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M. M. ZUCK ET AL

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TENTER CLIP

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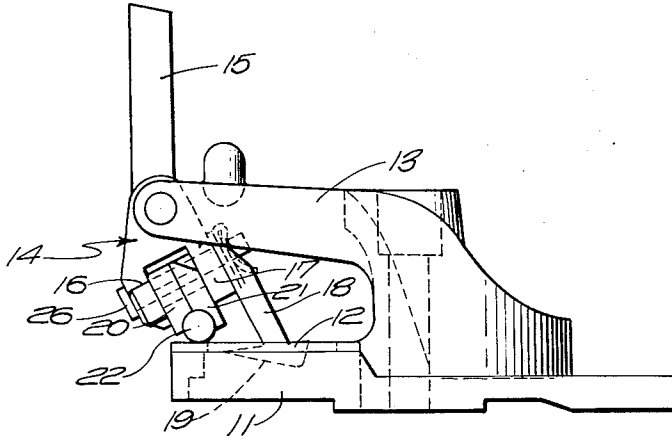


FIG. 1

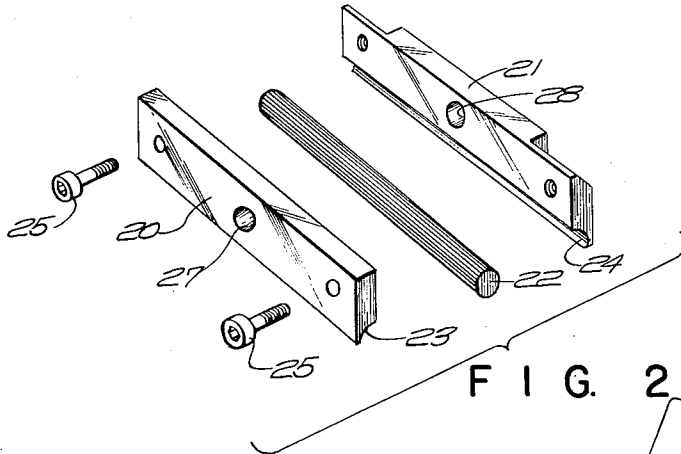


FIG. 2

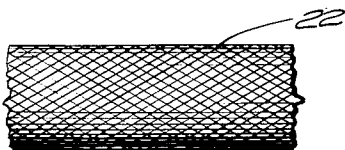


FIG. 3

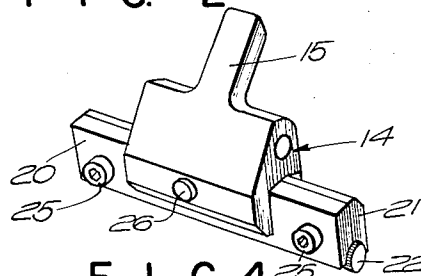


FIG. 4
INVENTORS
MATTHEW M. ZUCK
JOHN E. WATERMAN
BY

Barlow & Barlow
ATTORNEYS

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TENTER CLIP

Matthew M. Zuck, Warwick, and John E. Waterman, Chepachet, R.I., assignors to Winsor & Jerauld Manufacturing Company, a corporation of Maine
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This invention relates to a clip and more particularly to an improved tenter clip that is particularly adaptable for the lateral stretching of plastic webs by automatic machines.

Tenter clips have long been known and used in the art in connection with tentering machines which stretch web material as it is fed to the machine. Many shapes of tenter clips have been designed for various purposes and the item that perhaps has received the most widespread treatment has been the jaw of the tenter clip. The jaws have been shaped in various forms primarily to enhance the gripping relation thereof with the web material. The various forms have included knife edges, corrugated surfaces and other roughened surfaces. With the recent advances that have taken place in the organic plastic web field, it has been found that the plastic material will be greatly improved by the physical act of stretching the material. Accordingly, tentering machines, which were heretofore used primarily in connection with textiles, have been found especially adaptable for use with organic plastic materials provided certain changes were made in the operation of the machine. The major modification that must be made is the use of an entirely different tenter clip jaw. It will be apparent that when one tries to grip a plastic material, that in the first place the material is not as thick as textile material would be and secondly it is extremely smooth, thus giving a very low coefficient of friction. Consequently these physical factors give rise to difficulties with the operation of the tenter clip jaw. It is of course desirable that the plastic material be left intact while it is passed through the tentering machine and therefore the tenter clip jaw should not puncture or otherwise mar the material.

It is therefore an object of the present invention to provide a tenter clip which will have a jaw that will hold the plastic film or web material against slippage.

Another object of the invention is an improved tenter clip with a rocking jaw which will insure a large gripping area.

A still further object of the invention is to provide a tenter clip with a large gripping area over which the plastic web material is gripped at hundreds of spaced locations

With these and other objects in view, the invention consists of certain novel features of construction as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

FIGURE 1 is a side elevational view of a tenter clip embodying our invention;

FIGURE 2 is an exploded perspective view of a portion of the jaw;

FIGURE 3 is a fragmentary enlarged view looking at the work engaging portion of the jaw; and

FIGURE 4 is a perspective view of the jaw assembly.

The tenter clip illustrated in the drawings is a link of a tenter machine chain having a base 11 which is adapted to ride upon the usual rails of the tentering machinery. The upper surface of the base 11 forms the lower jaw member of the tenter clip which jaw member actually consists of a hardened facing plate 12 affixed to the base member 11. Rising from the base member 11 is an

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arched portion 13 which overhangs the lower jaw portion of the clip. Mounted for swinging movement in the arch portion 13 is an upper jaw member generally designated 14. The upper jaw 14 has an arm 15 extending therefrom in a general vertical direction when mounted within the clip and is adapted to engage cams (not shown) located at each end of the tenter machine. Upon such engagement the jaw 14 will pivot in a counter clockwise direction as seen in FIGURE 1 and will raise above the lower jaw 12 to allow web material to be moved from the clip or to be guided between the jaws of the clip as the case may be.

