(No Model.) 2 Sheets—Sheet 1.

C. H. STIMSON, Jr.

MACHINE FOR MAKING PILLS, &c.

No. 342,717. Patented May 25, 1886.

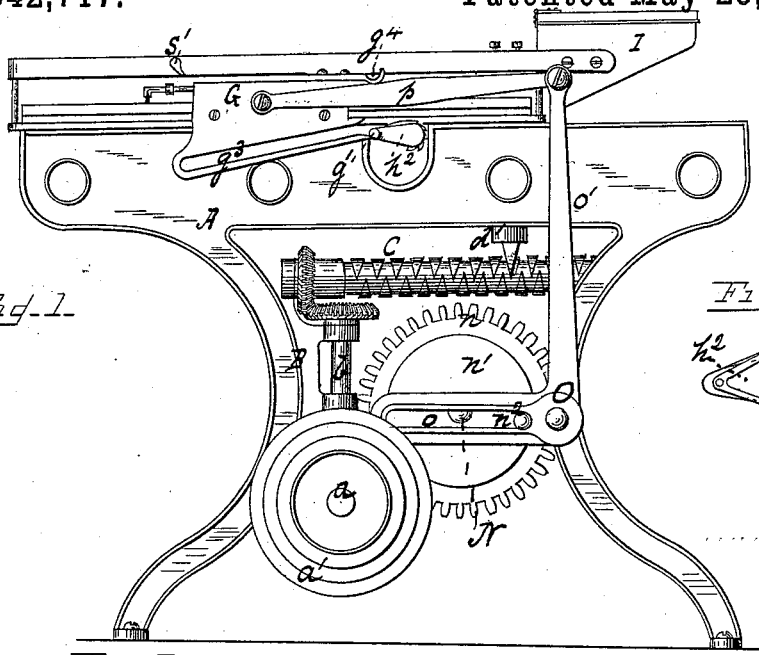

Fig. 1.

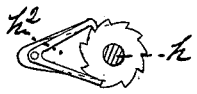

Fig. 2.

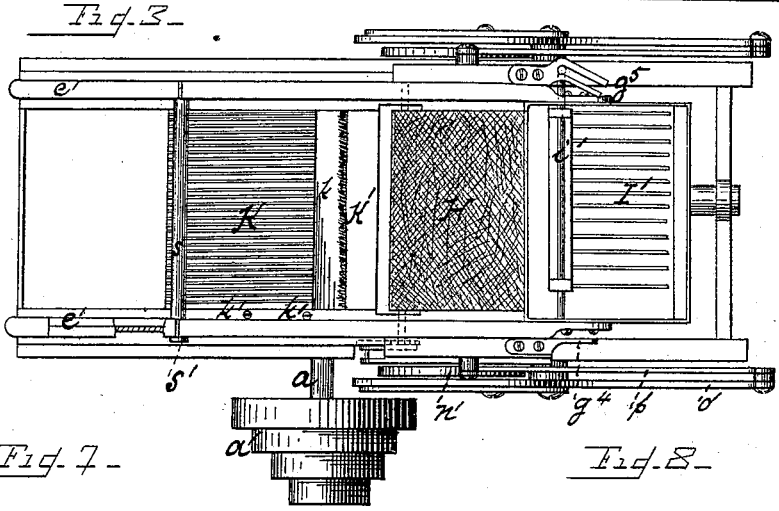

Fig. 3.

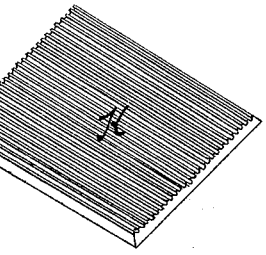

Fig. 7.

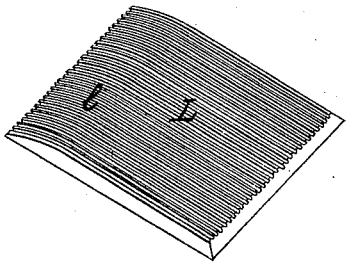

Fig. 8.

Witnesses
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(No Model.) 2 Sheets—Sheet 2.

