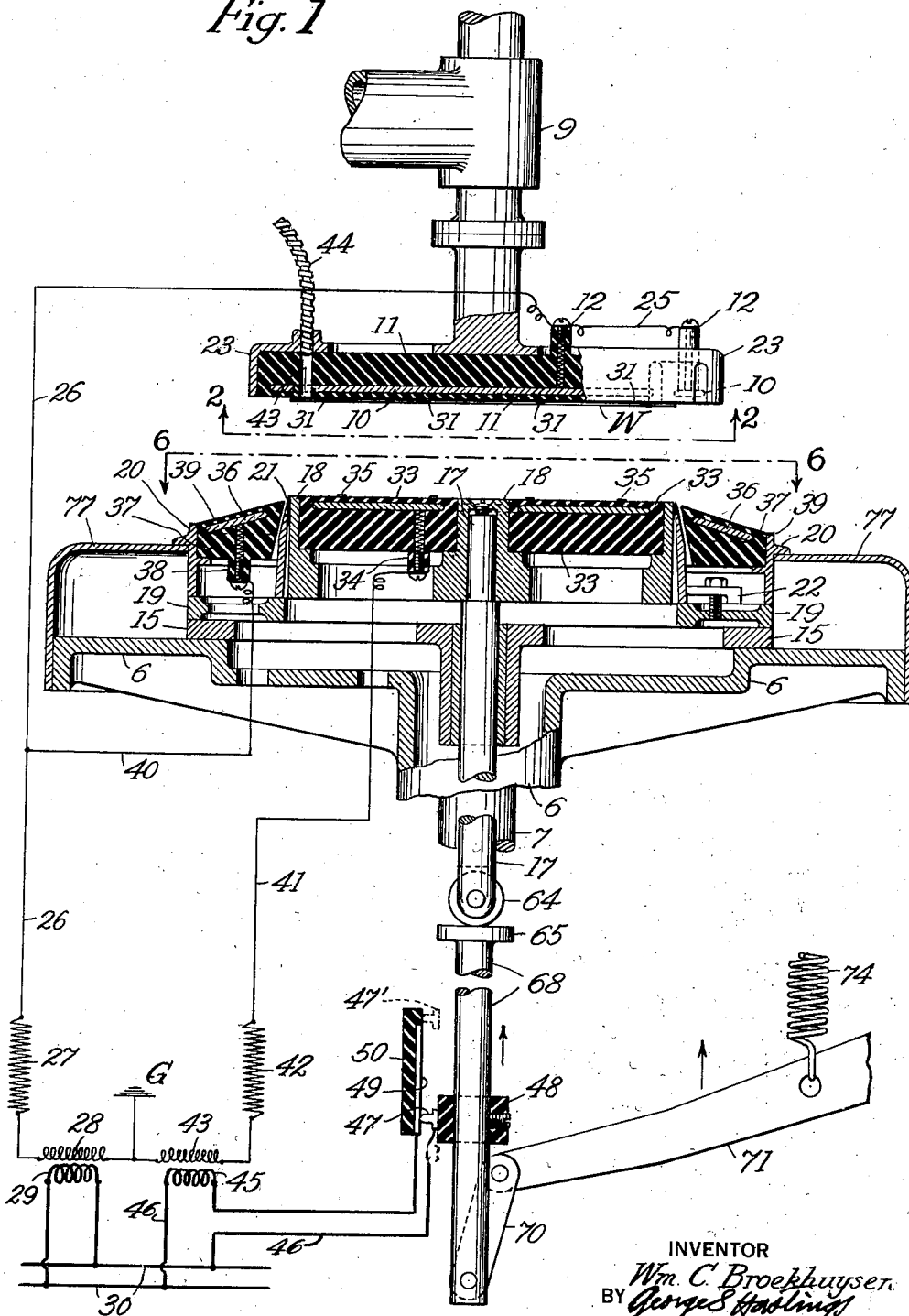
W. C. BROEKHUYSEN
METHOD OF TRANSFERRING LEAF SECTIONS, AND BINDER OR
WRAPPER HOLDER FOR CIGAR MACHINES

2,305,512

Filed Nov. 12, 1938

2 Sheets-Sheet 1

Fig. 1



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2 Sheets-Sheet 2

Fig. 2.

