Sept. 4, 1962 R. M. SCOTT 3,052,395

ROLLERS

Filed April 21, 1960

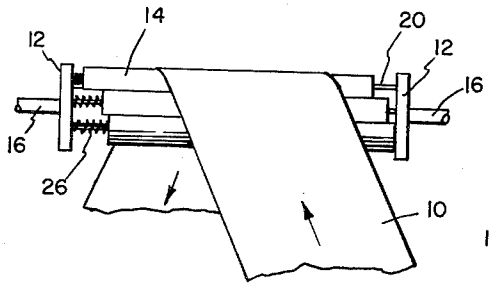

Fig 1

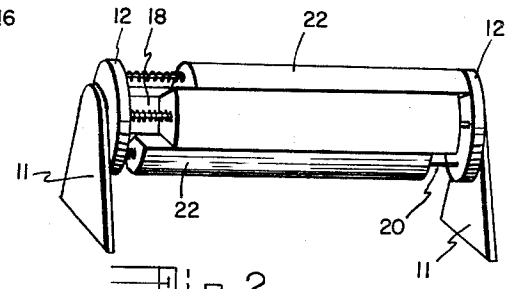

Fig 2

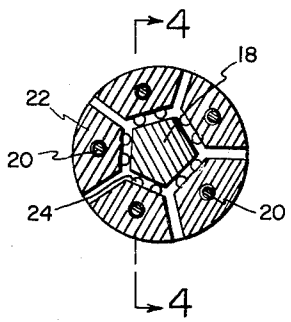

Fig 3

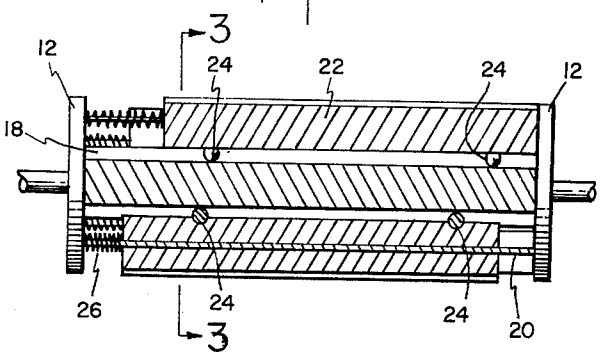

Fig 4

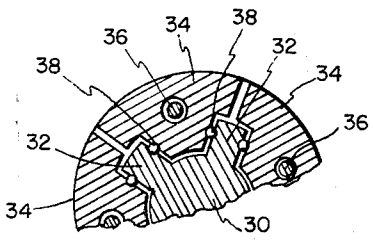

Fig 5

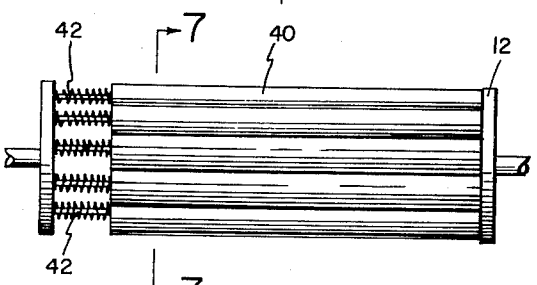

Fig 6

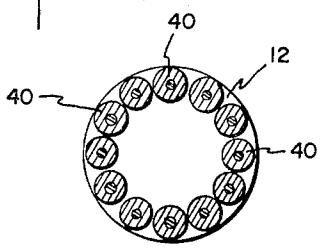

Fig 7

INVENTOR.
RODERIC M. SCOTT

BY Harold E. Ockenfels Jr.
ATTORNEY

United States Patent Office

3,052,395

Patented Sept. 4, 1962

1

3,052,395

ROLLERS

Roderic M. Scott, Stamford, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn., a corporation of New York

Filed Apr. 21, 1960, Ser. No. 23,785
1 Claim. (Cl. 226—190)

This invention relates to roller apparatus and more particularly to rollers having longitudinally movable surface sections.

It is often desirable to utilize cylindrical rollers with moving webs or films wherein the direction of travel of the film feeding onto and leaving the roller is non-perpendicular to the roller. This is often a requirement in conveyor belt equipment, for example, and also in film handling equipment such as that used in photographic processes. As soon as it becomes necessary to produce an angle between the film feeding onto a roller and the film leaving the roller, serious difficulties are apt to arise. These difficulties arise from the fact that the film must of necessity slide along the roller in an axial direction as it also rotates around the roller. This requirement of axial sliding not only creates mechanical stresses but may seriously scratch the surface of the film. This, of course, is a problem with respect to photographic films and also with equipment such as paper making machinery.