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MACHINE FOR MAKING PILLS, &c.

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Fig. 4.

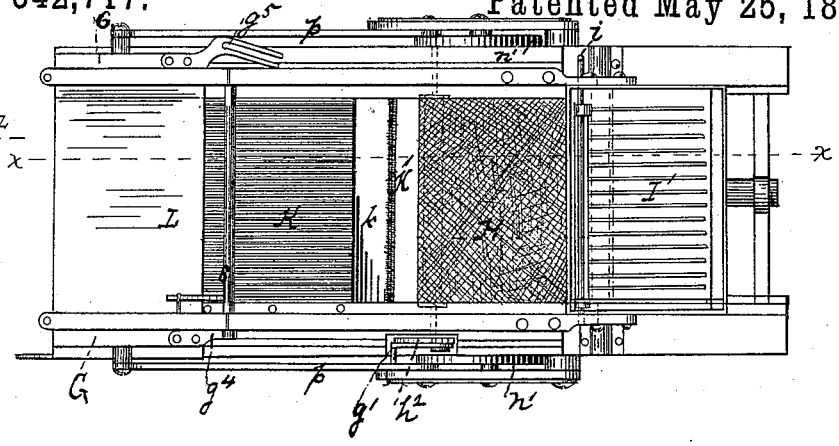


Fig. 5.

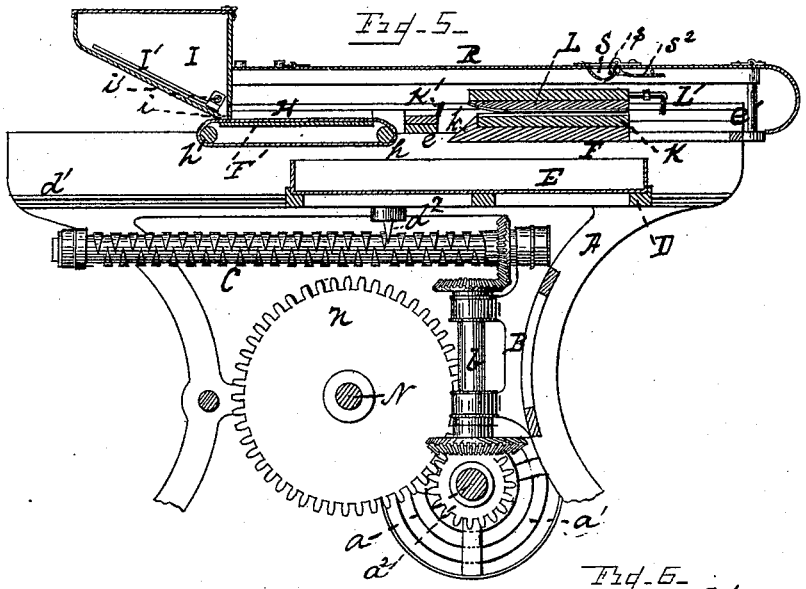
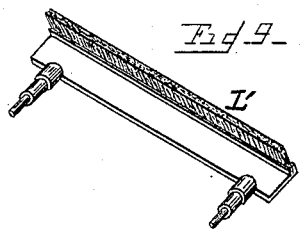


Fig. 9.



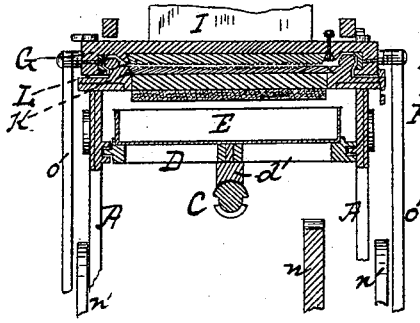
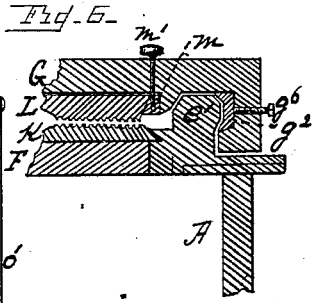


Fig. 6.



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES H. STIMSON, JR., OF NEWARK, OHIO.

MACHINE FOR MAKING PILLS, &c.

