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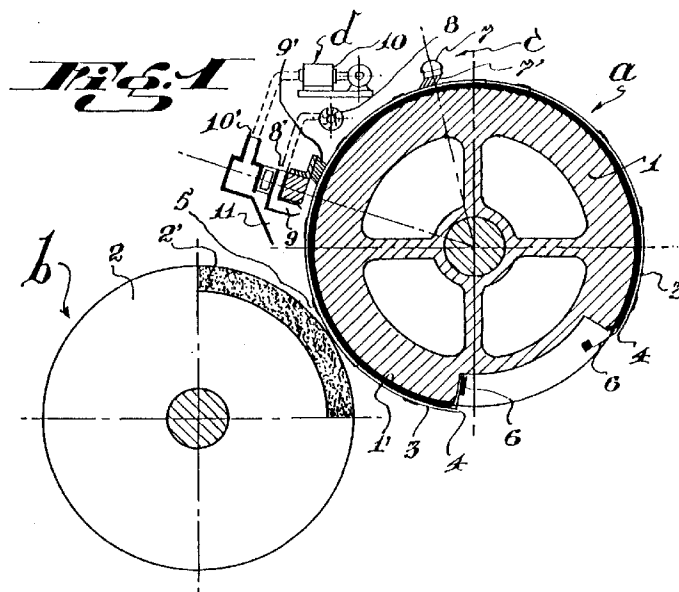
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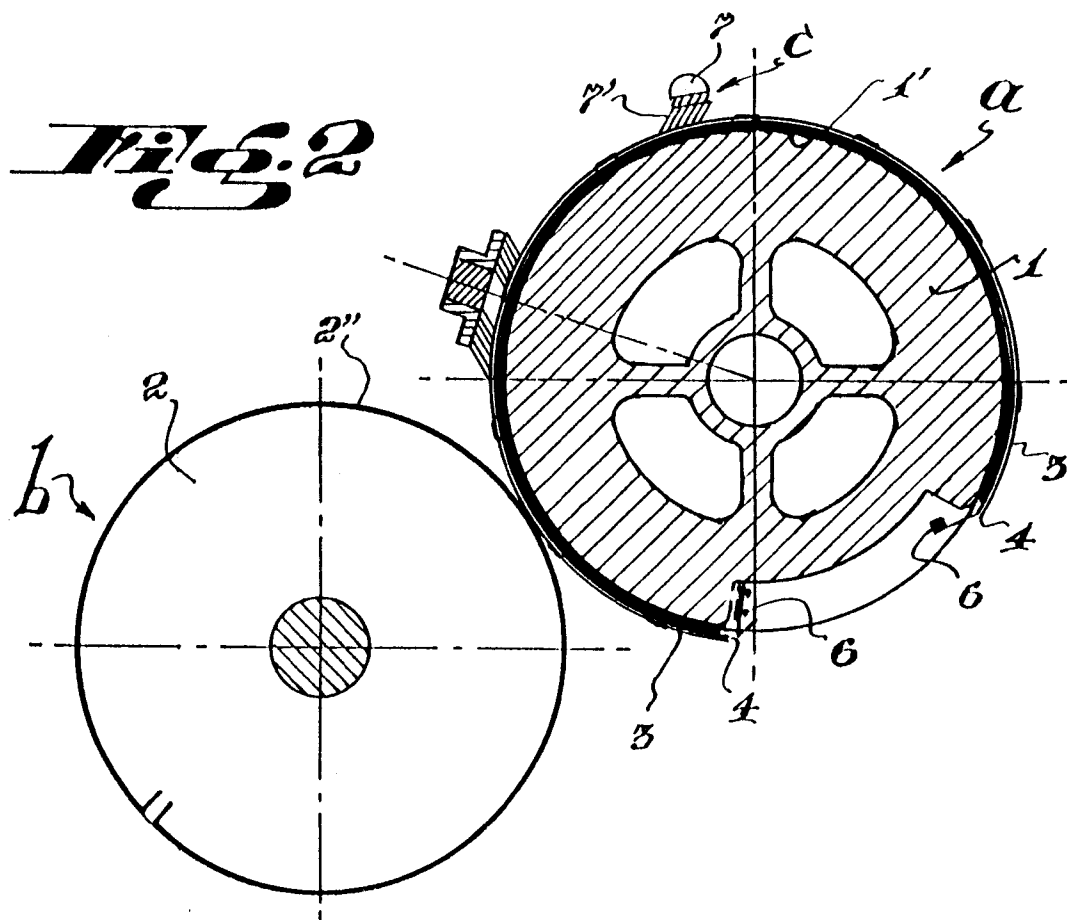
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(54) **Device for obtaining safety stamps applicable to paper or other laminar elements**

