United States Patent [19]

Corbellini

[11] **3,793,140**

[45] **Feb. 19, 1974**

[54] **ARC FOIL BLADE FOR MACHINE WIRES OF PAPER MAKING MACHINES**

[76] Inventor: **Glauco Corbellini,** Via Del Bon, 61, Udine, Italy

[22] Filed: **Nov. 17, 1971**

[21] Appl. No.: **199,733**

Related U.S. Application Data

[63] Continuation of Ser. No. 872,203, Oct. 29, 1969, abandoned.

[30] **Foreign Application Priority Data**

Jan. 29, 1969 Italy 60504/69

[52] **U.S. Cl.** **162/352,** 162/374

[51] **Int. Cl.** **D21g 9/00**

[58] **Field of Search** 162/352, 374, 351, 354

[56] **References Cited**

UNITED STATES PATENTS

3,393,124	7/1968	Klinger et al.	162/352
3,446,702	5/1969	Buchanan	162/374
3,404,066	10/1968	Francois	162/374
3,351,524	11/1967	Duncan	162/374
3,535,204	10/1970	Truxa	162/352

OTHER PUBLICATIONS

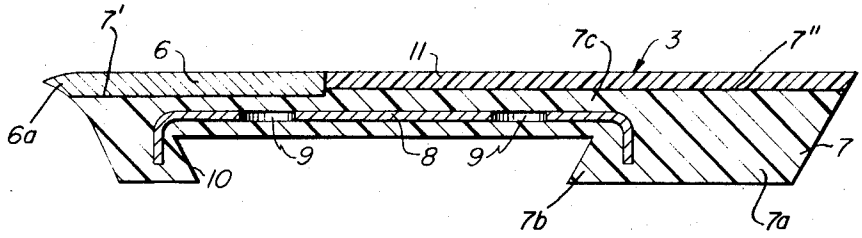
Bissell, "Chromium Plating in the Paper Industry", Reprinted from The Paper Industry – Nov. 1930.

Primary Examiner—Arthur D. Kellogg
Assistant Examiner—Alfred D'Andrea, Jr.
Attorney, Agent, or Firm—Harold L. Stowell

[57] **ABSTRACT**

An arc foil blade which is placed below a paper making machine forming wire to aid in liquid drainage is formed by a casting process and includes a body member made of plastic material, a strip of wear resistant hard casting metal alloy secured to the upper portion of the body member, and an elongated member made of antiabrasive plastic material secured to the body member in superimposed relation to the trailing edge portion thereof and presenting a substantially flat coplanar surface trailing from the strip of metal alloy. A metal insert is embedded within the body member for reinforcement. The casting alloy may contain 2 percent carbon, 35 percent chromium, 18 percent tungsten, cobalt, and traces of iron manganese, silicon, and nickel.

