Aug. 9, 1960 F. BODNER 2,948,569

NEW AND IMPROVED METHOD AND MEANS FOR FEEDING CUT TOBACCO TO A PLURALITY OF CIGARETTE MACHINES

Filed June 8, 1959 3 Sheets-Sheet 1

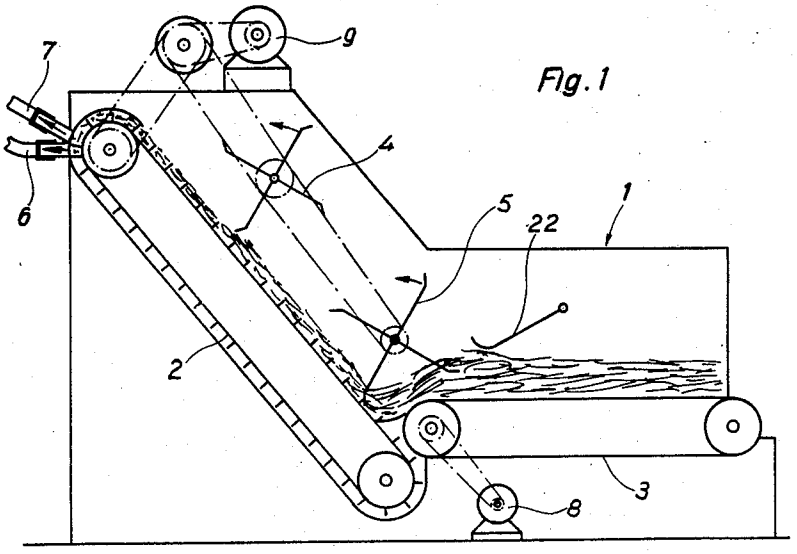
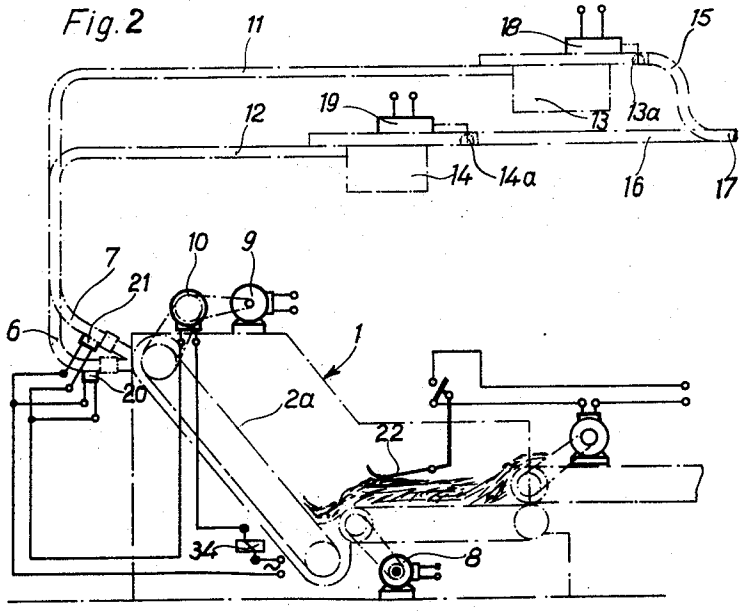