(57) Device for obtaining safety stamps applicable to paper or other laminar elements. Said device comprises a supporting cylinder (a) for paper (3) fitted with reliefs (5) separated from an abrasive periphery (2') wheel (b) along a distance that is shorter than the height of said relief (5) peaks (5'); the device includes antisliding pressure means (c) and adjustment means (d) for applying the paper (3) to the cylinder (a) side walls (1'), in addition to angular drive means (15) in said support-

ing cylinder (a). In view that the distance separating the abrasive wheel (b) from the supporting cylinder (a) is shorter than the height of the relief (5) peaks (5') when the relief (5) enters the contact zone, the abrasive periphery (2') of the wheel (b) abrades the ends of said peaks (5'), resulting in a water mark being implemented. The antisliding pressure means (c) secure the paper (3) in place, while the adjustment means (d) preclude any paper (3) maladjustment in the critical abrasion zone.





Description

The present invention relates to a device for obtaining safety stamps applicable to paper or other laminar elements, the object being to produce a so-called "water mark" by partially abrading the reliefs or low-reliefs of the paper on which the stamp is applied.

It is known in the paper industry that certain batches are provided with a safety stamp referred to as a water mark. Traditionally, these water marks have been used as a safety means for the printing of large-volume, high-cost documents and forms, such as the issuing of banknotes. These marks are furthermore applied as an indication of the high quality of the marked paper.

Traditionally, the devices for forming these water marks have consisted in auxiliary equipment for paper laminating machines, comprising stamping dies and stereotypes designed to increase the laminator thicknesses in the laminate area to be marked.

This means that stamping dies and their assembly and adjustment means are part of the paper-making machine and form an auxiliary means thereof. Applying these means causes the paper pulp to be altered as it passes the laminators, so that the paper thickness is reduced in the stamping area and a relief of the stamping die is obtained. The reduced thickness of the stamping area creates a transparency effect not evident in the rest of the paper, the water mark becoming thus defined.

Since these devices require setting-up modifications in the paper-producing machine, stamping is limited to large production volumes as a result of the high costs involved.

Subsequently, however, Argentine invention patent No. 240.422, owned by the holders of this invention, contributed a new procedure for producing safety stamps through a device based on a stamping die supporting cylinder and an abrasive wheel.

This stamping device offers an improvement, as compared to traditional stamping devices, in that it allows small productions to be performed at a reasonable cost without affecting the paper manufacturing process in view that stamping is implemented through a device that is independent from the paper rolling machine.

However, certain drawbacks are evident, such as the difficulty in managing a proper adjustment of the paper against the stamping cylinder. In fact, the cylinder stamping dies separate the paper from the cylinder side walls and thus facilitate its movement in respect to the cylinder on which it lies.

Furthermore, this spacing between the paper and the cylinder allows for the eventual formation of paper plies in the sector adjacent the contact area between the abrasion means and the stamping cylinder. In addition to this, minor maladjustments, unforeseen offsetting or paper tearing may cause the abrasive means to contact and damage the cylinder stamping dies.

All the above inconveniences are satisfactorily solved by the device of the present invention. It should

first of all be stated that this is not a device designed to form paper reliefs, since separate means are provided for this purpose which are either flat or rotating, e.g. a stamping cylinder which presses the paper against a surface carrying the stamping dies.

The present device comprises a supporting cylinder for the paper on which the reliefs have already been stamped. This supporting cylinder is spaced apart from an abrasive peripheric wheel by a distance that is shorter than the peak heights of the relief. It also comprises an antisliding pressure device, a means of adjusting the paper against the side walls of the cylinder, and a supporting cylinder angular drive means.

On rotation of the supporting cylinder, the movement retaining pressure device fixes the position of the paper, said device comprising brushes the filiform bundles of which exert pressure so that an intimate contact is attained between the cylinder side walls and the back side of the paper, thus impairing the paper's displacement.