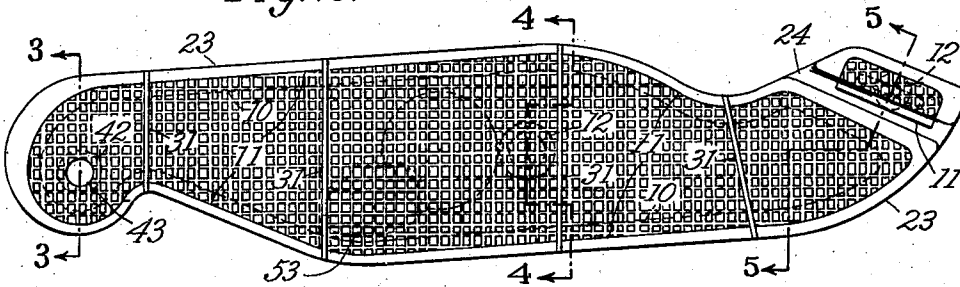


Fig. 3.

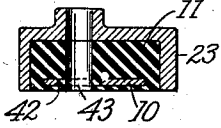


Fig. 4.

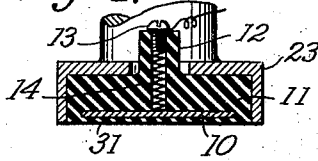


Fig. 5.

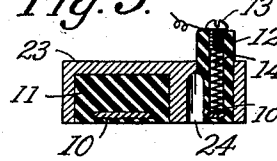


Fig. 6.

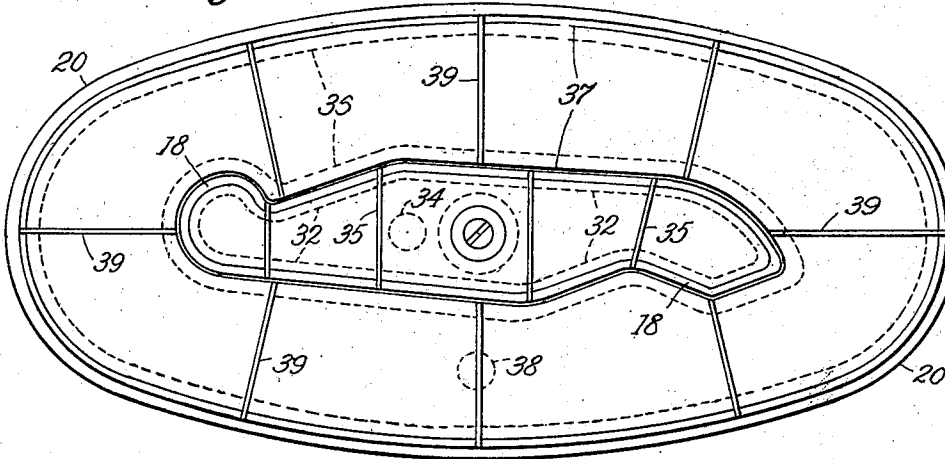
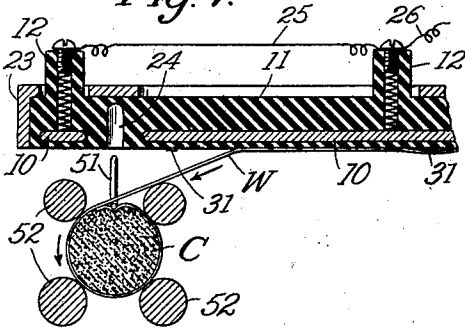


Fig. 7.



