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2,963,993

MACHINES FOR MAKING COATED TABLETS BY COMPRESSION

Filed Jan. 20, 1959

2 Sheets-Sheet 1

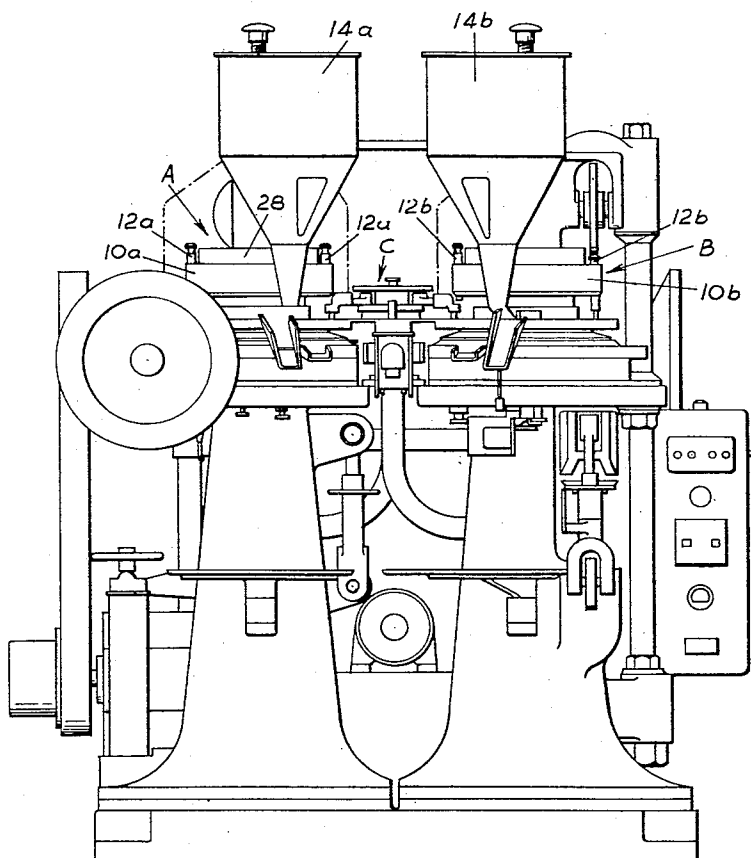


Fig. 1.

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2 Sheets-Sheet 2

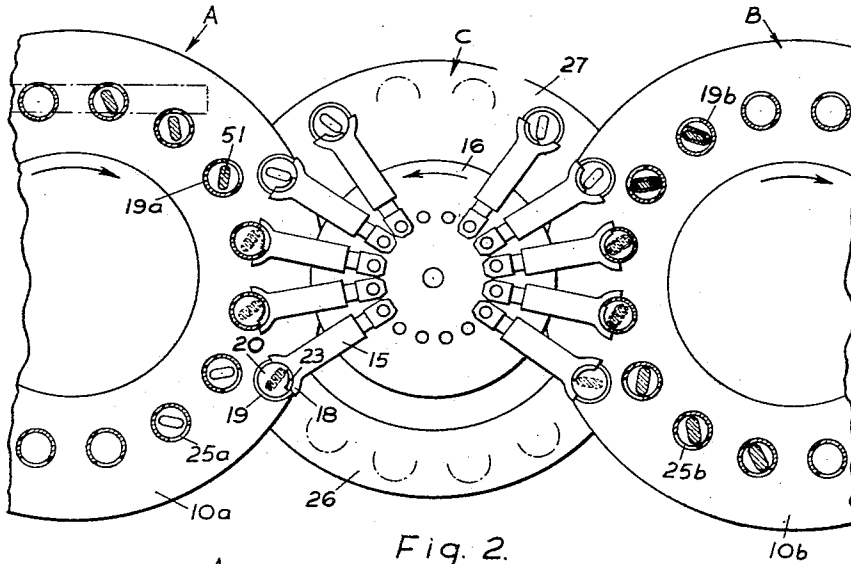


Fig. 2.

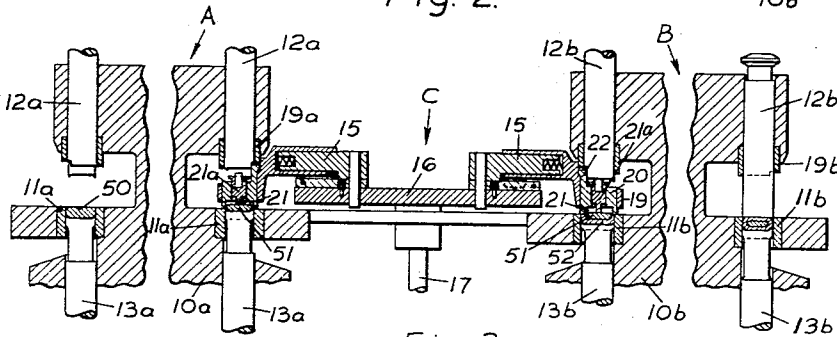


Fig. 3.