The surface engaging portion of the upper jaw 14 is formed by bifurcating the lower portion of the jaw into two plate portions 16 and 17 (FIG. 1). One or more feeler fingers 18 are mounted upon the plate portion 17 and extend into slots 19 which are formed in the lower jaw 12 for a purpose to be presently described. Between the plate portions 16, 17 the surface engaging portion of the upper jaw is mounted. This surface engaging portion is shown more particularly in FIGURE 2 and consists of two bars 20 and 21 between which there is held the work engaging member 22. The work engaging member 22 is preferably cylindrical and to accommodate this cylindrical shape, the bars 20 and 21 are formed with concavities 23 and 24 which are sufficiently deep to grasp the cylinder below the median thereof. Bars 20 and 21 are then brought together and held in position by means of fasteners 25 and the entire assembly is then mounted for rocking movement between the plate portions 16 and 17 by means of a pivot pin 26 that passes through the plate portions 16 and 17 and through the bar members 20 and 21, apertures 27 and 28 being provided in the bar members 20 and 21 for this purpose.

It will be apparent that with this mounting of the work engaging member relative to the upper jaw 14 that alignment of the work engaging member 22 with the lower jaw 12 is always insured. This comes about because of the pivoting action of the work engaging member 22 relative to the upper jaw, this pivoting taking place about the pin 26. According to the present invention the work gripping surface of the jaw 14 is related to the axis of the pivot of jaw 14 a distance greater than the distance between the axis of rotation of jaw 14 and the lower jaw 12. Thus in the closed relation of the jaw 14, the work engaging edge of the work engaging member 22 will engage the lower jaw 12 and limit the clockwise swing of the upper jaw 14. Tension on the material held between the jaws of the tenter clip will therefore only tend to move the upper jaw into tighter engagement with the material positioned on the lower jaw 12.

The surface of the work engaging member 22 has been found to be of critical nature. In order to hold the plastic web material, it is necessary to provide a multiplicity of spaced minute projections which will engage the work at a multiplicity of spaced points along the line of contact of the upper jaw with the web material. Preferably the surface of the work engaging member 22 is a file cut surface and particularly it has been found that a number 4 file cut renders optimum results. It has further been found that by providing this surface on the member 22, that plastic web material will be held against slippage during the travel thereof through the tentering machinery.

In operation, clips manufactured in accordance with the invention are mounted to form a continuous chain along the rails of the tentering machine. As plastic web material enters the tentering machine, the web is caused to pass between the upper and lower jaw members of the tenter clip. This is accomplished by maintaining

the pivoting upper jaw member in an open position by the use of cams (not shown) which engage the extending arm 15 of the upper jaw member. As the web enters the space between the upper and lower jaw members, the pivoting upper jaw member is released and engages the web by force of gravity. The first portion to engage the web will be the feeler finger 18 which will hold the upper jaw in open position until the edge of the web has been pulled outwardly a sufficient distance so that the edge will pass from under the feeler finger 18 and then the upper jaw will make initial engagement, the work engaging cylindrical member 22 then making contact with the web material. As the web exerts a pulling force, the frictional force between the web and the contacting surface increases, thus causing a greater holding or gripping force thereon. Upon reaching the end of the path of the tenting machine, the pivoting upper jaw member is released and the web leaves the area between the jaw members of the tenter clip.

The great holding power of the tenter clip made in accordance with the invention is occasioned by the provision of a multiplicity of minute projections, which in effect have quite sharp edges and which are best obtained by using the No. 4 file cut above referred. Positive engagement along a complete line is obtained by virtue of the pivoting action of the surface engaging portion of the upper jaw 14. A further advantage of the instant invention may be readily ascertained since it will become apparent that when such a fine line of minute projections is provided, these sharp edges or projections will tend to wear after a period of use. Rather than having to change the entire upper jaw, which is a tedious operation and requires the knocking out of the pivot pin of the upper jaw to replace it, we have provided a very simple construction where the surface engaging member 22 may be rotated a slight amount. Thus, it is merely necessary to loosen the fastening screws 25 that holds the two plates 20 and 21 together and rotate the cylindrical member 22 to another line engaging portion where an entirely new surface will be presented to the web that will have the characteristics of a new jaw. Thus, not only is superior contact provided, but also ease of maintenance is provided with the instant construction.

We claim:

1. A tenter clip for a tenter chain comprising a body having a plate portion for supporting a web, a clamp jaw pivotally connected to said body above said plate portion and having a free end depending toward said plate and disposed thereover for clamping a web to said plate portion, the said free end of said jaw comprising a pair of clamp bars, said bars being oriented generally parallel to the pivoting axis of said jaw, a work engaging member removably fastened between said clamp bars to permit rotation of said work engaging member relative to said jaw.

2. A tenter clip as in claim 1 wherein said free end of said jaw comprises a cylindrical work engaging member that is held between said clamp bars, said clamp bars being mounted on said jaw for pivoting movement relative to said jaw on an axis generally perpendicular to the pivoting axis of said jaw.

3. A tenter clip comprising a body having a fixed lower jaw member and a relative movable upper jaw member, said upper jaw member being mounted for pivoting movement through an arc greater than the distance between the axis of pivoting of the upper jaw member and the lower jaw member, said lower jaw member having a hardened flat engaging surface, the pivoting jaw member having a cylindrical surface engaging member, a pair of clamp bars pivotally mounted on said upper jaw member on an axis generally perpendicular to the pivoting axis thereof, said cylindrical surface engaging member being received between said clamp bars for selective rotation about its own axis.

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