Adjacent the contact zone, between the abrasive wheel and the cylinder, the adjustment means precludes the offsetting of the paper in the critical abrasive zone. In the various forms of embodiment foreseen, both the micro holes communicating with a vacuum chamber and the compressed air ejected from blower peaks secure the paper against the cylinder while the suction mouth removes all nature of impurities from the contact area.

Finally, in view that the distance separating the abrasive wheel from the supporting cylinder is shorter than the height of the relief peaks, and as the latter enter the contact zone, the wheel's abrasive periphery abrades the peak tips and produces the water mark, avoiding the inconveniences deriving, as previously stated, from known devices.

DRAWINGS

For further clarity and understanding of the object of the invention, several figures are provided depicting one of the preferred forms of embodiment for illustrative, nonlimiting purposes.

Figure 1 is a schematic cross-section of the present device. It shows the abrasive periphery of the wheel, in addition to the arrangement of the antisliding pressure brush. Shown nearer the contact zone between the cylinder and the abrasive wheel, the paper adjustment means are seen to comprise a motor compressor connected to blower nozzle complemented by a brush and a suction mouth.

Figure 2 is another cross-section, in which the adjustment means comprise a double brush fitted with an adjustment mechanism (not shown) controlled by a pneumatic circuit.

Figure 3 is a further cross-section, in which the adjustment means comprise micro holes which perforate the cylinder's side walls. A pneumatic chamber connected to a vacuum pump can be seen inside the cylinder.

Figure 4 illustrates another form of embodiment, in which the adjustment means comprise pneumatically adjustable pressure rollers.

Figure 5 is a cross-section of a prior art device. For the purpose of illustrating this, part of the means used by the present invention (paper antisliding and adjustment means) have been added, said means failing to remove the gap between the paper and the cylinder because of the presence of the stamping dies.

Figure 6A is a schematic side view illustrating the operational principle of the known device shown in figure 5.

Figure 6B is a schematic side view illustrating the stamping operation performed by a device based on a cylinder and a stamped surface. It reveals the manner in which the cylinder operates on the back side of the paper.

Figure 6C is a schematic side view illustrating the operation of the cylinder used in the device of the present invention. It reveals the manner in which the abrasive periphery of the wheel abrades the tips of the relief peaks.

In the various figures, the same reference numbers identify equal or corresponding parts; letters are used to designate different element assemblies.

List of the main references:

- (a) paper supporting cylinder
- (b) abrasive wheel
- (c) antisliding pressure means
- (d) paper adjustment means
- (1) supporting cylinder (a) body
- (1') supporting cylinder (a) body
- (2) abrasive wheel (b) body
- (2') abrasive wheel (2) periphery
- (2'') replaceable sandpaper
- (3) application paper
- (3') paper (3) front side
- (3'') paper (3) back side
- (4) paper (3) ends
- (5) paper (3) reliefs or low-reliefs
- (5') relief (6) peaks
- (6) end (4) of paper (3) position attachment means
- (7) antisliding pressure brushes
- (7') brush (7) filiform bundles
- (8) motor compressor
- (8') compressed air line
- (9) blower nozzle
- (9') adjustment brush
- (10) suction pump
- (10') suction line
- (11) suction mouth
- (12) cylinder (a) pneumatic vacuum chamber
- (12') side wall (1') pass-through micro holes
- (13) pneumatic suction lines
- (14) vacuum pump
- (15) supporting cylinder (a) shaft means (connected to angular drive means in cylinder (a))

- (16) first adjuster roller
- (16') second adjuster roller
- (17) relief stamping dies
- (17') low-relief stamping dies
- (18) stamping cylinder

MAIN OBJECT

On the basis of the above specified objects, this invention refers to a device for obtaining safety stamps applicable to paper (3) or other laminar elements, of the type designed to form water marks on paper (3) reliefs or low-reliefs (5) - by lowering the paper's thickness through partial abrading of the peaks (5') of said reliefs or low-reliefs (5) - produced by stamping dies (17), said device being characteristic in that it comprises:

- a) a paper (3) supporting cylinder (a), the paper being applied to the cylinder side walls (1') through end (4) position attachment means (6) arranged on the cylinder (a) proper;
- b) an abrasive periphery (2') wheel (b) connected to rotating drive means and arranged adjacent the supporting cylinder (a), from which it is separated by a distance that is shorter than the relief (5) peak (5') heights;
- c) paper (3) adjusting means (d) - over the surface of side walls (1') of supporting cylinder (a) - comprised in a pneumatic circuit and arranged at least adjacent the zone between the supporting cylinder (a) and the abrasive wheel (b);
- d) paper (3) antisliding pressure means (c) extending against the cylinder (1') side walls; and
- e) supporting cylinder (15) angle drive means.