It is, therefore, an important object of the present invention to provide novel means for operating a belt on a roller wherein the motion of the belt is non-perpendicular to the roller.

Another object of the present invention is to provide on a roller axially movable surface sections.

Other objects, features and advantages will be apparent from the following detailed description of a preferred embodiment thereof taken in conjunction with the accompanying drawings in which:

FIG. 1 is a front elevation view of an illustrative apparatus embodying the principles of the present invention;

FIG. 2 is a three-dimensional view of the apparatus of FIG. 1 with the belt removed to more clearly show the roller construction;

FIG. 3 is a cross-sectional view of the apparatus of FIG. 2;

FIG. 4 is a cross-sectional view taken along the line 4—4 of FIG. 3;

FIG. 5 is a cross-sectional view similar to that of FIG. 3 but showing an alternative construction;

FIG. 6 is an elevational view of another species of roller embodying the principles of the invention; and

FIG. 7 is a cross-sectional view of FIG. 6 taken along the line 7—7.

In accordance with the present invention, there is provided roller apparatus, including a surface rotatable about an axis, wherein the surface comprises a plurality of surface sections movable transversely in a plane substantially parallel to the axis of rotation of the surface.

FIG. 1 illustrates the apparatus of this invention wherein a moving film 10 passes around a roller having end plates 12 and axially slideable sections 14. The roller is mounted to rotate on an axle 16.

FIGS. 2, 3 and 4 illustrate in greater detail the apparatus of FIG. 1 and the same numbers are used on corresponding parts. The roller of this species may be mounted on brackets 11 (FIG. 2) and comprises a central pentagonal core 18 which is positioned between the two end plates 12. Guide rods 20 interconnect the end plates and serve as tracks for the roller segments 22. Roller segments are designed to form a cylindrical roller surface but each segment is free to slide axially along its associated guide rod 20. Each of segments 22 is further provided with four ballbearings 24 which roll along a surface of the inner core 18. Each of segments 22 is urged toward one of plates 12 by the action of a spring 26. It will now be apparent that as a film moves onto a roller as shown in FIG. 1 and begins to move about the roller in a non-perpendicular direction, the normal slip forces between the film and the roller will serve to move each of the slideable segments parallel to the axis of the roller in the direction in which the film tends to slip. Furthermore, as the film leaves the roller, each segment in turn will be returned by its associated spring 26 to its starting position.

2

FIGURES 5, 6 and 7 are illustrative of two other species of this invention. The partial cross-section shown in FIG. 5 illustrates a core 30 having radial projections 32. Roller surface segments 34 are positioned on rods 36 to slide between projections 32 on ballbearings 38.

The embodiment shown in FIGS. 6 and 7 will be seen to consist of a plurality of small cylindrical rollers 40 positioned on guide rods 42 to form a larger cylindrical roller.

Various other modifications may be made in the construction and details of the apparatus without departing from the scope or principles of the invention. I do not, therefore, limit myself to the details of the construction shown and described.

I claim:

A substantially cylindrical roller which comprises a central core of polygonal cross section adapted to rotate about its longitudinal axis; a first disc end plate at a first end of said core, having a diameter greater than said core and perpendicular to said longitudinal axis; a second disc end plate at a second end of said core, having a diameter greater than said core and perpendicular to said longitudinal axis; a plurality of longitudinal segments intermediate said first and second end plates, each of said segments having a first surface parallel to an individual surface of said core and a second surface forming a portion of a cylindrical surface coaxial with said core, each of said segments being longitudinally movable with respect to said core and rotatable therewith, said segments forming a cylindrical surface concentric with said longitudinal axis; rod means extending between said first and second end plates and passing through each of said surface segments, operable to maintain each of said segments at a fixed radial distance from said axis; and spring means resiliently urging each of said segments against one of said plates.

References Cited in the file of this patent

UNITED STATES PATENTS

678,121	Lewis	July 9, 1901
2,195,319	Sutcliffe	Mar. 26, 1940
2,435,430	Ewing	Feb. 3, 1948
2,576,233	Lorig	Nov. 27, 1951