

Feb. 6, 1945.

P. V. THOMAS

2,369,089

PRESSING DEVICE WITH ENDLESS STRIPS

Filed April 22, 1942

2 Sheets-Sheet 1

Fig. 1

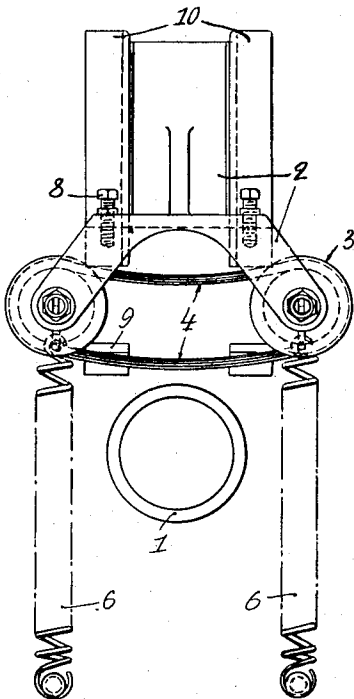


Fig. 2

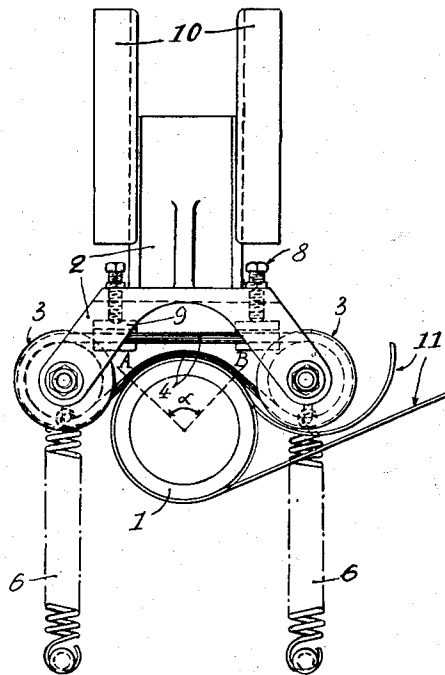
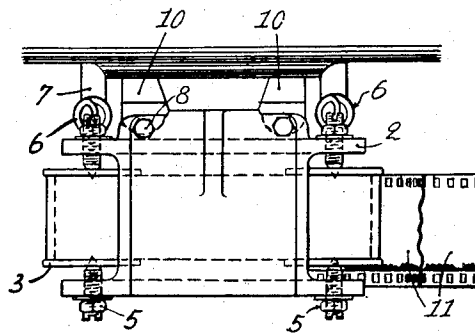


Fig. 5



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Fig. 3

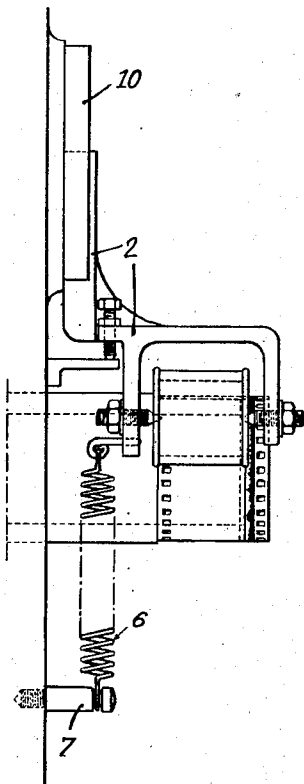
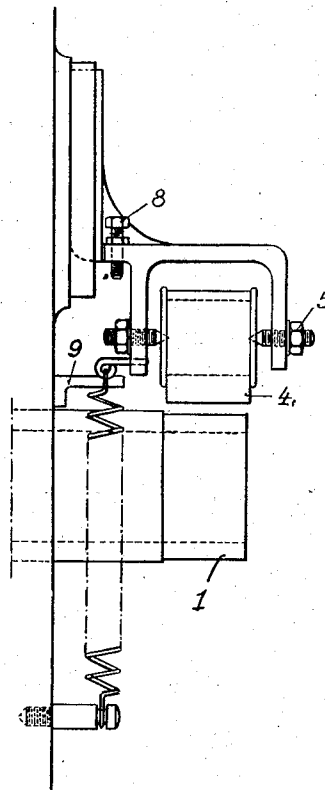


Fig. 4



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UNITED STATES PATENT OFFICE

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PRESSING DEVICE WITH AN ENDLESS STRIP

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vested in the Alien Property Custodian

Application April 22, 1942, Serial No. 440,037
In France April 3, 1941

2 Claims. (Cl. 271—2.3)

The present invention relates to improvements in devices intended to ensure the perfect regularity of the unwinding of cinematographic sound-films. It more particularly concerns the means to secure a good adherence between the film or films and a suitable regulating member as well as the uniform rotation of the regulating member by the devices used for ensuring said adherence.