SPECIFICATION forming part of Letters Patent No. 342,717, dated May 25, 1886.

Application filed November 9, 1885. Serial No. 182,273. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. STIMSON, Jr., a citizen of the United States, residing at Newark, in the county of Licking and State of Ohio, have invented certain new and useful Improvements in Machines for Making Pills and Like Articles; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, wherein—

Figure 1 is a side elevation of a machine embodying my invention, showing the cam-fork in position for operating the powder-carrying apron. Fig. 2 is an enlarged detail view of the loose arm and ratchet, whereby the roller of the powder apron or belt is moved in one direction only. Fig. 3 is a top view of the machine, the cover partially broken away to show the interior, the upper grooved cutting and rolling or forming plate being also removed to show the powder-apron beneath. This figure also shows the cam-fork in position for operating the agitator of the powder-receptacle. Fig. 4 is a similar view, the upper grooved cutting and rolling plate being in the position it occupies when the cylinder or pencil of pill mass is fed into the machine. Figure 5 is a longitudinal vertical section of the machine on the line *x x*, Fig. 4. Fig. 6 is a vertical transverse section on the line *y y*, Fig. 4. Figs. 7 and 8 are detached views of the upper and lower grooved cutting and forming plate. Fig. 9 is a detached view of one of the clearing-brushes for cleaning the cutting and forming plate.

Like letters refer to like parts wherever they occur.

My invention relates to the construction of machinery for the manufacture of pills and like articles from a mass of plastic material, so as to obtain uniformity in weight, size, and density of the article produced, as well as the production of said articles on a large or manufacturing scale commensurate with the demands of the trade.

The class to which the machine may be said to belong is that wherein a pencil or cylindrical strip of the mass is divided into pellets and shaped into pills between two corrugated or grooved plates, of which the old and well-known hand-machine is the type.

The machinery embodying my invention, as hereinafter set forth, presupposes a cylinder or pencil upon which it is to operate, and such cylindrical strips may be previously prepared in any desired way.

Generally considered the elemental parts of my machine are a grooved bed, a grooved plate or slide coacting therewith, and mechanism for actuating the slide, a receptacle for receiving the pills, when formed, a powder-receptacle, and means for feeding the powder to the pill-receptacle. In a machine, however, which is to do continuous and rapid work satisfactorily, there are minor details to be attended to—as, for instance, where the grooved slide moves on fixed ways the leading end of the slide must be beveled to grip and gradually compress the mass, and this bevel will increase proportionately with the increase of the diameter of the plastic cylinder or pencil operated upon. Again, the grooved bed and slide will become gummed or fouled, and to insure good work must be kept clean, for which purpose I provide brushes. The knife edges or ridges of the bed and slide should always coincide, to accomplish which I provide the boxes of the slide with adjustable pieces to compensate for wear and secure the grooved plate to the slide by an adjustable key-bar.

To obviate any lumping or clogging of the powder in the powder-receptacle, and its failure to feed to the pill-receptacle, which would cause the finished pills to adhere to each other and injure the product of the machine, I provide an agitator within the powder-receptacle, and this, as well as an automatic feed, for feeding the cylindrical strip or pencil to the grooved bed and sliding plate, may be operated from the slide which carries the movable or sliding, cutting, and forming plate.

Having broadly outlined my invention and indicated its scope, I will now proceed to describe more specifically the preferred forms of its embodiment, so that others may apply the invention.

In the drawings, A indicates a frame of suitable form to support the operative parts of the machine.

Journaled in the frame A is the power-shaft *a*, from which the various devices are operated, and as it is desirable to vary the speed to suit the condition of the mass operated on, I provide the power-shaft with a set

of speed-pulleys, a', to receive the driving-belt.

Upon the power-shaft a are two pinions, one of which, a^2, (through intermediate devices,) drives the slide G that carries the reciprocating cutting and forming plate, while the other (not shown in the drawings) imparts motion to a vertical shaft, b, (journaled in a bracket, B,) which in turn operates a worm, C, which causes the travel of the carriage of the pill-receptacle.