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METHOD OF TRANSFERRING LEAF SECTIONS, AND BINDER OR WRAPPER HOLDER FOR CIGAR MACHINES

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Application November 12, 1938, Serial No. 240,086

7 Claims. (Cl. 131—105)

This invention relates to the feeding of tobacco leaf sections, metal foil or sheet, and paper sheets and the like, and more particularly to the cutting and feeding of wrappers or binders in cigar machines. The main object of the invention is to replace the air suction usually employed to hold the tobacco leaf on the binder and wrapper dies, the carrier heads of the binder and wrapper transfers and on the rolling table, by electrostatic attraction and thereby simplify the mechanical structure of these devices.

When air suction is employed, the parts supporting the dies and the carrier heads must be hollow, their joints more or less air-tight and the contact faces of the transfer heads of the wrapper and binder dies and transfers, and of the rolling table must be perforated with a large number of small holes or slots to permit application of the suction to the leaf. Also valves with operating mechanisms are required to turn the suction on and off when needed. By using electrostatic attraction, all parts may be constructed much simpler and the attractive force controlled by simple switches.

In order to achieve the objects of this invention, use is made of the principle that opposite electric charges attract each other. By so constructing the holding surfaces of the respective units that the tobacco leaf to be held thereon forms one of the "plates" of an electric condenser, the moisture contained in the leaf when in normal working condition will render the tobacco a sufficiently good electric conductor for the purpose. The other "plate" is formed by an insulated metal plate placed near the holding surface. Since the electrostatic attraction between two conducting surfaces increases with the potential between the surfaces, a fairly high voltage, 3,000 volts and higher is required to obtain the necessary holding force under the prevailing conditions. This voltage is derived from the secondary of a small transformer fed from an ordinary 110-volt supply circuit, one terminal of the secondary being connected through a high resistance, 2 to 5 megohms, to the insulated metal plate, while the other terminal is grounded. The holding surface for the tobacco leaf is formed by the insulation of the high voltage metal plate, which preferably is embedded in a block of plastic insulating material such as Bakelite, inserted or directly molded into the holder casting which is made dish-shaped for accommodation thereof. The leaf is grounded by narrow strips of metal foil attached to the insulating holding surface

and in electrical contact with the rim of the holder casting.

The electrical stresses are greatest at pointed portions of a charged conductor, wherefore, in order to reduce these stresses as much as possible and avoid breakdown of the insulation, the electrode plate is made fairly thick with rounded corners and edges, or with rolled edges when thin sheet metal is used. The charged plate is placed very close to the contacting surface of the insulating block and its shape is so designed that its edges are a sufficient distance from all conducting surfaces of the machine, the metal frame and parts attached to the latter forming the "ground" of the system.

As an electrostatic charge resides on the surface of the conductor only, this principle may be used to advantage in picking up sheets of conductive material from a pile, such as for extracting sheets of metal foil or of slightly moist paper from a magazine. There is no danger in using this system. The high-reactance transformer develops very little wattage. Moreover, the high resistance in the secondary circuit limits the output so much that accidental contact with the high voltage terminals at worst is merely disagreeable.

For dry conducting sheets, such as metal foil, best results are obtained with a high D. C. voltage between the embedded metal plate and the foil. A small transformer and a rectifier tube are the most convenient source for such power. For sheets containing moisture which tend to deposit a film of moisture on the insulation, an alternating voltage has been found to give better results, as the film of moisture tends to slowly accumulate a charge when using D. C. This charge would shield the grounded conductor and prevent the electro-static attraction from acting upon it.

In the particular embodiment of the invention illustrated in the accompanying drawings:

Fig. 1 is a sectional elevation of the wrapper die and wrapper carrier of a cigar machine constructed in accordance with my invention;

Fig. 2 is a plan view of the carrier head seen from line 2—2 of Fig. 1;

Figs. 3, 4 and 5 are cross sections on lines 3—3, 4—4 and 5—5, respectively, of Fig. 2;

Fig. 6 is a top view from line 6—6 of Fig. 1, showing a wrapper die arranged for electrostatic attraction;

Fig. 7 is a sectional elevation showing a wrapper being transferred from the carrier to the cigar wrapping device.

