Aug. 16, 1960 L. T. McCARLEY 2,949,082

TABLET MACHINE

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Fig. 1

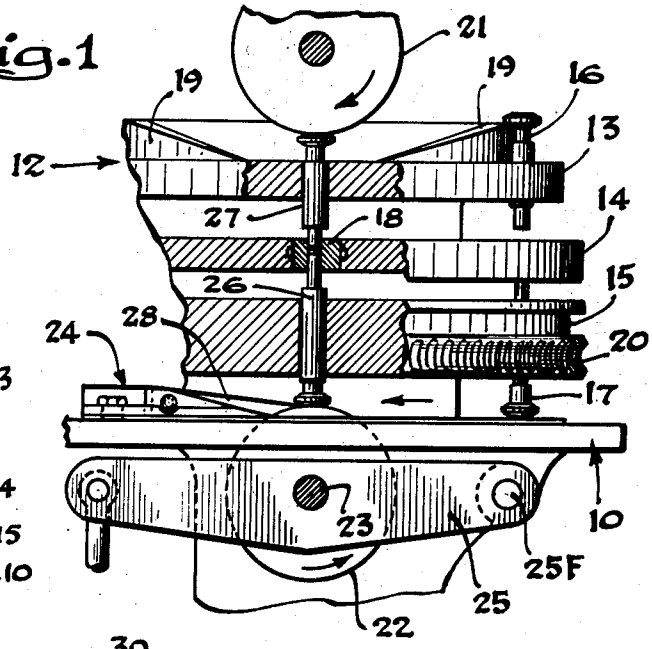


Fig. 1A

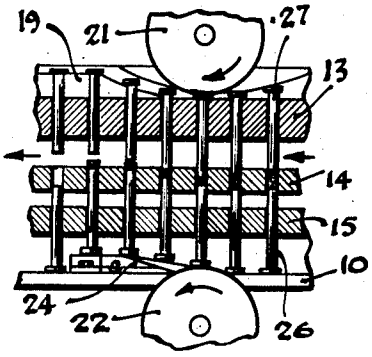
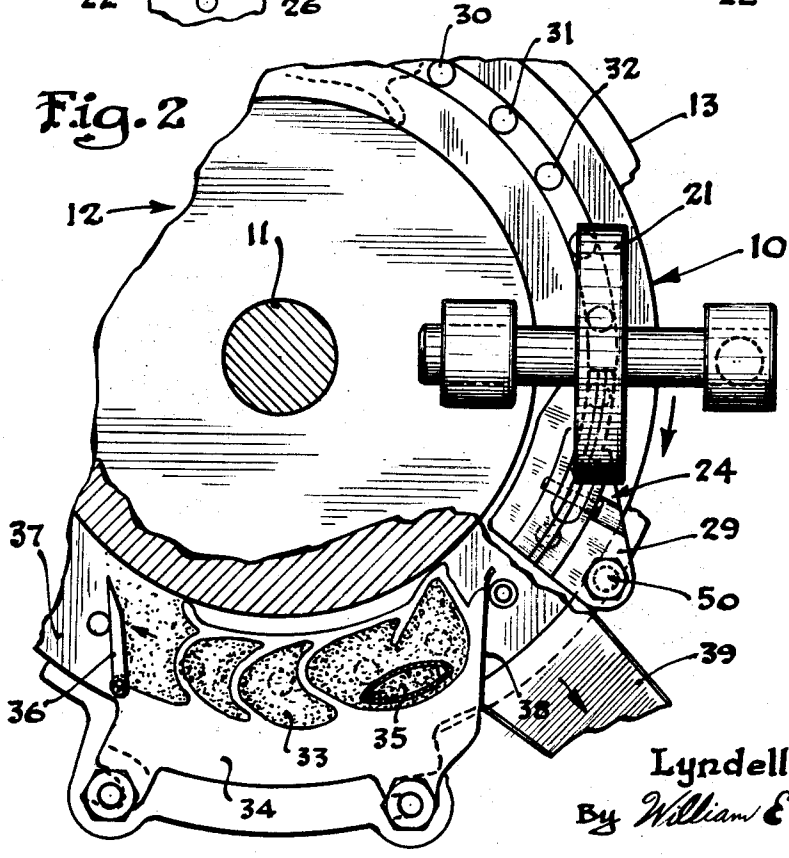