3 Claims, 3 Drawing Figures



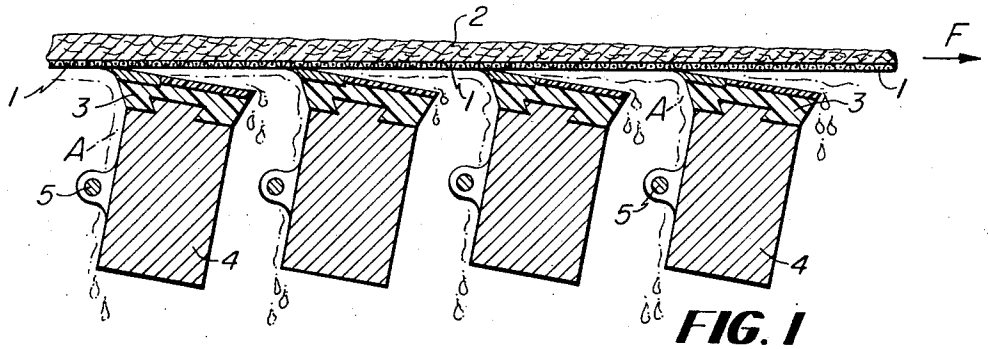


FIG. 1

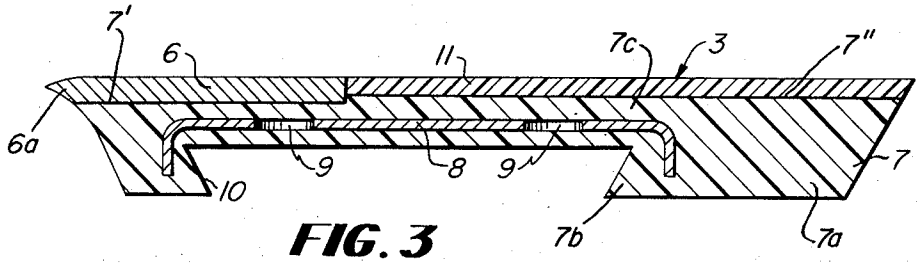


FIG. 3

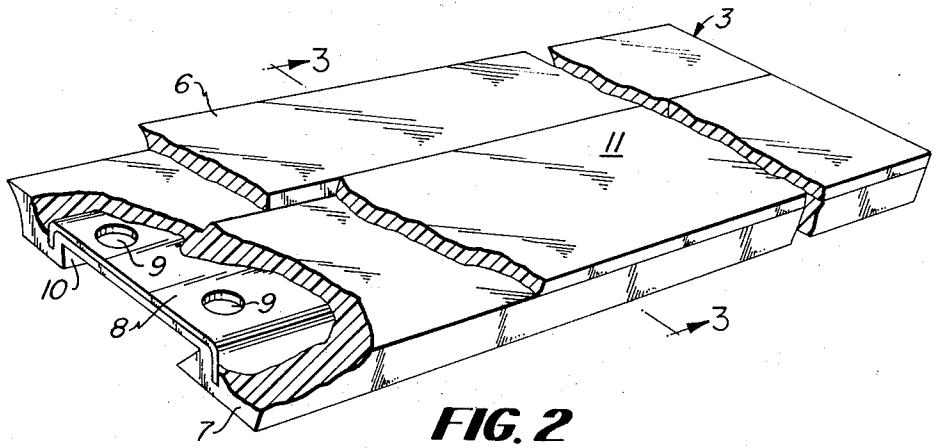


FIG. 2

INVENTOR.
GLAUCO CORBELLINI
BY Stowell & Stowell
ATTORNEYS

AN ARC FOIL BLADE FOR MACHINE WIRES OF PAPER MAKING MACHINES

This is a continuation of application Ser. No. 872,203 filed Oct. 29, 1969 and now abandoned.

This invention relates to an arc foil blade for machine wires of paper making machines.

It is known that in paper making machines provision is made for an apparatus referred to as machine wire, comprising a looped cloth belt and rotable on rollers, a wood pulp mixed with water being deposited on said machine wire from a headbox. The water filters below the machine wire, as the latter is moving on its supporting rollers, so that the pulp will leave the machine wire at a wet state only and ready to become paper.

In order to reduce manufacturing costs, the trend exists to increase the machine wire speed more and more, which involves however a shorter stay time for the pulp on said machine wire, thus making it extremely difficult to evenly remove the largest amount of water as possible from the pulp.

In order to solve this problem, i.e., to increase the machine wire speed and simultaneously to enable the pulp, as deposited on said machine wire, to loose the largest amount of water as possible, according to the prior art elongated blades have been provided, arranged below the machine wire transversely thereto, and sweeping the underside of the machine wire; these blades are mounted subsequently to one another and as with a free edge thereof they contact the machine wire, while the latter is fastly moving, they will cause a vaccum below the machine wire promoting the water even exiting from the pulp to provide good-quality paper.