Fig. 1

Fig. 2




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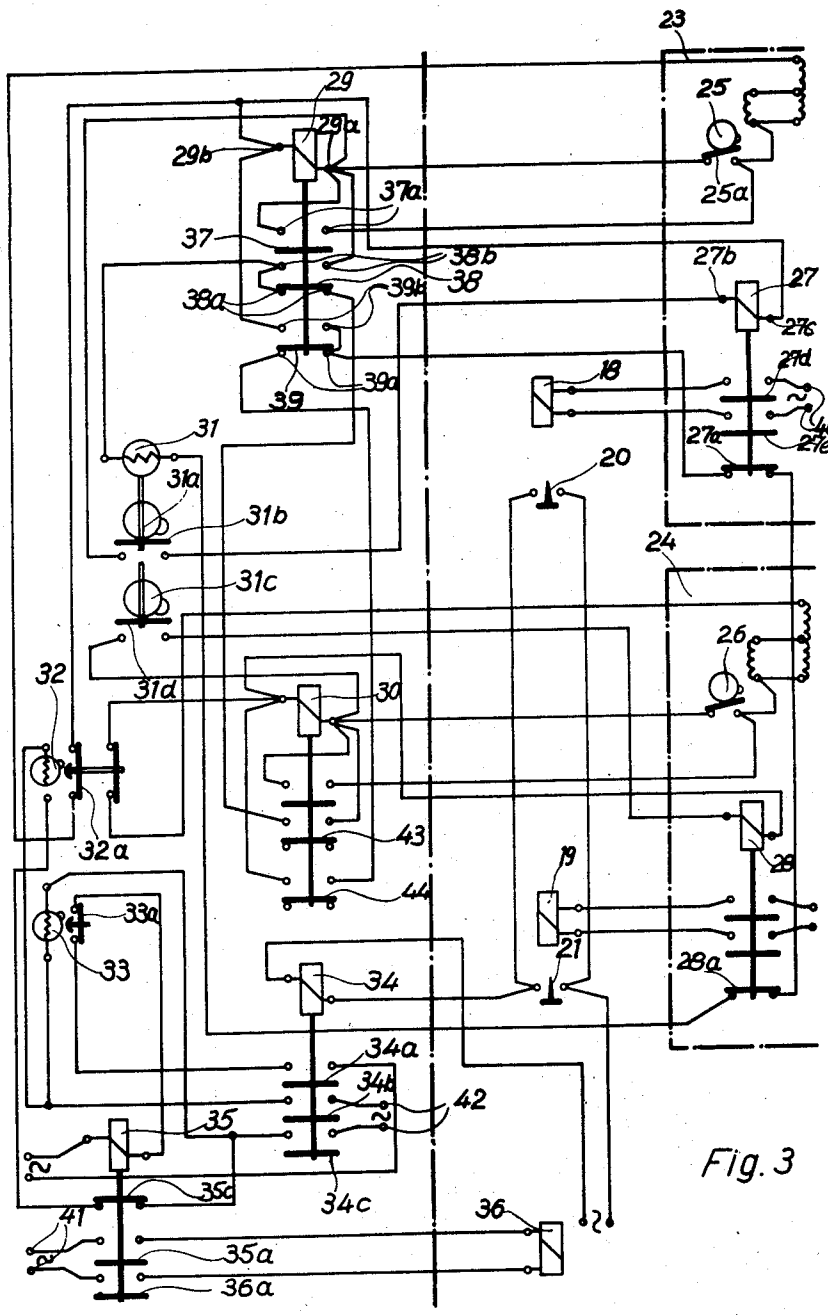



Fig. 3

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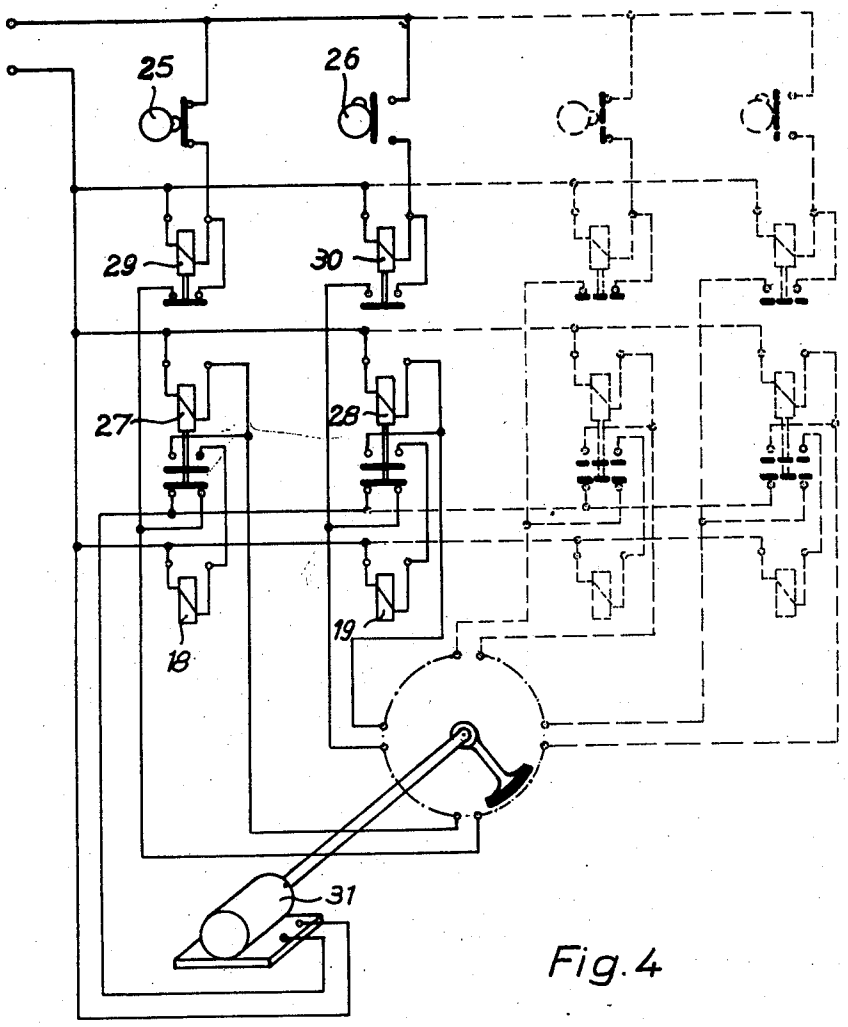



