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H. J. PAYNTER

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COATING MACHINE

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Fig 1

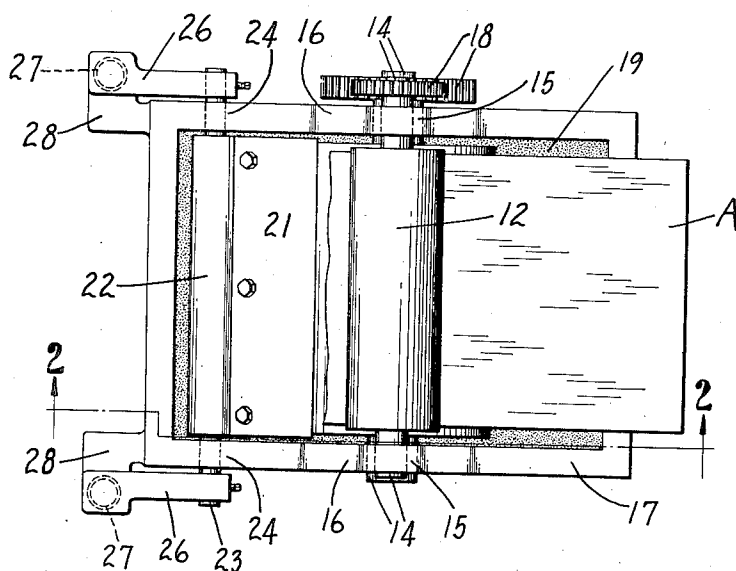


Fig 2

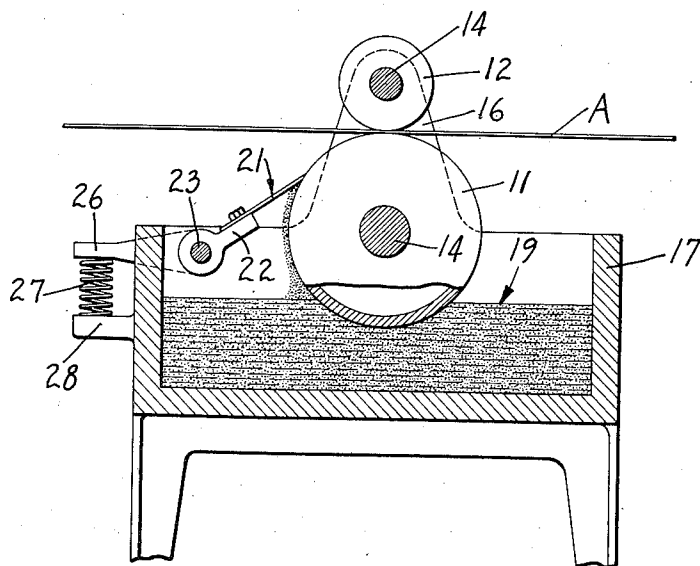
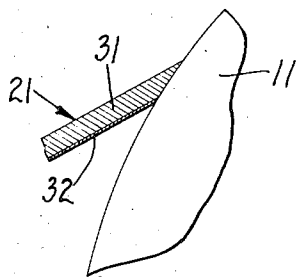


Fig 3



INVENTOR.
Horace J. Paynter
BY *Donna R. Thornburgh*
Charles H. Cline
ATTORNEYS

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COATING MACHINE

Horace J. Paynter, Union, N. J., assignor to American Can Company, New York, N. Y., a corporation of New Jersey

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5 Claims. (Cl. 91—51)

The present invention relates to coating machines for applying ink, adhesive or the like substances to web or sheet material and has particular reference to an improved scraper blade or doctor having a hardened surface for use in such a machine.

In modern coating machines which are adapted to apply a coating in the form of a design or the like to sheet material the coating substance is preferably applied by an etched roller rotating in a tank of the substance, the excess substance being scraped off the roller by a doctor before it engages the sheet. For high speed production the doctor is subjected to excessive wear and it has been found that during a day's run on certain kinds of work the doctor must be replaced several times. The present invention contemplates overcoming this difficulty by means of an improved doctor having all of the necessary characteristics of flexibility, evenness of edge, etc., but at the same time having a scraping surface of a relatively hard material which will stand up under such high production strains.

An object therefore of the invention is the provision of a doctor for a coating machine wherein the material of which the doctor is made is a relatively soft material which has applied to a surface thereof a layer of relatively hard material thereby producing a doctor in which the softer material wears away quicker than the hard material leaving the latter to carry the greater proportion of pressure exerted on the doctor and providing a keen thin edge of long wearing quality to perform the scraping operation.

Another object is the provision of such a doctor wherein the body portion is made of spring bronze or brass which forms a backing for a thin layer of chromium applied to a surface thereof thereby producing a doctor of long wearing qualities and capable of maintaining a keen hard scraping edge.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawing, discloses a preferred embodiment thereof.