Fig. 2



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Fig. 3

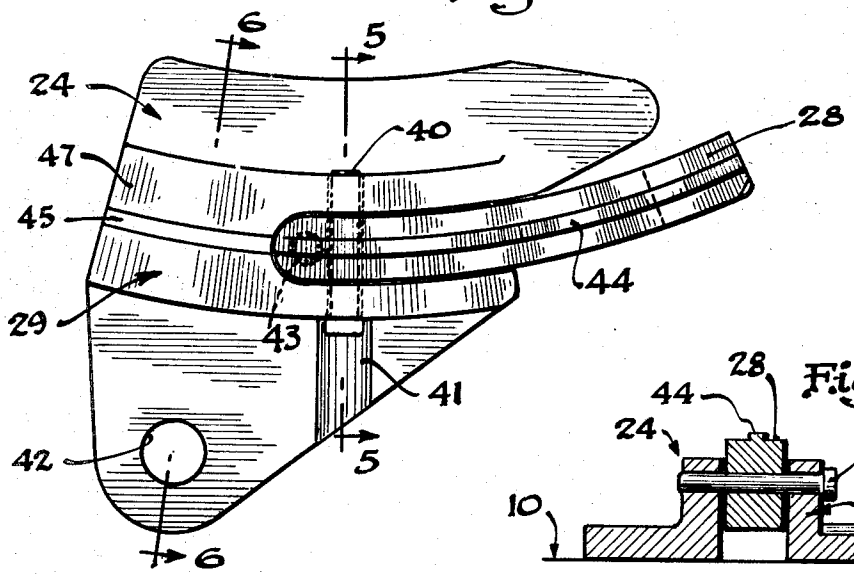


Fig. 5

Fig. 4

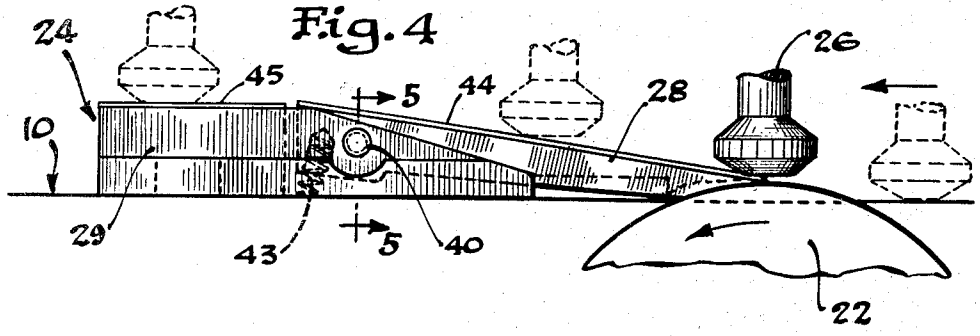
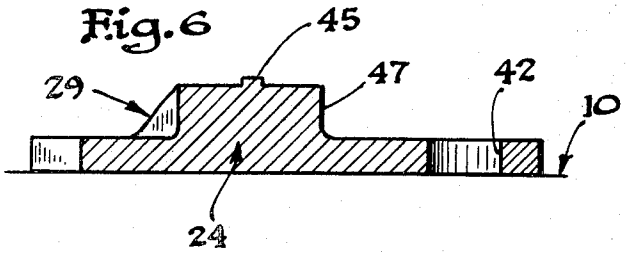


Fig. 6



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TABLET MACHINE

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4 Claims. (Cl. 107—17)

This invention relates generally to an improvement in rotary tablet compressing machines and more particularly to an improvement in a rotary tablet machine forming tablets which are impressed with a bisect line, or marked with indicia on at least one of the surfaces thereof.

In the conventional rotary type tablet compressing machine which has means associated with the compression wheel to raise the lower punch so that the tablet can be removed from the upper surface of the punch on contact with a baffle or gate, the lower punch falls by gravity from the tablet as the punch leaves the wheel. As soon as the punch contacts the punch elevating means, it begins to rise and once again contacts the surface of the tablet. During the sequence of dropping and rising, however, the punch frequently rotates several degrees about its longitudinal axis. While this rotation of the punch has no adverse effect on the plain unmarked tablet, any slight rotation of the punch having a design or marking thereon is very objectionable and generally results in irreparable damage to the tablet, such as chipping, cracking, or otherwise breaking the tablet.