C indicates the worm, operated from the shaft b. It is the usual cylinder in which are cut reverse threads or grooves, which necessarily intersect twice in every revolution, so that a point inserted in the groove will traverse the cylinder from end to end and reverse.

D indicates the carriage for the pill-receptacle, which moves longitudinally of the frame in grooves or ways d', and is actuated from the screw or worm C by means of a pin or fork, d^2, attached to the under side of the carriage, and whose end or ends enter the grooves of the screw.

E indicates the pill-receptacle, which may be a pan or its equivalent resting on or supported by the carriage D.

Directly over the pill-receptacle, and supported on the frame A, is a bed-plate or partial bed-plate, F, cut away, as at e, to permit the finished pill or like article to fall through into the receptacle E, and provided with rails or ways e', for the slide G, which carries the upper cutting and forming plate.

Journaled on the frame A are two rollers, h h', for carrying the apron or endless belt H, which feeds the powder to the pill-receptacle E. One of these rollers—preferably the roller h, which is located in the slot e of bed-plate F—has on the end of its shaft a loose arm or lever, h^2, provided with a pawl-and-ratchet clutch, by which it moves said roll in one direction only, and with a pin, g', by which it is moved from the slide G. The powder-apron H passes around these rollers h h', and also the inclosed portion of plate F', which supports the apron.

I indicates a powder hopper or receptacle, which is placed over the apron H at one end thereof, and from which guide-strips i may extend down to plate F' on each side of said apron, to insure its proper travel past the mouth of the hopper.

In order to prevent the balling or packing of the powder within the hopper I, and also to insure a constant and gradual feed of the powder to the apron, I arrange within the hopper I a sliding agitator, I', whose shaft i' projects through the hopper on one side into the path of a cam situated on the slide, so that every reciprocation of slide G operates the agitator I'.

K indicates the lower of the two cutting and forming plates, and L the upper. It is by means of these two plates that the cylindrical strip or pencil of mass is cut into sections and shaped.

The two plates have certain features in common—that is to say, they both have longitudinal grooves of the same width, forming knife-edge ridges, which coincide or should coincide when the corrugated plates are in the machine. They differ in the following respects: The lower plate, K, is level throughout its length, while the upper plate, L, slopes at one (its leading) end, or, in other words, is beveled for a short distance, as at l, to enable the plate on its forward movement to seize and gradually compress the pencil or cylindrical mass as it severs and rotates it. This is an important feature in machines wherein the cutting and forming plate moves on ways or in guides, and it will be evident the extent and slope of the bevel will depend on the diameter of the cylindrical mass or pencil operated on and the distance between the knife-edge ridges. These cutting and forming plates K and L are detachable from the machine, so as to be changed for plates having smaller or larger grooves, according to the size or weight of the pill to be formed on the machine. The lower plate, K, slides into a dovetailed groove on the inner side of rails or ways e' and abuts against an incline, k, (on the bed-plate F,) which, with slot e, forms a chute to direct the finished article from the plate K into the receptacle E. This plate is held firmly in position by suitable screws, k'. The upper cutting and forming plate, L, is also held in a corresponding groove in the slide G, but is secured by means of a key or wedge-bar, m, held by thumb or set screws m', which enables this plate to be adjusted so that its knife-edges exactly coincide with the knife-edges of the lower plate, K.

G indicates the slide (which moves on the ways e') for the reception of upper or reciprocating cutting and forming plate, L. This slide also carries, first, a cam for actuating the feed of the cylindrical pill strip or pencil; secondly, a cam for actuating the agitator of the powder-hopper; and, thirdly, a cam to actuate the roller of the powder-apron, for which reasons, as well as to preserve the alignment of the knife-edges of the plates K and L, it is desirable that the slide should not only run true, but be adjustable to compensate for wear; consequently I arrange within the boxes of the slide G the movable brasses or wear-plates g^2, and provide set-screws g^6 for holding and adjusting the same.

Upon one side, and dependent from the slide G, is a plate having a cam-slot, g^3, which engages with pin g' of the arm which is loosely journaled on the roller h of the apron H. This gives the apron movement. On top of the slide G, on the same side as cam g^3, is a trip-cam, g^4, which trips the leaf or door of the trough which holds the cylindrical strip or pencil of pill-mass, and on the opposite side of the slide occupying the same relative position as cam g^4 is a third cam, g^5, (or fork) which engages the end of shaft i' and operates the agitator I' of the powder-hopper.