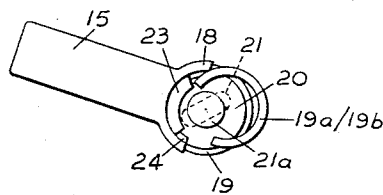


Fig. 4.

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MACHINES FOR MAKING COATED TABLETS BY COMPRESSION

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4 Claims. (Cl. 167—1)

This invention concerns machines for making coated tablets by compression. Such machines are known and generally comprise a feed mechanism for feeding tablet cores one at a time to a coating mechanism wherein a granular or pulverulent coating is applied to and compressed onto the core by means of coating dies and punches. The feed mechanism aforesaid may be adapted to receive pre-made cores (for example from an unscrambling device) or it may serve to transfer cores from a core making mechanism to the coating mechanism.

In making circular or round coated tablets, a circular core requires only to be deposited centrally in the appropriate die. Further considerations have to be taken into account where a shaped (which term will hereinafter be used to mean any shape other than circular) coated tablet is being made, since a shaped core requires, in addition to being deposited centrally in the die, being oriented relative thereto to ensure that it is properly coated.

An object of the invention is to provide apparatus, as aforesaid, whereby shaped coated tablets can easily and readily be produced.

The invention is particularly applicable to coating machines wherein the feed or transfer mechanism is adapted, during deposition of a core into a coating die, to move in the same path as the coating die for a precise distance. Examples of machines of this type are set forth in the specifications of our prior United States Patent No. 2,849,965 dated September 2, 1958 and co-pending application for United States Patent, Ser. No. 714,821, filed February 12, 1958.

According to the present invention, a machine for making shaped coated tablets comprising a circulatory tablet coating mechanism having at least one shaped die with complementary punches adapted to compress a coating upon a shaped core deposited in such die and feeding means for feeding shaped cores to said coating mechanism and adapted to move in the same path as the die for a distance whilst depositing a core in said die is characterized by control means for controlling the relative orientation of a shaped tablet in the feeding means and of the shaped coating die, whilst the core is being deposited, so as to ensure accurate registration of the core with the die.

Preferably the feeding means include a rotatable element having a shaped aperture or recess for accommodating a core, the control means serving to rotate the element relative to the feeding means to maintain the core correctly oriented relative to the coating die during transfer thereto.

In a preferred construction of machine according to the invention, the coating mechanism is rotatable about a vertical axis and includes a plurality of dies and associated punches and the feeding means comprises a rotary mechanism including a plurality of telescopic radially disposed arms, a rotatable element as aforesaid being disposed at the end of each of such arms.

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In such instance, each telescopic arm may conveniently have a fork or the like adapted to co-operate with locating means on the coating mechanism to cause the rotatable element to move over the same path as the corresponding coating die during core deposition, the control means being in the form of a tongue or the like which co-operates with further locating means on the coating mechanism in such manner as to rotate the element in its arm.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a side elevational view of one practical embodiment of the machine according to the invention,

Fig. 2 is a diagrammatic plan view showing certain of the parts of the machine of Fig. 1 on an enlarged scale,

Fig. 3 is a cross-sectional side elevational view corresponding to Fig. 2, and

Fig. 4 is a fragmentary detail of parts of the machine of Fig. 1.

The machine for making shaped coated tablets illustrated is similar in its construction to that described in the specification of my prior Patent No. 2,849,965, and comprises a rotary tablet core making mechanism designated generally at A, a rotary core coating mechanism designated generally at B, and an intermediate rotary transfer mechanism designated generally at C, which serves to transfer tablet cores from the core making mechanism A to the coating mechanism B. Such transfer mechanism C, therefore, constitutes feed means for supplying cores one at a time to the coating mechanism B. The core making and coating mechanisms A and B each comprise a rotary table 10a, 10b respectively having shaped dies 11a and 11b at spaced intervals therearound, there being an upper shaped punch 12a, 12b and a lower shaped punch 13a, 13b associated with each die and adapted to compress material fed to the die. The core making mechanism A has material feed means 14a which serves to feed, to each die, material to be compressed to form tablet cores. The coating mechanism B has somewhat similar material feed means 14b, but such serves to feed a first predetermined quantity (or "first fill") of coating material to each die and then, after a core has been deposited on such first fill, to apply a "second fill," whereafter the whole is compressed to form a coated tablet.