It is therefore an object of the present invention to provide an inexpensive and simple means of preventing the rotation, of a tablet punch about its longitudinal axis.

It is a further object of this invention to provide a means for preventing the rotation of a tablet punch about its longitudinal axis without altering the structure of the punch or of the guide disc therefore.

It is a still further object of the present invention to provide an improved tablet ejector cam means associated with the compression wheel for maintaining the end of the punch in contact with the tablet at all times until the tablet is removed from the die.

Other objects of the invention will be apparent to those skilled in the art from the detail description and claims to follow.

Fig. 1 is a partial side elevation view partially in vertical section of a rotary tablet compressing machine embodying the present invention.

Fig. 1A is a fragmentary diagrammatic side elevation view partially in vertical section embodying the present invention.

Fig. 2 is a fragmentary plan view of the rotary tablet compressing machine shown in Fig. 1.

Fig. 3 is an enlarged plan view of the novel cam assembly of the present invention.

Fig. 4 is an enlarged side elevation view of the cam assembly of Fig. 3 in operative association with the compression wheel.

Fig. 5 is an enlarged vertical sectional view taken along the line 5—5 of Fig. 3.

Fig. 6 is an enlarged vertical sectional view taken along the line 6—6 of Fig. 3.

Figures 1 and 2 of the drawing illustrate a rotary tablet-forming machine having the improved ejector cam assembly of the present invention which comprises a stationary base or table **10** having a central spindle **11** around which the tablet-forming head **12** rotates. The rotating

head **12** is made up of a number of superimposed spaced discs **13**, **14** and **15**. A plurality of small cylindrical apertures in axial alignment are spaced around the head **12** to form bearings and seats for a plurality of punch elements **16**, **17** which are carried by the rotating head **12**. Any number of apertures and punch elements may be disposed in the head with one tablet being made by each pair of oppositely disposed punch elements. The upper punch **16** has its bearing and guide in disc **13** and the lower punch **17** has its bearing and guide in disc **15**. The die **18** in which the tablet is formed and into which punches **16** and **17** extend is carried in disc **14**. The lower disc **15** can be provided with gear teeth **20** which are engageable with a suitable drive means which imparts the desired speed of rotation to the head **12**.

Oppositely disposed compression rollers **21**, **22** are placed at one or more points in the path of the punches and as the punches pass between these rollers the compression of the powder in the die **18** takes place, whereby the tablet is formed. This operation is further illustrated diagrammatically in Fig. 1A of the drawing. The lower compression roller **22** has its axle **23** supported in a carrier **25** with its fulcrum **25F** fastened to the table **10**. As the lower punch **26** passes over roller **22** it comes into immediate contact with the upper edge of roller **22** and is forced upwardly in the die **18** compressing the powder therein between it and the upper punch **27**.

The vertical movement of the punch elements in the rotatable head **12** is controlled by one or more cam elements. The upper punch **16** coacts with cam **19** which is secured rigidly to spindle **11**, and punch **16** is raised and lowered to suit the cycle of operation. The movement of the lower punch **17** is controlled by the ejector cam **24** assembly mounted on table **10**.

As illustrated in Fig. 2, dies **30**, **31** and **32** are filled with powder **33** from a feed hopper and feed frame **34** like that shown at **35** (the corresponding feed hopper for compression roller **23** is not shown). Excess powder is removed by means of a scraper **36** which is in close contact with the die bed **37**. After the powder is compressed into tablets by means of the compression rollers and punches the tablets are raised by means of the lower punches and the ejector cam to the surface of the die bed **37** upon which the ejected tablet travels until it strikes the deflecting baffle **38** and is guided into the chute **39**.

The novel ejector cam assembly **24** of the present invention is shown in detail in Figs. 3 to 6. Fig. 3 shows the cam element **28** positioned in its supported housing **29**. The cam element **28** is held in place in the housing **29** by means of a pivotal pin **40** which is inserted through accommodating openings in the cam element **28** and the housing **29**. The cam housing **29** also has a lateral recess **41** therein to accommodate an enlarged head of the pivotal pin **40**.