The slide G is actuated from the power-shaft by the following or any other appropriate intermediate mechanism. The pinion a^2, before referred to as attached to the main power-shaft a, gears, with a pinion, n, on a shaft, N, also journaled in the frame A, and this shaft N has at its end the disks n', provided each with an eccentric or wrist pin, n^2. The wrist-pin n^2 engages in the slot o of an elbow-lever, O, journaled at its angle on the frame A, while the opposite arm, o', of the elbow-lever is connected by a lever or link, p, with and reciprocates the slide G.

R indicates a cover for the protection of the operative devices against dust, &c. This cover R also serves to protect the hands of the operator when the machine is fed by hand. Within this cover, if employed, or independently thereof, if desired, or the cover is dispensed with, I place over one end of the bed-plate F and its cutting and forming plate K a hopper or trough, S, one side of which, s, is pivoted on the frame and has a shaft with projecting crank-end s', which stands in the path of the trip-cam g^4 on the slide G, and I so counterweight this pivoted side or leaf of the hopper, or provide it with a spring, s^2, that when released by the cam g^4 the leaf s will fly back or close. By this means I obtain an automatic feed of the pencil mass.

In order to keep the cutting and forming plates K and L at all times clean, so that perfect pills shall be formed, I provide two clearing-brushes, the one, K', set in the bed between the chute e and the apron H, so as to clean the upper plate, L, after it has done its work, and the other, L', on the slide G in rear of the plate L, so as to sweep the lower plate, K, after the pills have passed. These brushes K' and L' may be detachably secured by a slide, (K',) and posts (L',) or in any other suitable manner, provided they are placed and arranged to operate as specified.

The devices being constructed and arranged substantially as hereinbefore specified will operate as follows:

A pencil or cylindrical stick of the pill-mass or plastic composition, in length equal to the width of the plates K or L, and of such diameter as will give the desired size (number of grains) to each pill, (or like article,) which pencil or stick may be previously formed in any of the several well-known ways, is placed by hand, or may be fed from a suitable belt or hopper, into the trough S when the operative devices are in the position shown in Fig. 4. Power is then applied to the shaft a and communicated through the intermediate gearing to the slide G, which at the close of its back-stroke causes the trip-cam g^4 to trip the pivoted leaf s of the trough S and deposit the pencil on the grooved cutting and forming plate L. The slide G then advances with the cutting and forming plate L, whose bevel l projects over the cylindrical pill mass or pencil, seizes, indents, and compresses the same, and passes it in between the plates K and L, whose knife-edge ridges sever it into pellets of equal and exact size, which pellets are then finished or formed in the grooves by the advance of the plate L. As the slide G continues to advance, the pin g' of the arm h^2, which is loosely journaled on the shaft or roll h, enters the cam-slot g^3 on the flange dependent from slide G, and the arm is rocked, and by means of the pawl-and-ratchet mechanism, (see Fig. 2,) partially rotates roll h, and causes the apron or endless belt H to feed the powder which it has received from the hopper I into the pill-receptacle E. By this time the forming and cutting plate L has advanced beyond the plate K, and the finished pills or like articles have been swept off the plate K down the chute e into the receptacle, and fall on the powder which has been deposited therein from belt or apron H. In this movement of the cutting and forming plate L over the plate K, the cleaning-brushes K' and L' have cleaned both of said forming-plates for the reception of the next cylinder or pencil of pill-mass, which meanwhile has been deposited in the trough S, as before specified. The slide G continues to advance, and when near the end of its stroke the cam-fork g^5 engages the bent end or pin on shaft i' of the agitator I', and operates the same to stir up the powder in hopper I and feed a portion of the same down on the apron H, which powder is then deposited in the pill-receptacle, as before specified. The slide then commences its return-stroke; but the cam-slot g^3, pin g', &c., do not operate the roll h reversely on this movement of the slide, because the arm is loose on the shaft and the pawl slides on the ratchet in the well-known manner. Near the close of its back-stroke, however, the trip-cam g^4 operates the leaf s of hopper S, and the following pencil is dropped in front of the cutting and forming plate L, ready for the next advance of the slide.