Fig. 4

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BY Singer, Stern & Carlberg

United States Patent Office 2,948,569 Patented Aug. 9, 1960



2,948,569

# NEW AND IMPROVED METHOD AND MEANS FOR FEEDING CUT TOBACCO TO A PLURALITY OF CIGARETTE MACHINES

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2 Claims. (Cl. 302—28)

This invention relates to a new and improved method and means for feeding cut tobacco to a plurality of cigarette machines.

Means for feeding cut tobacco to a plurality of cigarette machines in a predetermined sequence are known in which the tobacco is transported to a supply point by means of a feed belt and from said supply point through separate pipe means to the individual cigarette machines by stream or sliver forming pneumatic means. The feed belt may comprise an elevator band or an inclined conveyor, preferably provided with prongs or spikes and arranged for cooperation with rake wheels to maintain the layer of transported tobacco below a predetermined thickness. The belts or bands are frequently called carding belts.

It is an object of the invention to provide novel and valuable improvements in methods and means of the general character indicated.

Another object of the invention is to provide novel and improved means for the transportation of the cut tobacco from the unloading point of the conveyor means to the cigarette machines whereby the need of special equalizing or compensating equipment is eliminated.

Still another object of the invention is to provide means of the type indicated in which the cut tobacco is picked up at the unloading point of the carding belt by pneumatic means whereby it is feasible to supply two or more cigarette machines through separate suction conduits directly from one and the same carding belt.

A further object of the invention is to provide means of the type indicated in which a plurality of carding belts are arranged side by side and each adapted to cooperate with two or more suction conduits having their inlet openings disposed adjacent to the unloading point of the respective carding belt.

It is a further object of the invention to provide means of the type indicated including electrical means for automatically and sequentially controlling the carding belts and the pneumatic means in the individual conduits from the respective cigarette machines.

Another object of the invention is to provide means of the type indicated in which the electrical control means include timing means for controlling the periods of activity of the pneumatic means.

A further object of the invention is to provide means of the type indicated in which the timing means include delayed action relay means.

Other objects and advantages of the invention will be apparent from the following description of an embodiment thereof with reference to the accompanying drawings, in which:

Fig. 1 shows diagrammatically a partial side elevation of the embodiment of the invention,

Fig. 2 is a similar diagrammatic view indicating also the electrical control means,

Fig. 3 is a diagram showing the control circuits for one section of the embodiment including a single carding belt, and



Fig. 4 is a simplified diagram showing in full lines the control circuits of the section of Fig. 3 and in dotted lines the control circuits for an additional section.

The elevator conveyor shown in Figs. 1 and 2 comprises a plurality of carding or prong-bearing belts 2*a* arranged side-by-side, only one of said belts being shown on the drawings, all said belts being adapted to be individually controlled. A supply container 1 for the tobacco to be delivered is provided, the bottom wall of which is formed by a feeder belt 3. The latter is driven by a motor 8 and the carding belts 2*a* are driven by a motor 9. In the region of the upper reversal point of the carding belts 2*a* there is located in each case two (or more) connections for delivery pipes 6 and 7 which extract the tobacco carried upwardly on the surface of the carding belts 2*a*. As shown on the drawings the connection leading to the feed pipe 6 is disposed approximately horizontally while the other connection for the suction pipe 7 is arranged above it at an angle of about 30° to the horizontal. If for example five carding belts 2*a* are arranged one beside the other it is possible to supply ten cigarette machines with the plant shown on the drawings by reason of the presence of two suction connections for each belt, but, of course, three suction connections can be used if desired.