DESCRIPTION

The present device for obtaining safety stamps applicable to paper (3) or other laminar elements is designed to produce water marks in reliefs or low-reliefs (5) on application paper (3) by reducing the thickness of said paper (3) through a partial abrading of the relief (5) peaks (5').

Generally speaking, this device comprises a supporting cylinder (a) for the paper (3) with reliefs (5) spaced apart from an abrasive periphery (2') wheel (b) by a distance that is shorter than the peak (5') heights of said relief (5); the device including antisliding pressure means (c) and paper (5) adjustment means (d) against the cylinder (a) side walls (1'), in addition to angular drive means (15) fitted on said supporting cylinder (a). See figures 1, 2, 3 and 4.

More specifically, the device of the present invention comprises an application paper (3) supporting cylinder (a). The paper (3) is applied on the side walls (1') of cylinder (a) body (1) in a manner that its ends (4) become secured by position attachment means (6) located in the body (1) proper of cylinder (a). See figure 1.

Adjacent the supporting cylinder (a) is a wheel (b) fitted with an abrasive periphery (2') connected to rotating drive means. This abrasive wheel (b) is spaced apart from the cylinder (a) by a distance that is shorter than the relief (5) peaks (5') formed on the paper (3). See figures 1 and 6c.

In the various forms of embodiment, the abrasive periphery (2') wheel (b) body (2) may be an abrasive stone or a drum the cylindrical periphery (2') of which faces the supporting cylinder (a) side walls (1'). This drum is fitted with replaceable sandpaper (2'') covering said periphery (2'). See figure 2.

Furthermore, and adjacent the zone between the supporting cylinder (a) and the abrasive wheel (b), are provided paper (3) adjusting means (d). Said adjusting means (d), comprised within a pneumatic circuit, adjust the paper (3) against the supporting cylinder (a) side wall (1') surface.

In a form of embodiment, said adjustment means (d) consist in a pneumatic circuit comprising a motor compressor (8) and a compressed air container. Said container is fitted with a feeding nozzle forming a pressure fluid outlet connected to a compressed air line (8') associated to a blower nozzle (9). The latter (9) is fitted with an ejection mouth facing the paper (3) and directed toward the contact zone between said paper (3) and abrasive wheel (b). See figure 1.

Based on this same principle, another form is foreseen wherein the compressed air line (8') is connected to one or two blower nozzles (9), each of which has its mouth arranged adjacent the contact zone between the paper (3) and the abrasive wheel (b), which in turn faces one of the paper (3) edges and flushingly projects air thereon.

In another possible embodiment, the paper (3) adjusting means (d) consists of a pneumatic circuit comprising a motor compressor (8) connected through a corresponding line (8') to a blower nozzle (9), the ejection mouth of which faces the paper (3). Adjacent said blower nozzle (9) is a suction mouth (11) connected through a respective line (10') to a suction pump (10) and oriented toward the contact zone between the paper (3) and the abrasive periphery (2') wheel (b). Adjacent blower nozzle (9) and suction mouth (11) a complementary adjustment brush (9') is installed. See figure 1.

Also foreseen are variants wherein the paper (3) adjusting means (d) comprise elements such as brushes (9') or cylinders (16, 16') variably adjustable against the supporting cylinder (a) side walls (1'). In order to allow for adjustment variations, a pneumatic forward-reverse adjustment mechanism (not shown) is included. See figures 2 and 4.

Another form of embodiment foreseen comprises an adjustment means (d) comprising a pneumatic circuit composed of a pneumatic chamber (12) and a vacuum pump (14). According to this variation, a pneumatic chamber (12) is formed within the supporting cylinder (a) body (1) itself, its suction entry taking the form of a

nozzle connected to a pneumatic network, the suction outlet being fitted with a plurality of micro holes (12') which perforate the cylinder (a) side walls (1'), distributed throughout the cylinder's usable peripheric surface. The chamber (12) entry is connected to a vacuum pump (14) via a vacuum line (13). See figure 3.