Referring to Fig. 1, the carrier head 23 of a

wrapper transfer 9, such as shown in Patent 1,824,400, issued September 22, 1931, to J. F. Halstead may be constructed as hereinafter described to permit electrostatic charging thereof, and the wrapper cutting bed may be similarly constructed. If desired a pair of the latter may be mounted on the carrier 6 of a cigar machine die turret such as disclosed in U. S. Reissue Patent 19,677, issued August 20, 1935, to H. H. Wheeler, the carrier being mounted on an intermittently rotating shaft 7, and similarly equipped with a die holder 15, in which is slidably mounted a rod 17 carrying a die-block 18 loosely fitting a plate 19 fastened to holder 15 and carrying a die shell 20. To plate 19 is secured the die 21 by the clamps 22. On the lower end of rod 17 is mounted the roller 64 engaging the head 65 of a slide-rod 68 connected by a link 70 to a cam lever 71 held against a cam (not shown) by a tension spring 74, whereby the die block is periodically lifted to present the cut wrapper to the carrier head 23. The wrapper may be cut on the die by the passage thereover of suitable cutting rolls, such as shown in the Wheeler patent mentioned above.

To electrically charge the wrapper carrier shown in Figs. 1 to 5, a metal plate 10 is embedded in a block of insulating material such as Bakelite, etc., inserted into the carrier head 23 and connected to a source of high-voltage current of 3,500 volts more or less. The said plate has the general shape of the insulating block and carrier head, but is sufficiently smaller than them to provide an adequate insulating gap at all points. The terminal 12 for connecting the metal plate 10 to the high voltage supply consists of a screw 13 (Fig. 4) threaded into a hole in an upwardly projecting boss 12 of the insulating block 11, this hole extending all the way to the plate 10 and carrying a coil spring 14 pressed by the screw 13 against the metal plate. At the flag end of the carrier (Figs. 2 and 3) the plate 10 and block 11 have a perforation 42 registering with the wrapper blow-off hole 43 for the flexible compressed air hose 44. At the tuck end of the carrier, on account of the slot 24 provided for admission of the tuck needle, the plate 10 is split as shown in Figs. 2 and 5 and hence an additional high voltage terminal 12 is provided for the disjointed portion.

The terminals 12 are joined by a wire 25 and are connected by a wire 26 to a high resistance 27 in series with one terminal of the secondary winding 28 of a step-up transformer, the primary 29 of which is connected to an A. C. supply line 30. The other terminal of the secondary 28 is grounded at G by connecting it to the metal frame of the machine. The wrapper W, while being carried by the head 23, is grounded by foil strips 31 cemented across the contact surface of the insulating block 11 and extending on to the edge of the casting of the carrier head.

The wrapper die-block 18, Figs. 1 and 6, is constructed similarly to carrier head 23 with a metal plate 32 embedded in an insulating block 33 inserted into the casting of the die-block. The plate 32 has a terminal 34 similar to terminals 12 shown in Fig. 4, and the face of block 33 has metallic strips 35 similar to strips 31 on carrier head 23, for grounding the wrapper thereon.

In order to hold the waste portion of the leaf on the turret after the wrapper is cut and while it is being raised to the carrier 23, an annular plate 36 embedded in a block 37 is inserted into

the shell 20 of the die, the plate 36 having a high voltage terminal 38 and the outer face of block 37 being provided with grounding strips 39 in electrical contact with the rim of shell 20.

The terminal 38 is connected in parallel by a wire 40 to the wire 26 leading to the secondary transformer winding 28, the primary 29 of which is permanently connected to the supply circuit 30. The terminal 34 is connected by a wire 41 through resistance 42 to the secondary winding 43 of a transformer having a primary winding 45. The primary 45, by means of wires 46, is connected to supply lines 30 through a make-and-break switch consisting of a movable contact point 47 attached to an insulating collar 48 fastened on slide rod 68, and of a stationary contact rail 49 embedded in a block of insulating material 50 mounted on the frame of the machine. When the rod 68 is actuated through link 70 from cam lever 71 the die-block 18 is raised into contact with the carrier head 23 after the wrapper is cut, the die-block being normally supported in a lowered position during the serving and cutting operations as the roller 64 of rod 17 rides over a circumferential cam track (not shown). The length of rail 49 is so adjusted that the contact between 47 and 49 is broken at the moment the wrapper W has contacted with the block 11 of carrier 23, in position 47' of the contact point. The wrapper is thus released from the die-block, as the electrostatic charge thereon is discharged, and the wrapper sticks to the carrier while the die head returns to its cutting position, ready to receive the next leaf.