The transfer mechanism C is also of a rotary nature and comprises a plurality of radial arms 15 pivotally connected to a disc 16 mounted on a vertical shaft 17 disposed between the core making and core coating mechanisms A and B just described. Each arm 15 is telescopic and has at its outer end a substantially semi-circular fork 18. Disposed in a boss 19 below such fork is a rotatable sleeve-like element 20 having a shaped aperture 21 therein for accommodating a shaped tablet core, an appropriately shaped weight 21a being slidably located above such aperture, and an extension 22 of the sleeve-like element 20 is provided with a segment-shaped flange or tongue 23 lying on a rebate or shoulder 24 provided in the convex part of the semi-circular fork 18. The weight 21a is mounted as shown in my said prior Patent #2,849,965, the weight being numbered 46 in said patent.

On both the rotary tables 10a, 10b, there are transfer mechanism locating means in the form of projecting spigots 19a and 19b, one above each die 11a and 11b, and these are disposed so that, as a fork 18 of the transfer mechanism C moves toward a die 11a or 11b such fork 18 engages with the spigot 19a or 19b associated with such die, so that the associated rotatable sleeve-like element 20 is held immediately above the die. As the table 10a or 10b and transfer mechanism C continue to ro-

tate, the rotatable element 20 is constrained to move in the same path as the die, the telescopic and pivoted nature of the arms 15 permitting this.

The tongue 23 on the extension of the rotatable element 20 just described constitutes part of control means for such rotatable element 20, and complementary to such tongue 23 is a recess 25a or 25b in the spigot 19a or 19b. Thus, as shown in Fig. 4, as the fork 18 engages with a spigot 19a or 19b the tongue 23 also engages into the recess 25 and is located therein.

Bridging the space between the two tables 10a and 10b are two arcuate plates 26 and 27 one disposed at either side of the transfer mechanism shaft 17, and when the transfer mechanism C is rotated, the fork 18 of the arms 15 (and the rotatable elements 20) move over such plates 26 and 27.

In use, the machine described operates in the following way. Material 50 (Fig. 3) fed into each shaped die 11a of the core making mechanism A, by feed means 14a, is compressed, in known manner by punches 12a and 13a, to form a shaped tablet core 51 (which may, for instance, be oval) as the table 10a of the core making mechanism A rotates. The upper punch 12a of each die 11a is raised by cam means supported by a cam disc 28 (Fig. 1) as the die 11a approaches the transfer mechanism C, and as can be seen from Fig. 1 synchronous rotation of the transfer mechanism C brings the fork 18 of one of the arms 15 of the transfer mechanism C into engagement with the spigot 19a associated with the die 11a under consideration. Also the tongue 23 of the rotatable element 20 of the arm 15 is engaged into the recess 25 in the spigot 19a thereby orienting the rotatable element 20 relative to the die 11a so that the shaped aperture 21 in the element 20 is in register with the shaped core 51 in the die 11a. As the table 10a and transfer mechanism C continue to move, the fork 18 and the rotatable element 20 move in a path corresponding to the path of movement of the die 11a (as previously explained) and simultaneously the rotatable element 20 is rotated by the spigot 19a so as to maintain it always in alignment with the core 51. During this movement, the lower punch 13a of the core-making die 11a is raised, so that the core 51 is pushed up into the aperture 21 of the rotatable element 20, the weight 21a being raised by the core 51.

As the table 10a and transfer mechanism C continue to move, the fork 18 becomes disengaged from its associated spigot 19a, and the arm 15 sweeps over the arcuate plate 26, so carrying the core 51 from the table 10a of the core making mechanism A to the table 10b of the coating mechanism B which latter also rotates in synchronism with the transfer mechanism C.

As the fork 18 approaches the coating mechanism B, it engages a spigot 19b of one of the dies 11b thereof, and the rotatable element 20 is located relative to a die which has already had a first fill 52 of coating material deposited therein by the feed means 14b. The location of the rotatable element occurs in a manner similar to that previously described, so as to move in the same path as the die 11b and so as to be constantly aligned with such die 11b. The lower punch 13b of the die 11b is lowered whilst the core 51 is in register therewith, and consequently the core 51 is accurately deposited in the die 11b. Subsequently the feed means 14b provides a second fill of coating material which is deposited over the core in known manner, the whole then being compressed by the upper and lower punches 12b and 13b to produce a coated tablet 53 which, after raising of the upper punch 12b, is ejected from the die 11b by raising of the lower punch 13b.

