Dec. 24, 1929. C. E. McMANUS 1,740,697

TIN PLATE SPOTTING MACHINE

Filed June 27, 1925

Fig. 1,

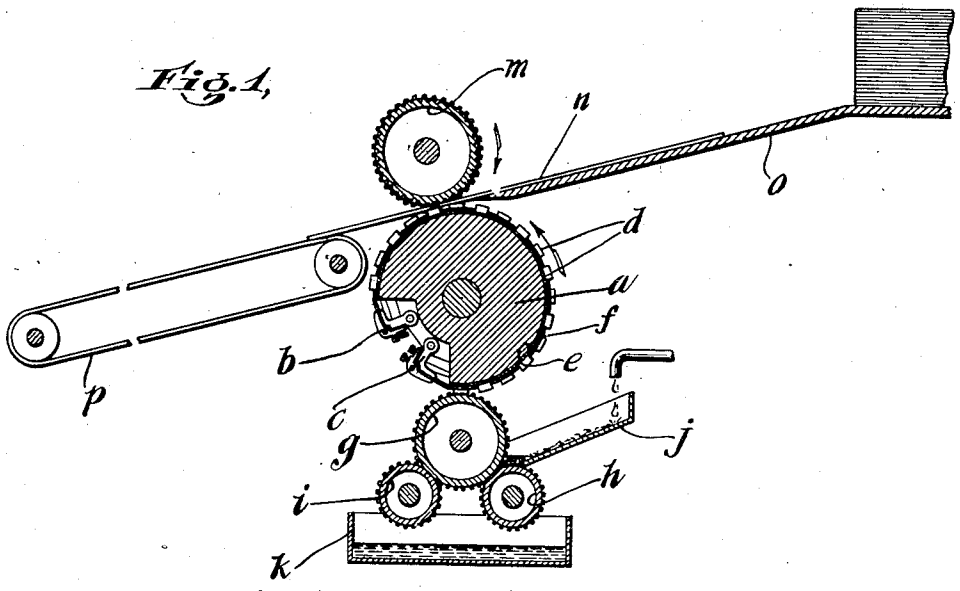
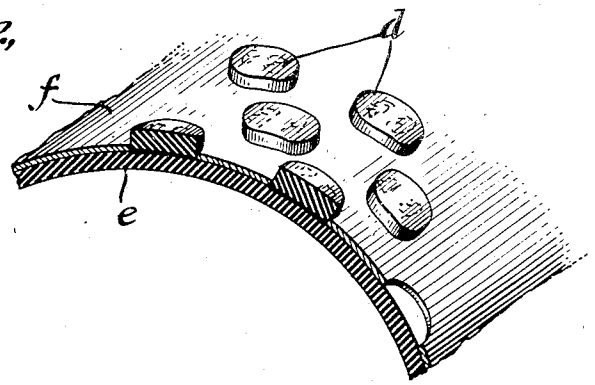


Fig. 2,



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BY Francis P. Wentworth his ATTORNEY.

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UNITED STATES PATENT OFFICE

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TIN-PLATE-SPOTTING MACHINE

Application filed June 27, 1925. Serial No. 40,125.

My invention relates to tin plate spotting machines, and more particularly to a machine adapted to apply spaced spots of adhesive material upon tinned sheets for use in the manufacture of bottle caps of the crown type.

By one method of producing bottle caps of the character above referred to, a cushion disk of cork, or composition cork, is secured within a metal shell having a fluted skirt, by means of a resinous cement which is made tacky so as to act effectively as an adhesive, either by the application of heat to the shell while in the assembling machine, or by the application of a solvent to the resinous cementitious material and the driving off of the solvent from the cement by the application of heat. Irrespective of the manner of making the cement tacky, the cement, as the metal shells are delivered to the bottle cap assembling machine, is in a hard dry state, baked directly upon the tin of which the shell is formed, and is limited to a spot of substantially the area of the inner side of the top of the shell.

While in the bottle cap art, spotting with cement is old and well known, this method has not been used to any material extent because of the difficulties of limiting the area to which the cement is applied, so that this material will not foul the dies in the punch press used in making the caps, or interfere with the lubrication of said dies which is necessary to the economical production of the shells.

While a very thin coating of adhesive is required, nevertheless by methods and machinery heretofore used, there has always been extreme difficulty in limiting the operative area of the surface used for applying the cement to the tin sheet. It has been attempted to use ordinary planographic printing surfaces for spotting tin sheets for the purposes above described, but machines using such surfaces have been found unsuited for the work, since the wetting operation incidental to such presses, is not effective when using resinous or like cements, and the cleaning of the plates and of the offset planographic surface is extremely difficult, and requires so much time as to materially reduce the output capacity of such a machine.

With the above conditions in mind, I have devised a machine so constructed as to permit the control of the area of each spot of cement and ensure uniformity in the area of all spots on each tin plate while permitting a continued operation of the machine at its maximum speed.

In a machine embodying my invention, no such fouling of the spot applying member can occur as to result in any material variation in the quantity of adhesive contained in each spot or the area of the spot, and as a result of this condition, a continued running of the machine is possible.