Referring to the drawing:

Figure 1 is a top plan view of a coating machine embodying the instant invention, with parts broken away;

Fig. 2 is a sectional view taken substantially along the line 2—2 in Fig. 1; and

Fig. 3 is an enlarged fragmentary detail of the doctor in engagement with the coating roller.

As a preferred embodiment of the invention the drawing illustrates the principal parts of a coating machine adapted to apply fluid adhesive in a preferred design to the bottom surface of a substantially continuous web of sheet material A which is fed through the machine.

Such a machine includes an adhesive applying roller 11 having a design etched on its outer surface and a frictionally engaging pressure roller 12 which are adapted to feed the web of material to be coated through the machine while simultaneously applying to it a coating of adhesive. These rollers are carried on cross shafts 14 which are journaled in bearings 15 formed in side frames 16 projecting upwardly from an adhesive tank or reservoir 17. The shafts are preferably geared together by meshing gears 18 and are rotated in unison in any suitable manner.

The applying roller 11 is disposed in the tank 17 and rotates in a bath of adhesive 19 contained in the reservoir. Hence as the applying roller rotates it carries upon its surface a quantity of the adhesive 19 and conveys it toward the web A.

Provision is made for scraping off the excess adhesive from the surface of the applying roller 11 so that only that portion which is to be applied to the web will be left in the etched recesses of the design on the roller. This scraping action is effected by a doctor 21 which is disposed adjacent the applying roller in dragging engagement therewith and extends across the face of and for the full length of the roller.

The doctor 21 is bolted to a rocker bracket 22 mounted on a cross shaft 23 carried in bearings 24 formed in the side wall sections of the tank 17. The ends of the shaft extend beyond the tank and carry outwardly extended arms 26. The outer or free ends of the arms engage on top of compression springs 27 seated on lugs 28 formed on the tank. These springs force the outer ends of the arms upwardly and hence keep the roller contacting edge of the doctor in tight engagement with the outer surface of the applying roller.

The doctor is preferably made of a relatively soft material such as spring bronze, brass or the like, which is indicated in Fig. 3 by the numeral 31. This soft material serves as a base and a backing for a thin layer (approximately one-thousandth of an inch thick) of a relatively hard material such as chromium or the like (marked 32) applied to the bottom surface of the doctor.

Hence as the springs 27 force the engaging edge of the doctor against the rotating applying roller 11 the relatively soft material wears away faster than the relatively hard material. This leaves

the hard thin edge as a superior keen scraping medium which performs the scraping action on the roller in a greatly improved manner, the softer backing material doing no scraping work but merely serving as a support for the relatively hard layer. Due to the difference in hardness between the materials the pressure of the springs transmitted to the softer material will be only a fraction of that carried by the harder material thereby bringing the greater portion of the pressure to bear on the keen scraping edge and hence producing a tighter contact between the scraping edge and the roller.

It has been found that a doctor of this construction produces a better scraping action than anything heretofore devised. Experience shows that it also has a longer life than the usual doctors heretofore used. Records of continuous use show that the amount of wear in doctors of this improved two metal construction is relatively exceedingly small. As one concrete example, a single doctor has been continuously in use over a period of several months during which several million impressions were made and the wear is hardly noticeable. This when taken in contrast to ordinary doctors which at best are good for only two or three days under high production is very impressive.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a machine for applying a coating substance to sheet material, the combination of a rotating coating roller, means for applying a coating substance to said coating roller, and a doctor engaging said roller for scraping off excess coating substance therefrom, said doctor including a relatively soft material serving as a base for a layer of relatively hard material so that wearing

of the roller engaging edge of said doctor will be more rapid along the relatively softer material thereby leaving said relatively hard material as a keen edge for scraping.

2. A doctor for a coating machine, comprising a base of a relatively soft material, and a layer of a relatively hard material on a surface of said base, said materials forming a scraping edge having a relatively soft section and a relatively hard section, said soft section serving as a support for said hard section which wearing away more rapidly than said hard section maintains a hard keen edge for scraping.

3. A doctor for a coating machine, comprising a base of a relatively soft material, and a surface layer of a relatively hard material and of comparatively thin cross section, said materials forming a composite scraping edge having a relatively soft section and a relatively hard section, the soft section serving as a support for said thin and hard section and which wearing away more rapidly than said hard section produces an improved hard, thin and keen edge for scraping.

4. A doctor for a coating machine, comprising a base of spring bronze, and a thin layer of chromium on a surface of said base, said combined metals forming a scraping edge having a relatively soft section and a relatively hard section, said soft section being adapted to serve as a support for said thin layer of relatively hard section and being adapted to wear away more rapidly than said hard section thereby producing a thin hard and keen edge of long wearing quality to perform the scraping action.

5. A doctor for a coating machine, comprising a base of brass, and a thin layer of chromium on a surface of said base, said combined metals forming a scraping edge having a relatively soft section and a relatively hard section, said soft section being adapted to serve as a support for said thin layer of relatively hard section and being adapted to wear away more rapidly than said hard section thereby producing a thin hard and keen edge of long wearing quality to perform the scraping action.

HORACE J. PAYNTER.