In the case of apparatus for recording, printing or reproducing sound-films, this regulating member is generally a braked fly-wheel of great inertia, rigid with the cylinder about which passes the film and on which, in most cases, the recording, printing or reproducing operation is effected. The film must ensure the rotation of said unit of great inertia, by simple adherence, or must be drawn along thereby, and this without the slightest slipping. Therefore said adherence must be rendered as perfect as possible, without prejudice, on the one hand, to the rigorously uniform and constant unwinding of the film and without introducing on the other hand, any disturbance or vibration in the rotation of the cylinder.

The devices used for ensuring said adherence on the cylinder, and simultaneously the mutual adherence of a plurality of films which are caused to simultaneously unwind in the case of printing on a cylinder, only rarely satisfy the three above mentioned conditions, that is to say:

Maximum adherence;

Rigorously uniform unwinding of the film;

Absence of introduction of disturbances or vibrations in the rotation.

These devices generally have one or more cylindrical rollers pressing on the film. To produce the proper adherence, a somewhat high pressure is necessary owing to the small surface of contact between said rollers and the film, which surface is reduced to the generatrices of contact of the cylinders. This very high pressure acting according to a line, whereas adjacent points are not pressed, is not without causing prejudice to the uniform unwinding of the film and to the rotation of the cylinder.

One of the objects of the present invention consists in eliminating this very high pressure, localized at one point, and to replace it by a medium pressure uniformly distributed by means of an endless strip acting on a large portion AB of the surface of the cylinder, portion comprised in the angle α of Fig. 2 of the accompanying drawings. The opening of said angle α is not limited and can easily reach a half-circumference in certain

applications. Owing to such an arrangement, the system hereinafter described and forming the subject-matter of the present invention produces the following conditions:

(a) Maximum adherence obtained by a medium pressure of the endless strip, uniformly distributed on the film according to a cylindrical surface as large as possible;

(b) No point whatever of the surface thus pressed can be subjected to vibrations and disturbances which might be generated by the mechanical members of the pressing device, said members never coming in contact with the film and the regulating cylinder and the endless strip being resilient.

The accompanying drawings intended to illustrate the invention, show by way of example a simplified embodiment thereof. However it is to be understood that the invention is not limited to the embodiment illustrated which has been chosen only for facilitating the following explanations and descriptions.

In said drawings:

Figs. 1 and 2 illustrate in front elevation, the device forming the subject-matter of the invention in non-operating position and in operating position.

Figs. 3 and 4 are corresponding side views and Fig. 5 is a plan view of the same device.

The pressing device with an endless strip according to the invention comprises, in the example under consideration, a support 2, constituted by a multiple fork between the branches of which are mounted rollers 3 carrying the endless strip 4. The number of rollers 3 which is two at the minimum, can be increased according to circumstances, in order to increase for instance the length of the arc of contact AB (see Fig. 2).

The support 2 has a part forming a shoe sliding in two slide-ways 10 on any suitable supporting medium, so that the two following conditions are always satisfied: the axis of symmetry of the pressing device, which is also its axis of translation, always passes through the axis of rotation of the cylinder 1; the axes of rotation of the rollers 3 always remain parallel in all the positions of operation, to the axis of rotation of the cylinder 1.

In none of the positions of operation, at no moment whatever, whatever may be the opening of the angle α , must the rollers 3 come in contact with the cylinder 1. In the particular case of two rollers, the distance between the axes of the rollers must therefore be greater than $D+d$, D being the diameter of the cylinder 1, all thick-

nesses of films being included, and d being the maximum diameter of the cheeks of the rollers 3.