The cam element **28** is preferably of a curved configuration which conforms with the circumferential path in which the punch elements travel and has a gradual inclined surface extending from the forward edge rearwardly. The forward edge of the cam element **28** rides upon compression roller **22** and is held in contact therewith by means of a spring **43** exerting an upward force upon the inner end of the cam element causing it to pivot on its pivotal pin **40** thereby forcing the outer or forward end of the cam element **28** into contact with the compression roller **22** at the highest point on its circumference. The lower surface of the outer end of the cam element **28** preferably conforms generally to the curvature of the compression roller **22**.

Fig. 5 shows the ejector cam element **28** pivotally mounted in the cam housing **29**. The upper surface of ejector cam **28** has a narrow flat ridge **44** on which the

lower end of the punch **26** rides as it leaves the compression roller **22**.

Fig. 6 shows a cross sectional view of the cam housing **29** immediately following the ejector cam element **28**. The cam housing **29** is of a general inverted T shape having a raised center portion **47**, and a narrow flat ridge **45** along its upper surface which is in effect a continuation of the ridge **44** of the ejector cam **28**. The assembly is of a curved configuration so as to conform to the circular pattern of the tablet machine and is fastened to the base of the tablet machine by means of a bolt **50** which is inserted through an opening **42** in the housing **29**.

It should be understood that the cam element **28** and cam housing **29** can be made, if desired, as an integral unit and need not be separable as shown in the preferred embodiment of the invention.

Others may readily adapt the invention for use under various conditions of service, by employing one or more of the novel features disclosed or equivalents thereof. As at present advised with respect to the apparent scope of my invention, I desire to claim the following subject matter.

1. In a rotary tablet-compressing machine comprising a frame, a rotating head moving in a given direction, an upper punch and a lower punch, said punches being reciprocally mounted in said head for cooperating axial movement relative to each other, an upper and lower compression roller positioned at the top and bottom of the said head and contacting the upper and lower punches respectively: a cam element extending in said direction from the top of said lower roller, the end of said cam at said roller riding on said roller, said cam being pivotally mounted on said frame adjacent the end of said cam in said direction, said end of said cam in said direction being at a substantially greater elevation than said end of said cam at said roller, said cam having a curved cam track; and means to resiliently urge said end of said cam at said roller toward said roller.

2. In a rotary tablet-compressing machine the combination comprising a rotating head, an upper punch and a lower punch, said punches being mounted in said head for cooperating axial movement relative to each other, compression rollers located at the top and bottom of said head and contacting the upper and lower punches respectively, a cam means having a forward edge thereof in riding engagement with the bottom compression roller at the most elevated part on the peripheral surface of the bottom compression roller and having a narrow flat ridge disposed on its upper surface said upper surface inclined gradually upwardly to a flat horizontal surface, said cam enclosed in a cam assembly which is of a curved configuration so as to conform to the circular pattern of the tablet machine.

3. In a rotary tablet-compressing machine the combination comprising, a rotating head, an upper punch, and a lower punch, said punches being mounted in said head for cooperating axial movement relative to each other, compression rollers located at the top and bottom of said head and contacting the upper and lower punches respectively, a cam means having the forward edge thereof in riding engagement with the bottom compression roller at the most elevated part on the peripheral surface of the bottom compression roller and having a narrow flat ridge disposed on its upper surface said upper surface inclined gradually upwardly to a flat horizontal surface, said cam enclosed in a cam assembly and secured therein by means of a pin which is inserted transversely through accommodating openings in the cam and the cam assembly.

4. In a rotary tablet-compressing machine the combination comprising a rotating head, an upper punch and a lower punch, said punches being mounted in said head for cooperating axial movement relative to each other, compression rollers located at the top and bottom of said head and contacting the upper and lower punches respectively, a cam means comprising a cam assembly with a cam element mounted therein, said cam element having the forward edge thereof in riding engagement with the bottom compression roller at the most elevated part on the peripheral surface of the lower compression roller and having a narrow flat ridge disposed on its upper surface said upper surface inclined gradually upwardly to a flat horizontal surface, said cam element being pivotally secured in the cam assembly by means of a pin and held resiliently in riding engagement with the said lower roller having a spring means mounted in said cam.

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