Among the advantages of my invention are, first, the simplicity of the devices, which enable them to be readily kept in operative condition; second, the cutting and forming plates are cleaned after each operation, so that the articles produced are all perfect; thirdly, the pills are uniformly compressed and divided, so as to obtain uniform density, weight, and size in the product; fourthly, the pills or like articles are uniformly powdered, so that none of the product of the machine is wasted by adhering or gumming; and, finally, the machine produces rapidly, averaging three hundred and sixty thousand two-and-one-half-grain pills, United States Pharmacopœia compound cathartic mass, in eight hours by one operator.

Having thus set forth the nature, operation, and advantages of my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a machine for the manufacture of pills and like articles, the combination of two cor-

rugated cutting and forming plates, one of which is sloping or beveled at its leading end, substantially as and for the purposes specified.

2. In a machine for the manufacture of pills and like articles, the combination, with corrugated cutting and forming plates, one of which reciprocates, of cleaning-brushes arranged to sweep the faces of the plates, substantially as and for the purposes specified.

3. In a machine for forming pills and like articles, the combination, with a fixed corrugated cutting and shaping plate, of a reciprocating cutting and forming plate and a sweep or brush arranged in rear of and moving with the reciprocating cutting and forming plate, substantially as and for the purposes specified.

4. In a machine for forming pills and like articles, the combination, with a reciprocating cutting and forming plate, of a fixed cutting and forming plate and a fixed brush arranged in the plane of the fixed plate and adapted to sweep the movable plate, substantially as and for the purposes specified.

5. In a machine for forming pills and like articles, the combination of a fixed cutting and forming plate, a reciprocating cutting and forming plate, a pencil-trough arranged over the fixed plate and having a movable leaf, and a trip for operating the movable leaf from the reciprocating cutting and forming plate, substantially as and for the purposes specified.

6. In a machine for forming pills and like articles, the combination, with two corrugated cutting and forming plates, one of which is adapted to reciprocate, of a powder-apron supported on suitable rollers and cam mechanism for actuating the feed-rollers of the apron from the reciprocating cutting and forming plate, substantially as and for the purposes specified.

7. In a machine for forming pills, the combination, with two cutting and forming plates, one of which is movable, of a powder-apron, intermediate mechanism, substantially as described, for actuating the powder-apron from the movable cutting and forming plate, and a pill-receptacle arranged below the powder-apron and cutting and forming plates, substantially as and for the purposes specified.

8. In a machine for forming pills and like articles, the combination of two cutting and forming plates, one of which is adapted to reciprocate, a pill-receptacle, and a powder-hopper having a powder feed (or agitator) actuated by the reciprocating cutting and forming plate, substantially as and for the purposes specified.

9. In a machine for forming pills and like articles, the combination of two cutting and forming plates, one of which is adapted to reciprocate, a powder-apron for conveying powder to dust the finished pill, a powder-hopper arranged over the apron and having an agitator, and cam mechanism for actuating the powder-apron and the agitator from the reciprocating cutting and forming plate, substantially as and for the purposes specified.

10. In a machine for forming pills and like articles, the combination of two cutting and forming plates and a key-wedge and set or thumb screws for securing one of said cutting and forming plates adjustable with its holder, substantially as and for the purposes specified.

11. In a machine for forming pills and like articles, said machine having two cutting and forming plates, one of which is movable, the combination, with the movable cutting and forming plate, of a slide having wear-compensating boxes, substantially as and for the purposes specified.

12. In a machine for forming pills and like articles, the combination of two cutting and forming plates, a powder-feed, and a pill-receptacle arranged below the powder-feed and forming-plates, and mechanism, substantially as described, for actuating the powder-feed and traveling pill-receptacle, substantially as and for the purposes specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 5th day of November, 1885.

CHARLES H. STIMSON, JR.

Witnesses:
F. W. RITTER, Jr.,
H. A. HALL.