The resinous cement as used in the machine, while viscous, is nevertheless much thinner than printer's ink, and requires merely a distributing thereof upon rollers, and no cutting or working as in a printing machine. In fact the resinous material entering into the adhesive, contains a solvent which prevents the hardening thereof in and about the spotting machine, the solvent subsequently being driven off from the adhesive in an oven so that the spots of adhesive upon the tin plates are dry when these plates are fed to the punch presses in which the metal shells are formed.

The construction of the spotting elements is such as to ensure uniformity in pressure conditions between every point of each element and the tin plate, while avoiding any material expansion and deflection of this element as a result of such pressure. In actual practice, each tin plate will have hundreds of these spots applied thereto, and the construction of the spotting member is such that while the elements thereof which apply the adhesive to the tin plate are of flexible material, nevertheless, each of these portions is rigidly supported so as to check any material expansion thereof under the pressure incidental to the applying of the cement to the tin plate, and also rigidly supported in relation to adjacent similar portions, and to the cylinder carrying all of said portions, so as to ensure accuracy in the positioning of all of the spots upon the tin plate.

The machine of my invention is essentially

a cylinder machine, this construction being essential to ensure the proper application of the resinous cement to the spotting elements, and also to permit the development of the desired speed in the machine.

The invention consists primarily in a tin plate spotting machine embodying therein a cylinder having upon its surface, a member comprising a plurality of spaced resilient spotting elements, a metallic plate having a plurality of openings therein through which said elements respectively project, and a resilient backing positioned between said metallic plate and the surface of said cylinder to which said elements respectively are connected, means carried by said cylinder adapted to secure said metallic plate in position thereon, a roller engageable by said elements, means applying cement or other material to said roller, and a presser cylinder co-operating with said first named cylinder; and in such other novel features of construction and combination of parts as are hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

Referring to the drawings,

Fig. 1 is a longitudinal section through a machine embodying my invention; and

Fig. 2 is an enlarged view of a fragmentary portion of the spotting member carried by one cylinder of the machine.

Like letters refer to like parts in both of said views.

In the embodiment of my invention shown in the drawings, *a* indicates a cylinder provided with clamp members *b* and *c*, such as are commonly used upon the metal plate cylinders of planographic printing machines. This cylinder has mounted thereon a spotting member comprising a number of spotting elements *d*, which ordinarily are round in form and made of soft vulcanized rubber. These elements *d* are either formed integral with, or cemented to, a common backing *e* which also is preferably made of soft vulcanized rubber. The backing *e* and elements *d* are secured in relation to the cylinder *a* by means of clamps *b* and *c*, through the medium of a metallic plate *f* having openings therein through which the elements *d* project. These elements extend beyond the plate *f*, outwardly of the cylinder *a*, to an extent to limit the engagement of the spotting member with a plate, to the outer faces of the elements *d*. The openings through the plate *f* have a fairly tight fit about each of the elements *d*, thus serving to rigidly support each of these elements, and also to rigidly position it in relation to all of the other elements, thus ensuring continued accuracy in the locating of all of the spots upon the various tin plates.

In actual practice, the elements *d* need not extend beyond the metallic plate *f* to any great extent, a distance of .025 of an inch being adequate to secure excellent results. This distance may be varied so long as the extent of projection is within limits which will preclude undue expansion or deflection of the elements as a result of the pressure incidental to the application of the cement thereto and therefrom to a tin plate.

In the production of the spotting member, the elements *d*, backing *e* and reinforcing and securing plate *f* constituting the spotting member, are assembled and placed upon a cylinder of substantially the same diameter as the cylinder *a*. When so positioned, the cylinder is turned in relation to a grinding tool which will impart a curvature to each element *d* concentric with that of the cylinder upon which the spotting member is mounted, so that when this member is mounted upon the cylinder *a*, the surface of each spot will be upon an arc concentric with said cylinder.

Below the cylinder *a* are distributing rollers *g*, *h* and *i*, one of which as *g* is in engaging relation with the outer surfaces of the spotting elements *d* upon said cylinder. The cement is constantly delivered or flowed in a viscous form to a trough *j* along which it flows into engaging relation with the rollers *g* and *h* so as to cause it to be spread in a thin film upon the former of these rollers. The roller *i* serves merely as a supplemental distributing roller. Any surplus adhesive will fall within a tank *k*. The rollers *g*, *h* and *i* are preferably metal rollers.

Associated with the cylinder *a* is a presser cylinder *m*, the tin plates indicated at *n* passing between the spotting member upon the cylinder *a* and said cylinder *m* from a feed shelf *o* to delivery chains *p*.