For taking off the wrapper from the carrier while being applied to a cigar bunch C (Fig. 7) the electric system has the advantage that the holding power per unit area remains at full value during the entire wrapping operation, while with air suction the holding power decreases as more perforations are exposed with the gradual removal of the wrapper from the perforated carrier surface. On arriving in wrapper-applying position, the tuck needle 51 enters the slot 24 above the tuck end of the wrapper W, pulls it down from the carrier head and presses it against the cigar bunch C which is being revolved in the direction of the arrow by the rolls 52 of the wrapping device, the needle 51 turning with the cigar for a couple of turns and receding after the tuck end is firmly held by the wrapper. In order to increase the holding force against shifting in the direction of the pull, the surface of the holding block 11 of the wrapper carrier preferably is made with a pattern having alternate ridges and small depressions such as in the top of a waffle iron, as shown at 53 in Fig. 2.

The carrier head of a binder transfer is arranged similarly to that of the carrier shown in Figs. 2 to 5, except that, since the metal electrode is not divided by the slot for the tuck needle, only one high voltage terminal 12 for the embedded plate is required, and since no shifting force is present when delivering the binder, the depressions 53 are omitted. Since there are no suction holes to clean with this system, the carrier heads of the wrapper and binder transfers need not be constructed with a demountable cover plate.

What is claimed is:

1. The method of feeding tobacco leaf sections comprising moving a carrier into contact with a tobacco leaf section and causing electrostatic ad-

hesion thereof to the carrier, transporting the adhering leaf section to a predetermined position and removing the section from said carrier.

2. The method of feeding tobacco leaf wrappers comprising moving a carrier into contact with a cut wrapper section and causing electrostatic adhesion thereof to the carrier, transporting the adhering leaf section on said carrier to wrapper-applying position and removing the section from said carrier.

3. The method of handling moist tobacco leaf portions comprising moving a conveying element having a leaf portion engaging surface into engagement with a leaf portion and producing opposite electrostatic charges on the adjacent surfaces of said element and leaf to cause adhesion of the leaf portion to said element.

4. A cigar wrapper transfer comprising a carrier head, insulating material supported in said head, a metallic member embedded in said material, and an electric circuit connected to said member for electrically charging it and causing electrostatic attraction of a cigar wrapper to said material.

5. A cigar transfer comprising a carrier head provided with a layer of insulating material on its operating face wherein is embedded a metallic member, an electric circuit connected to said member to electrically charge and cause electrostatic attraction of a tobacco leaf section thereto, said carrier head being movable to transport the adhering leaf section.

6. The method of holding moist leaf tobacco which comprises relatively moving the moist leaf tobacco and a holding element to engage the leaf tobacco with the surface of the holding element, and producing opposite electrostatic charges on the contacting surfaces of said element and the leaf tobacco to cause adhesion of the leaf tobacco to said element.

7. Apparatus for holding moist leaf tobacco comprising an electrically conductive metallic member having a face extending across the moist leaf tobacco to be held, non-conductive insulating material interposed between said leaf tobacco and said face, an electrically conductive element extending across said insulating material and arranged to engage a portion of the leaf tobacco which is to be held, an electric circuit having a high voltage alternating current and connected to said member, mechanism for closing said circuit to electrostatically charge the moist leaf tobacco and thereby cause electrostatic attraction of the leaf tobacco to said material, and then opening said circuit to discontinue the flow of electric current through said member, and means for grounding said element to dissipate the electrostatic charge remaining on the leaf tobacco after said circuit has been opened and thereby release said leaf.

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