The delivery pipes 6 and 7 are associated with feeder pipes 11, 12 and lead into delivery boxes or trunks 13, 14 including screen devices to extract the tobacco from the suction stream. These boxes 13, 14 are connected to suction pipes 15, 16 fed from a common suction pipe 17. The delivery boxes 13, 14 thus extract the tobacco carried from the conveyor 2*a* through the pipes 6, 7 respectively for delivery to cigarette making machines receiving the tobacco from time to time from the delivery boxes 13, 14, thus providing a simple and efficient means for conveying the tobacco from the supply point represented by the elevator belts 2*a* to delivery points represented by the delivery boxes 13, 14.

All the carding belts 2*a* of the elevator are driven from the motor 9 through respective clutches or other suitable couplings 10 and the suction operative upon the suction feed pipes 6, 7, 11, 12 is controlled by means of throttle valves 13*a*, 14*a* on the downstream side of the delivery boxes 13, 14. The operation of the throttle valves is effected by means of delivery box control magnets 18, 19. Air pressure operated switches 20 and 21 are provided on the suction intake pipes 6 and 7, which switches are closed when a sufficient degree of suction is operative in the region of the suction connections. Since the coupling 10 must in each case be closed when either of the two delivery boxes 13 and 14 require tobacco the two air operated switches 20 and 21 are connected in parallel one with the other. The motor 9 for driving the carding belts 2*a* is in continuous operation. The feed of tobacco to the carding belts is cut off by feeler means 22 when the level of the tobacco on the bottom belt 3 feeding all the carding belts has exceeded the desired amount.

In Fig. 3 a switching diagram for two cigarette making machines is shown in detail, these being the two machines shown or indicated in full lines in more generalized outline form in Fig. 4. Each machine has a switch box 23, 24 respectively, embodying a timing mechanism 25, 26 with an associated relay switch 27, 28. The timing mechanisms 25, 26 are adjusted for a definite supply time corresponding to the consumption of tobacco by the cigarette making machines concerned and which may be of the order of 100 to 110 seconds. The delivery box control magnets 18, 19 are connected to the relay switches 27, 28.

A storage relay 29 or 30 is provided for each cigarette machine and a common distributor, for example a rotary selector switch 31 changes over from one cigarette ma-

chine to the other under the control of the relay switches **27, 28**, the operating time being only about 1.5 to 2 seconds. A delay action relay **32** ensures that the delivery box control magnet **18, 19** only closes the respective throttle valve **13***a* or **14***a* (see Fig. 2) when there is no longer any tobacco in the fed pipes **11, 12**. A further delay action relay **33** replaces the feeler means previously provided in the delivery boxes and determines the operating period for supplying these delivery boxes. A relay **34** responds to the switches **20, 21** and closes the protective switches **35** for the magnet **36** operating the respective coupling **10**. The two air-operated switches **20** and **21** of one pair of machines are connected in parallel to the circuit of the relay **34**.

The switching diagram of Fig. 3 taken in conjunction with the general outline circuit arrangement of Fig. 4 shows in detail the method of operation of the apparatus and it should be noted that the circuit diagram of Fig. 3 is shown under the condition that neither of the two cigarette machines is being supplied. When the timing mechanism **25** closes the two associated contacts by the associated switch arm **25***a* the feed terminal **29***a* of the storage relay **29** is connected to a source of current at the machine concerned. The terminal **29***b* is returned through the closed contact of the delay action relay **32** to the other terminal of the supply source. In this way the relay **29** is energized as long as the contact arm **32***a* of the delay action relay **32** is closed. On energization of the storage relay **29** the moving contact member **38** opens the contacts **38***a* and closes the contacts **38***b* and the contact member **39** opens the contacts **39***a* and closes the contacts **39***b*. By opening of the contacts **38***a* and **39***a* the connections to the storage relay **30** and to the distributor mechanism **31** are broken. By the closing of the contacts **38***b* the distributor mechanism **31** is energized from the terminal **29***a*. The other terminal of the mechanism **31** is connected to the terminal **29***b* through the switch member **28***a* of the switch relay **28**, the switch member **27***a* of the relay **27**, the switch member **39** and contacts **39***b* of the storage relay **29**.