However, these known blades exhibit substantial disadvantages, since such blades when made of too soft materials would quickly wear out and should be frequently replaced. Attempts have been made to make the blades of extremely hard materials, such as ceramic materials and carbides, but it was found that such materials, which in practice cannot be machined to form large-sized blades having a perfectly flat smooth free edge intended to face the machine wire, and this due to flaws and hardness thereof, would cause a quick wear in the machine wire which, therefore, should be frequently replaced. In this connection, it should be noted that the cost for the machine wires is very high and the replacement thereof would involve the stopping of the entire plant for paper making and resulting very considerable economical losses.

Therefore, the need exists for making the above blades of materials which are hard, that is to say wear resistant, have a very low coefficient of friction and are resistant to corrosive action of the liquids draining through the machine wires of the paper making machine. As in the case hereinabove mentioned, the manufacturing of arc foil blades with these alloys is extremely difficult and expensive, since efforts have been hitherto directed to make blades having a substantial cross-section in order to assure a per se considerable bending and torsional mechanical strength.

It is the object of the present invention to overcome the disadvantages mentioned above and, particularly, to provide an arc foil blade, relatively inexpensive and made of an antiabrasive hard metal alloy, not attackable by chemical agents and having a low coefficient of friction.

Another object is to provide a blade which may be made in a comparatively simple manner with a free edge intended to sweep the underside of the machine wire in paper making machines, this edge being perfectly straight and smooth.

Still another object is to provide a blade of a lower weight than that of the prior art blades and capable of being mounted below the machine wire onto a bearing, the simple pivoting of which allowing to remove the clearances as caused by wear between the blade and machine wire the paper making machine operation.

These and still other objects are attained by an arc foil blade comprising a first elongated plastic material body reinforced by at least one metal insert and having a portion thereof which is shaped for mounting on a supporting beam, an elongated strip of antiabrasive hard metal alloy, not attackable by chemical agents and having a low coefficient of friction, this strip being fast with said first body and having a longitudinal edge thereof projecting from a longitudinal edge of said first body, and a second antiabrasive plastic material body fast with the first body and said strip, providing therewith a substantially flat free surface.

In order that the blade structure and features be more clearly understood an embodiment thereof will now be described by mere way of not limiting example, reference being had to the accompanying drawing, in which;

FIG. 1 is a schematical longitudinal view showing a portion of a machine wire and a cross-sectional view showing four arc foil blades located below said machine wire;

FIG. 2 is a perspective and partly sectional view of a blade; and

FIG. 3 is a cross-section of said blade according to line III—III in FIG. 2.

FIG. 1 shows a portion of a machine wire 1 for a paper making machine, this machine wire moving in the direction of arrow F and on which a known type of headbox (not shown) has deposited the wood pulp 2. Arc foil blades 3 are provided below the machine wire 1 and have a free longitudinal edge sweeping the underside of machine wire 1, these blades 3 transversely extending of machine wire 1 and having a longitudinal dovetail groove allowing the blades to be mounted onto a shaped projection of a rigid beam 4 which is pivoted on a pin 5 carried by a fixed frame of the machine (for simplicity also not shown in the drawing).

During the papermaking machine operation, the machine wire 1 moves fast contacting the free edge of blades 3, where a vacuum is built up promoting the outlet of pulp 8 and water A through machine wire 1. As the machine wire moves rightward, the water content of pulp 2 evenly decreases and the thickness of the pulp on the machine wire decreases as well.

When a clearance is generated by wear between the free edge of blades 3 and underside of the machine wire, it will suffice to rotate anticlockwise beams 4 on their pins 5 to remove such a shortcoming; of course, this applies only within some limits which can be readily experimentally determined.

FIGS. 2 and 3 particularly show the structure of blade 3, comprising an elongated strip 6 of a low coefficient of friction, not attackable by chemical agents, antiabrasive hard metal alloy, this strip 6 being fast with a first elongated body 7 made of plastic material and reinforced by a longitudinal metal insert 8 having holes

9 assuring a good anchorage for insert 8 within the plastic material body 7.