The length of the arc of contact AB of the strip 4 with the film or films 11 and consequently the value of the corresponding angle at the centre are adjusted by the position of support 2 relative to cylinder 1. For that purpose, two abutment screws 8 on the support 2 coming in contact with abutments 9 on the supporting medium are provided and allow said adjustment. The pressure of the endless strip on the film and the cylinder 1 is obtained by means of springs 6 having their lower ends attached at 7 to the supporting medium, and their upper ends attached to the support 2 and exerting a pull on the member 2, which has the effect of stretching the endless strip on the cylinder 1 until the abutment screws 8 touch the abutments 9. At this moment, the length of the arc of contact AB reaches the required value.

The rollers 3 are mounted, as above explained, in such a manner that in all the positions of operation, their axes remain rigorously parallel to the axis of the cylinder 1 which they must never touch. They must run rigorously true and have the least possible resistance to rotation. As shown in the drawings, the rollers 3 are mounted on anti-friction bearings 5. The needle screws of these bearings are only diagrammatically illustrated and can have any other shape in particular at the end supporting the roller (cylindrical bearing, etc.). Any other bearing system can be contemplated, as long as it ensures the uniform rotation of the roller and without vibration.

Each roller 3 can have the shape of a grooved pulley or of a roller having cheek members secured in position. It must, without prejudice to its ease of rotation, have a maximum inertia, ensuring the regularity of said rotation. The diameter at the bottom of the groove of the rolling track for the endless strip on said roller is a function of the available place; it must never be forgotten that by increasing the diameter, the inertia of the roller is increased.

The endless strip 4 is one of the main parts of the invention. The texture and homogeneity of said strip must remain rigorously constant at all points which successively pass on the arc of contact AB. The material constituting said strip must be flexible and resilient so as to be rigorously applied at all points of the cylindrical surface of contact.

Rubber is quite suitable for this purpose, but any other material possessing the required properties of homogeneity, flexibility, resiliency can be employed.

The cross section of the strip can be rectangular, semi-circular, trapezoidal or triangular according to circumstances. Its width must be such that it presses on the greatest possible width of the film 11.

The length of the endless strip depends on the diameter of the rollers and on the distance separating their axes. Whilst complying with the condition above mentioned, according to which the distance between the axes of the rollers must be greater than $D+d$ (in the particular case of two rollers), it is advantageous not to increase too much said distance between the axes. In

fact, if this was so, a vibratory wave might be created of prejudicial amplitude in the parts of the strip between the rollers and the cylinder. Said vibratory wave will be so much the less important as the strip is thicker and as said portions stretched between the rollers and cylinder are shorter.

In position of rest, the endless strip between the two rollers must have a certain amount of "slack" (Fig. 1). This slack of the strip when at rest will be so much the smaller as the arc surrounded by the strip upon operation, is smaller.

The application of the means which have just been described, allows, as will be understood, of obtaining on a film in movement, stretched around a rotating cylinder, a uniform pressure distributed over a large surface; it allows of thus increasing the adherence of said film on the cylinder or the adherence of a plurality of films, of eliminating any slipping and of avoiding, in the rotation of the cylinder and in the unwinding of the film or films, all the vibrations or other disturbances due to the pressing devices usually employed.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a pressing device, mounted on a suitable supporting medium, for applying one or more films on a rotating and speed regulating cylindrical member mounted on said supporting medium, the combination of a pair of rollers slidably mounted on said supporting medium; an endless band rove about said rollers; means to urge said rollers toward the cylindrical member to press the band against the film on the surface of the cylindrical member; and adjustable means to limit the movement of the rollers, the measure of the arc of contact of the band on the film being determined by the adjustment of said limiting means.

2. In a pressing device, mounted on a suitable supporting medium, for applying one or more films on a rotating and speed regulating cylindrical member mounted on said supporting medium, the combination of a slideway on said medium; a carrying member slidable in said slideway and comprising a pair of forks; a roller journaled in each fork, the parts being so disposed that the axes of the rollers are constantly parallel to the axis of the cylindrical member; an endless band rove about said rollers; a pair of springs, each having one end attached to one of said forks and its other end attached to the supporting medium, said springs being adapted to urge the carrying member toward the cylindrical member; a pair of abutments on the supporting medium; and an adjustable stop member on each of said forks and adapted to co-operate with one of said abutments to limit the movement of the carrying member toward the cylindrical member, the parts being so related that the endless band is pressed, by action of the springs, against the film on the surface of the cylindrical member, the measure of the arc of contact of the band on the film being determined by the adjustment of the stop members.

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