The device of the present invention further comprises paper (3) antisliding pressure means (c). In a preferred form of embodiment, said antisliding pressure means (c) consist of brushes (7) the filiform bundles (7') of which project against the cylinder (a) side walls (1'). Concerning their location, the antisliding pressure brushes (7) are arranged adjacent the paper (3) adjustment means (d) and preceding the rotation direction of the supporting cylinder (a). Also foreseen is the possibility of arranging a plurality of pressure brushes (7) distributed throughout the periphery of said supporting cylinder (a). See figures 1 to 4.

In other possible forms of embodiment, the paper (3) antisliding pressure means (c) may be formed by rollers, the periphery of which roll over the periphery of the supporting cylinder (a).

The device of the present invention is completed with angular drive means (15) for said paper (3) supporting cylinder (a).

Operation of the device is as follows:

In the closest exponent of the state of the art, the relief (5) stamping dies (17) are arranged along the cylinder (a) side walls (1'). Merely adding some of the means used in the present invention (as depicted in figure 5) would fail to solve the problems stated herein.

Initial preparation of the paper (3) by submitting it to the relief and low-relief (5) stamping cylinders (18) and stamping dies (17') allows for conditioning and arrangement of the paper (3) in the present device. In fact, once the paper (3) has passed between the stamping cylinder (18) and the stamping dies (17'), a relief (5) is formed, including peaks (5') on the paper (3) back side (3''). See figure 6b.

Thus, the paper (3) is arranged over the cylinder (a) side walls (1') so that the paper's back side (3'') rests against said side walls (1') and the front side (3') is exposed for treatment. The paper (3) ends (4) are attached to the cylinder (a) through position attachment means (6) fitted in the cylinder (a).

On rotation of the supporting cylinder (a), the brushes (7) forming the movement retaining pressure means (c) fix the position of the paper (3) as a result of the filiform bundles (7') exerting pressure, so that intimate contact between said cylinder (a) side walls (1') and the back side (3'') of the paper (3) is obtained, thus impairing movement of the paper.

Adjacent the contact zone, between the abrasive wheel (b) and the cylinder (a), the adjustment means (d) preclude the offsetting of the paper (3) in the critical abrasive zone. Concerning the blower nozzle (9), the ejected compressed air adjusts the paper (3) against the cylinder (a), while the presence of the suction mouth (11)

removes all nature of impurities from the contact area. See figure 1.

A similar adjustment effect is achieved by an embodiment wherein the adjustment means (d) comprise a pneumatic chamber (12) fitted with micro holes (12') which perforate the cylinder (a) side walls (1'). In this case, the action of the suction pump (14) through said chamber (12) and micro holes (12') maintains the paper applied against the supporting cylinder (a) side walls. See figure 3.

In view that the distance between the abrasive wheel (b) and the supporting cylinder (a) is shorter than the height of the relief (5) peaks (5'), once the relief (5) enters the contact zone the abrasive periphery (2') of wheel (b) abrades said peaks (5'), producing the water mark. See figure 6c.

Upon putting this invention to practical use, modifications can doubtless be introduced in regard to certain construction and forming details without departing from the fundamental principles clearly defined in the following claims.

Claims

1. Device for obtaining safety stamps applicable to paper or other laminar elements, of the type designed to form water marks on the paper's reliefs and low-reliefs by lowering their thickness through partial abrading of said relief or low-relief peaks formed by stamping dies, characteristic in that it comprises:

a) a paper supporting cylinder, the paper being applied to the cylinder side walls through end position attachment means arranged on the cylinder proper;

b) an abrasive periphery wheel connected to rotating drive means and arranged adjacent the supporting cylinder, from which it is separated by a distance that is shorter than the height of the relief peaks;

c) paper adjustment means - over the surface of the supporting cylinder side walls - comprised in a pneumatic circuit and arranged at least adjacent the zone between the supporting cylinder and the abrasive wheel;

d) paper antisliding pressure means projecting against the cylinder side walls; and

e) supporting cylinder angle drive means.

2. Device for obtaining safety stamps applicable to paper or other laminar elements, according to claim 1, characteristic in that it comprises:

a) a paper supporting cylinder, the paper being applied to the cylinder side walls through end position attachment means arranged on the cylinder proper;

b) an abrasive periphery wheel connected to uniform circular drive means and arranged adjacent the supporting cylinder, from which it is separated by a distance that is shorter than the height of the relief peaks;

c) pneumatic means for adjusting the paper over the surface of the supporting cylinder side walls, arranged adjacent the zone between the supporting cylinder and the abrasive wheel;

d) paper antisliding pressure brushes, the filiform bundles of which project against the cylinder side walls; and

e) supporting cylinder circular drive means.