The body 7 has a body portion 7*a* provided with an upper portion 7*c* and a lower portion 7*b*. The upper portion 7*b* has a leading edge portion 7′ and a trailing edge portion 7″. The lower portion of said first body 7 has a longitudinal groove with inclined edge 10 conferring a dovetail configuration to said groove and allowing the blade mounting by simple sliding on a dovetail-shaped projection forming part of one of the beams 4 previously described.

A second elongated body 11, made of antiabrasive that is to say abrasive resistant plastic material, is also secured to the upper surface 7*c* of said body 7, the free surface of body 11 and strip 6 forming a substantially flat surface facing the machine wire 1 when the latter is operating.

Besides by metal insert 8, the first body 7 is also preferably reinforced by fiber glass uniformly distributed within the plastic material forming said body 7.

The elongated strip 6 is made of a carbon, chromium, tungsten, cobalt alloy, in the case comprising traces of iron, manganese, silicon and nickel, it being particularly found that an alloy comprising carbon 2 percent, chromium 35 percent, tungsten 18 percent, and cobalt and traces of iron, manganese, silicon and nickel to balance, will fully meet the desired purpose. It should be noted that the presence of iron, manganese, silicon and nickel in the alloy is not essential.

As seen, the transverse dimensions of the elongated metal strip 6 are somewhat reduced relative to the entire blade 3, which allows said strip to be provided in the desired configuration and with its free of leading edge 6*a* intended to project from the leading edge 7′ of body 7 and to contact the substantially quite straight machine wire 1; this would be impossible or rather difficult to be obtained, should the blade 3 be made of the same metal alloy as that of strip 6, since the blade can be provided only by casting and would considerably buckle when being cooled. The mechanical operations which would then be required for making quite linear and flat the free edge of the blade intended to face the machine wire 1 would be extremely difficult due to transverse dimensions of the blade and resulting extent of deformations.

The mechanical operations which are instead required for making flat and quite straight the free edge of strip 6 after it has been formed are on the contrary comparatively simple, as mentioned above.

For providing the blade, as shown in FIGS. 2 and 3, use is made of a die having a recess as shaped as the blade to be obtained. The elongated metal strip 6 and metal insert 8 are first placed within the die recess and then the antiabrasive plastic material intended to form body 11 is poured. After hardening of body 11, the plastic material intended to form body 7 is poured into the die recess. The plastic materials, forming bodies 7 and 11, are introduced into the die recess at a liquid state and, to cure therein, hardening and firmly binding to each other and strip 6.

What I claim is:

1. An arc foil blade made by a casting process and adapted to be mounted below and in supporting relation to the machine wires of a paper making machine comprising,

a. a first elongated body member formed of plastic material having an upper and lower portion, a metal insert embedded within said body member for reinforcing the body member, the lower portion being formed for mounting on a supporting beam and the upper portion having a leading and a trailing edge portion in relation to the overlying moving wires,

b. a strip of wear resistant hard metal cast alloy secured to the upper portion of the first member and fixedly superimposed on the leading edge portion thereof with said strip having a leading edge portion projecting beyond the leading edge portion of the first member to contact the under surfaces of the wires, said strip consisting of about 2 percent carbon, about 35 percent chromium, about 18 percent tungsten and about 45 percent cobalt, and

c. a second elongated plastic materials member of a thickness comparable to the metal cast alloy strip and secured to the first member in superimposed relation to the trailing edge portion thereof and presenting a substantially flat coplanar surface trailing from the strip of metal cast alloy.

2. An arc foil blade according to claim 1 wherein said lower portion of the first elongated body member is formed with a dovetail groove extending throughout the length of said body portion for mounting it on a supporting beam.

3. An arc foil blade according to claim 1 wherein said first elongated member of plastic materials is reinforced also by fiber glass.

* * * * *