In this way the distributor mechanism is operated and the cam disc **31***a* rotates and operates the switch arm **31***b* so that the terminal **27***b* of the operating coil of relay **27** is connected to the terminal **29***a*. Since the terminal **29***b* is already connected to the terminal **27***c* of the switch relay **27** the latter is energized and through the switch arms **27***d* and **27***e* connects the delivery box magnet **18** to the source terminals **40**. At the same time the switch arm **27***a* is lifted from the associated contacts and the circuit to the distributor mechanism **31** is broken. The delivery box magnet **18** opens the throttle valve **13***a* and connects the suction to the feed pipe **11** concerned and when there is a sufficient vacuum in the region of the connection point of the suction pipe **6**, the air switch **20** closes. This closes the circuit of the relay switch **34** which is energized and through the contact lever **34***a* it closes the circuit of the control switch **35** for the coupling magnet **36** concerned so that the latter is connected for energization through switch arms **35***a* and **35***b* from the source terminals **41**.

Now the carding belt **2***a* concerned is connected as shown in Fig. 2 through the coupling **10** with the driving motor **9** and tobacco is fed to the suction connection **6** and is delivered therefrom to the feed pipe **11** and to the delivery box **13**. At the same time as the closing of the switch arm **34***a* operates, the switch arms **34***b* and **34***c* connect the delay action relay **33** to the feed terminals **42** and prepare a circuit for relay **32**. After a predetermined time the delay relay **33** lifts the switch arm **33***a* and thus breaks the circuit for the protective switch for the coupling magnet so that the track or feeder **2***a* is stopped. Since the protective switch **35** is no longer energized the contact arm **35***c* completes the circuit to the delay acting relay **32** The operating disc of the delay action relay **32** moves for



a predetermined period and then opens the circuit for the magnets of the switch relay **27** and the storage relay **29**. Thereby the delivery box magnet **18** is de-energized and the throttle valve **13***a* cuts off the suction from the pipe **15**. The delay period is so proportioned that the tobacco still remaining in the feed pipe **11** is sucked into the delivery box. The changeover contacts of the storage relay **29** revert to the position shown in Fig. 3. Now the distributor mechanism **31** is connected on the one hand through the switch arm **38** and on the other hand through the switch arms **28***a*, **27***a* and **39** to the storage relay **30** and is energized through the switch arms **43** and **44** when the relay **30** is operated by the timing mechanism **26**. The timing cam disc **31***c* of the switch mechanism now moves on and actuates the switch arm **31***d* whereby the operating circuit for the magnets on switch relay **28** for the delivery box operating coil **19** is closed. The circuit then continues to operate in a manner which will be obvious and similarly to that previously described, but now feeds the second machine of the pair—and a further machine if each carding belt feeds three machines and so on.

Fig. 4 of the drawings shows a generalized view of a complete delivery plant according to the invention in diagrammatic form from which not only the control cooperation of the individual parts but also the further possibilities of including other equipment connected to a single suction fan is indicated by dotted lines.

By the invention it is possible to connect to one elevator with several carding belts **2***a* up to 15 cigarette making machines, and by the improved control procedures it is possible for the individual cigarette machines to be fed rapidly and reliably with tobacco in sequence according to requirements.

What I claim is:

1. In an apparatus for feeding cut tobacco from a source of supply to a plurality of cigarette machines, a carding belt, electric motor means for moving said carding belt in one direction from a loading station to an unloading station, an electric circuit for said motor means, rake means rotatably mounted adjacent to said carding belt to keep the thickness of the layer of tobacco on said carding belt below a maximum value, a first suction conduit extending substantially horizontally from said unloading station, a second suction conduit extending at an angle of substantially thirty degrees upwardly from said unloading station, conduit means connecting said first and second suction conduit means separately with two cigarette machines, a delivery box in each of said connecting conduit means, a valve in each of said connecting conduit means between said delivery box and said cigarette machine, separate electromagnet means for operating said valves individually, an air pressure operated switch forming part of said motor circuit in each of said conduit means in the proximity of said unloading station, electrical circuit means interconnecting said motor circuit with said electromagnet means, air pressure switches, and cigarette machines, and means in said electrical circuit means for operating said electromagnet means and electric motor means in timed relation to intermittently and alternatingly furnish said cigarette machines with the cut tobacco.

2. Apparatus as set forth in claim 1, including a delay switch relay in said electrical circuit means for delaying the closing of each of said valves.

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