It will be appreciated from the foregoing that the mechanism according to the invention can be of extremely simple construction, requiring means for orienting that part of the core feeding mechanism which carries the core so as to ensure oriented alignment with the die, in addition

to means for causing such part to follow the same path as the die.

The invention may be employed for making tablets of various shapes (such as oblong, polygonal or rectangular) other than circular, and is, of course, not confined to the precise details of the foregoing example. For instance, in the example a machine which makes the cores and then coats them has been described and it will be evident that the invention can equally well be applied to machines which serve only to coat pre-formed tablet cores.

I claim:

1. In a machine for making non-circular coated tablets including a coating mechanism consisting of a rotatable die table having a plurality of non-circular dies and a plurality of complementary punches adapted to compress coatings upon non-circular cores deposited in the dies with each of the punches having an orienting means for bringing the respective sides of a die and punch and core into centered parallelism for providing a uniformly thick coating on the finished tablet, the improvement in feeding means for feeding non-circular cores to the coating mechanism comprising, a plurality of telescopic radially-disposed arms, each of the arms of said plurality thereof having a fork adapted to engage the orienting means of one of the punches and carrying a rotatable element having a non-circular aperture for accommodating a non-circular core, and control means for controlling the relative orientation of the non-circular core in said feeding means and of the respective non-circular die while the respective core is being deposited for ensuring accurate registration of the core with the respective die, and including a tongue on the rotatable element of each of the arms of said plurality thereof engageable in a complementary recess in said orienting means of the respective punch for orienting the respective rotatable element relative to the respective die by causing the movement of the rotatable element for a distance in the same path as the corresponding die so that the non-circular aperture in the respective rotatable element registers with the non-circular core in the respective die.

2. In a machine for making non-circular coated tablets including a coating mechanism having a die table provided with a plurality of non-circular dies and complementary punches with orienting means for bringing the respective sides of a die and punch and core into centered parallelism for providing a uniformly thick coating on the finished tablet, the improvement in a feeding mechanism for feeding non-circular cores to the coating mechanism comprising, a plurality of telescopic radially disposed arms each having a fork, a rotatable element carried by each of said arms and having a non-circular aperture for accommodating a non-circular core, and control means for controlling the relative orientation of a non-circular core in said feeding mechanism and of the respective non-circular die and comprising a tongue on each said rotatable element engageable in a complementary recess in each orienting means of the coating mechanism and cooperating to rotate the respective said rotatable elements in the same path as the respective die through a certain distance while the non-circular core is being deposited for insuring the accurate registration of the core with the respective die.

3. In a machine for making non-circular coated tablets including a coating mechanism consisting of a rotatable die table having a plurality of non-circular dies and complementary punches coacting in pairs thereof to compress coatings disposed therebetween and including an orienting means with each punch for bringing the sides of the punch and the respective die and core into centered parallelism, the improvement in feeding means for feeding non-circular cores to the coating mechanism comprising, a plurality of radially-disposed arms each having a fork adapted to engage the orienting means of one of the punches and carrying a rotatable element having a shaped aperture for accommodating a non-circular core,

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and control means for controlling the relative orientation of the non-circular cores and of the non-circular dies and including a tongue on the rotatable element of each of the arms of said plurality thereof and a complementary recess in the orienting means of each punch, the recesses of the orienting means and the tongues of the arms of said plurality thereof cooperating to rotate the respective rotatable elements in the respective arms of said plurality thereof in the same path as the respective die for a distance while the respective core is being deposited in a die for ensuring accurate registration of the core with the respective die.

4. In a machine for making non-circular coated tablets including a coating mechanism with a plurality of non-circular dies and complementary punches and an orienting means associated with each punch, the improvement in a feeding mechanism for receiving and feeding non-circular cores to the coating mechanism comprising, a plurality of radially disposed arms, each arm of said plurality

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thereof having a fork engageable with the orienting means of a punch, a rotatable element carried by each said arm and having a shaped aperture for accommodating a non-circular core, and control means for controlling the relative orientation of non-circular cores in said feeding mechanism and of the non-circular dies of the coating mechanism and comprising a tongue on each said rotatable element and a complementary recess in each orienting means of the coating mechanism, the tongues and recesses cooperating to rotate said rotatable elements in paths corresponding to the paths of the respective dies while the cores are being deposited for insuring the accurate registration of cores with their respective dies.

References Cited in the file of this patent

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