3. Device for obtaining safety stamps applicable to paper or other laminar elements, according to claims 1 and 2, characteristic in that the paper adjustment means applied over the surface of the cylinder side walls consist of a pneumatic circuit comprising:

a) a pneumatic vacuum chamber formed within the supporting cylinder body itself, its suction entry taking the form of a nozzle connected to a pneumatic network, the suction outlet being fitted with a plurality of micro holes which perforate the cylinder side walls and are distributed throughout the cylinder's usable peripheric surface, and

b) a vacuum pump, the suction mouth of which is connected to said suction inlet corresponding to the supporting cylinder chamber.

4. Device for obtaining safety stamps applicable to paper or other laminar elements, according to claim 1, characteristic in that the paper adjustment means applied over the surface of the cylinder side walls consist of a pneumatic circuit comprising:

a) a motor compressor which, together with compressed air container means, is fitted with a feeding nozzle forming a pressure fluid outlet; and

b) at least one blower nozzle connected to said motor compressor outlet and fitted with an ejection mouth facing the paper, directed toward the proximity of the contact zone between said paper and said abrasive wheel.

5. Device for obtaining safety stamps applicable to paper or other laminar elements, according to claim 1, characteristic in that the means for adjusting the paper over the surface of the cylinder side walls consist in a pneumatic circuit comprising:

a) a motor compressor which, in addition to compressed air containers, ends in a feeding nozzle forming a pressure fluid outlet; and

b) at least one blower nozzle connected to said

motor compressor outlet, fitted with a mouth arranged in the proximity of the contact zone between said paper and said abrasive wheel and facing one of said paper edges for flushingly projecting air thereon.

6. Device for obtaining safety stamps applicable to paper or other laminar elements, according to claim 1, characteristic in that the means for adjusting the paper over the surface of the cylinder side walls consist in a pneumatic circuit comprising:

a) a motor compressor which, in addition to compressed air containers, ends in a feeding nozzle forming a pressure fluid outlet;
b) at least one blower nozzle connected to said motor compressor outlet, its ejection mouth facing said paper;
c) a suction pump fitted with a connection nozzle forming an inlet for said sucked-in air;
d) at least one suction mouth adjacent the blower nozzle which, connected to said suction pump connection nozzle, is oriented toward the proximity of said contact zone between said paper and abrasive periphery wheel; and
e) complementary adjustment brushes proximally arranged in respect to said blower nozzle and suction mouth.
7. Device for obtaining safety stamps applicable to paper or other laminar elements, according to claim 1, characteristic in that the paper adjustment means comprise variable adjustment brushes applied against the cylinder side walls, said means being fitted with a pneumatic adjustment mechanism.
8. Device for obtaining safety stamps applicable to paper or other laminar elements, according to claim 1, characteristic in that the paper adjustment means comprise variable adjustment cylinders applied against the cylinder side walls, said means being fitted with a pneumatic adjustment mechanism.
9. Device for obtaining safety stamps applicable to paper or other laminar elements, according to claim 1, characteristic in that the paper antisliding pressure means are brushes, the filiform bundles of which project against the cylinder side walls and are located at least adjacent the paper adjustment means.
10. Device for obtaining safety stamps applicable to paper or other laminar elements, according to claim 1, characteristic in that the paper antisliding pressure means are brushes, the filiform bundles of which project against the cylinder side walls and are distributed facing the overall supporting cylinder periphery.

11. Device for obtaining safety stamps applicable to paper or other laminar elements, according to claim 1, characteristic in that the antisliding pressure means are rollers, the peripheries of which roll over the periphery of the paper supporting cylinder.

12. Device for obtaining safety stamps applicable to paper or other laminar elements, according to claim 1, characteristic in that the abrasive periphery wheel is an abrasive stone.

13. Device for obtaining safety stamps applicable to paper or other laminar elements, according to claim 1, characteristic in that the abrasive surface wheel is a drum, the cylindrical periphery facing the supporting cylinder side walls of which is fitted with replaceable sandpaper covering said periphery.

14. Device for obtaining safety stamps applicable to paper or other laminar elements, according to claim 1, characteristic in that the supporting cylinder is rotatingly driven in a sequential manner involving angular fractions delimited by stations which correspond to the paper relief-abrasive surface coincidence zone.