The operation of the herein described spotting machine is substantially as follows:—

With the rotation of the cylinder *a* in the direction indicated by the arrow, the various elements *d* of the spotting member carried by said cylinder receive resinous cement in a thin film from the roller *g*, the curvature of the top surface of each element *d* insuring a uniform pressure relation between each of these elements and the cylinder *h*, this pressure relation being very light. The method of making the spotting mechanism, including the step of grinding the top surface of the various elements *d*, will permit all of thes elements upon the spotting member to be brought to exactly the same level, or height, so as to make the pressure relation as to each element the same as with every other element, both when receiving the cement from the roller *g* and when applying it in spot form to each plate *n*. Without this curvature there would be developed excessive pressure adjacent the forward and rear edge of each spotting element *d* in the direction of rotation of the cylinder *a*. This would not only interfere with the proper application of the adhesive thereto by the roller *g* through the tendency

of the element to squeeze the cement from between it and the roller at such points, but as each spot engages the plate would cause a tendency of the same portions of each spotting element to spread the cement beyond the desired area for the spot of adhesive upon the tin plate, and thus cause this cement to extend to a point where it would be engaged by the forming die in making the shell.

In fact there are two essentials in the application of adhesive to within the tops of the metal shells, one being the limitation of the quantity of adhesive to a thin film and the other being the assurance of the presence of sufficient of the adhesive toward the center of the shell to ensure a firm binding of the cushion disk at this portion of the shell, which is slightly dished.

The projection of the various elements *d* beyond the pierced metal plate *f* will limit the application of the cement to the top surface of each element, thus avoiding the necessity for making any provision in the machine for applying water or other material to any portion of the spotting member in order to define the area of the surface to which the cement will be applied. This condition avoids all possibility of any variation in the size of the cement spots irrespective of the length of a run of the machine. During the run of a machine no cleaning of the spotting member is required, the manner of applying the cement to the element *d* and the manner by which such cement is applied to the tin plates *n* preventing any possibility of the fouling of the spotting member since there can be no substantial accumulation of the cement upon or about the various elements *d*.

While I prefer to use in a machine a slightly viscous resinous cement, the degree of viscosity being such as to permit it to flow readily, if desired a cement in the form of paste such as casein cement or albuminous cement, also in the form of a paste, may be effectively used.

It is apparent that the feeding and delivery mechanisms for the tin plates may be of any desired construction, the details thereof being immaterial to the invention.

It is not my intention to limit the invention to the precise details of construction shown in the accompanying drawings, it being apparent that such may be varied without departing from the spirit and scope of the invention.

Having described the invention, what I claim as new and desire to have protected by Letters Patent, is:—

1. In a machine as described a cylinder having upon its surface, a member comprising a plurality of spaced resilient spotting elements, a metallic plate having a plurality of openings therein through which said elements respectively project, and a resilient backing positioned between said metallic plate and the surface of said cylinder to which said elements respectively are connected, and means carried by said cylinder adapted to secure said member in position thereon.

2. In a machine as described a cylinder having upon its surface, a member comprising a plurality of spaced resilient spotting elements, the surface of each element extending upon a curve concentric with the surface of said cylinder, a metallic plate having a plurality of openings therein through which said elements respectively project, and a resilient backing positioned between said metallic plate and the surface of said cylinder to which said elements respectively are connected, and means carried by said cylinder adapted to secure said member in position thereon.

3. In a machine as described a cylinder having upon its surface, a member comprising a plurality of spaced resilient spotting elements, a metallic plate having a plurality of openings therein through which said elements respectively project, and a resilient backing positioned between said metallic plate and the surface of said cylinder to which said elements respectively are connected, and means carried by said cylinder engageable with said metallic plate whereby said member is secured in position upon said cylinder.

4. In a machine as described a cylinder having upon its surface, a member comprising a plurality of spaced resilient spotting elements, the surface of each element extending upon a curve concentric with the surface of said cylinder, a metallic plate having a plurality of openings therein through which said elements respectively project, and a resilient backing positioned between said metallic plate and the surface of said cylinder to which said elements respectively are connected, and means carried by said cylinder engageable with said metallic plate, whereby said member is secured in position upon said cylinder.

5. In a machine as described a cylinder having upon its surface, a member comprising a plurality of spaced resilient spotting elements, a metallic plate having a plurality of openings therein through which said elements respectively project, and a resilient backing positioned between said metallic plate and the surface of said cylinder to which said elements respectively are connected, means carried by said cylinder adapted to secure said metallic plate in position thereon, a plurality of metallic distributing rollers, one of which is in engagement with the elements upon said member, a trough by which a cement is flowed into engaging relation with two of said rollers, a tank positioned below said rollers, and a

presser cylinder co-operating with said first named cylinder.

6. In a machine as described a cylinder having upon its surface, a member comprising a plurality of spaced resilient spotting elements, the surface of each element extending upon a curve concentric with the surface of said cylinder, a metallic plate having a plurality of openings therein through which said elements respectively project, and a resilient backing positioned between said metallic plate and the surface of said cylinder to which said elements respectively are connected, means carried by said cylinder engageable with said metallic plate, whereby said member is secured in position upon said cylinder, a plurality of metallic distributing rollers, one of which is in engagement with the elements upon said member, a trough by which a cement is flowed into engaging relation with two of said rollers, a tank positioned below said rollers, and a presser cylinder co-operating with said first named cylinder.

In witness whereof I have hereunto affixed my signature this 22nd day of June 1925.

CHARLES E. McMANUS.