April 27, 1965 J. C. NASH 3,180,002

AUXILIARY CLOSING MECHANISM FOR TENTER CLIPS

Original Filed Dec. 21, 1961 2 Sheets-Sheet 1

Fig 1

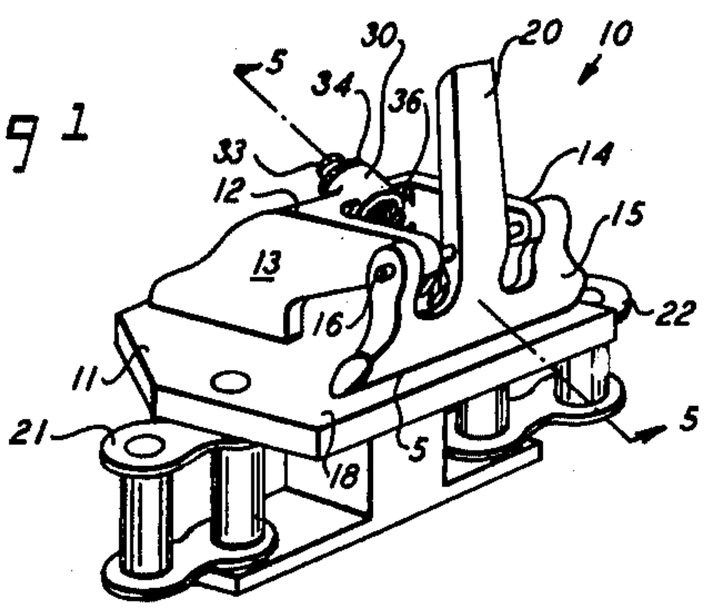



Fig 2

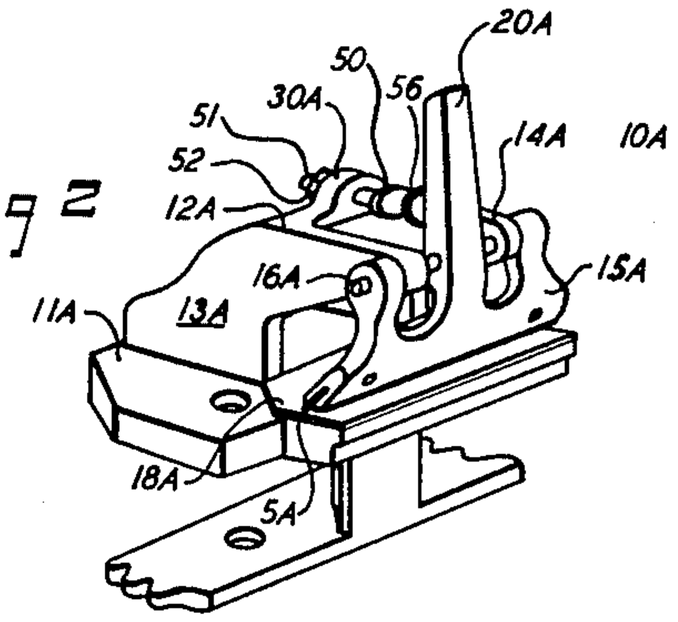



Fig 4

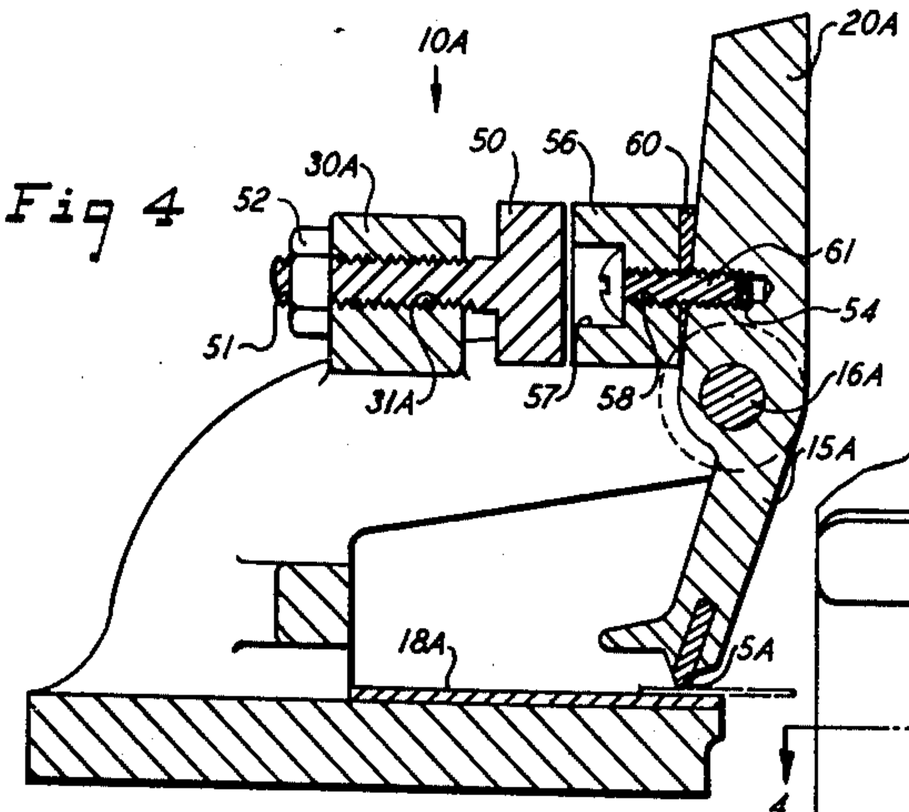



Fig 3

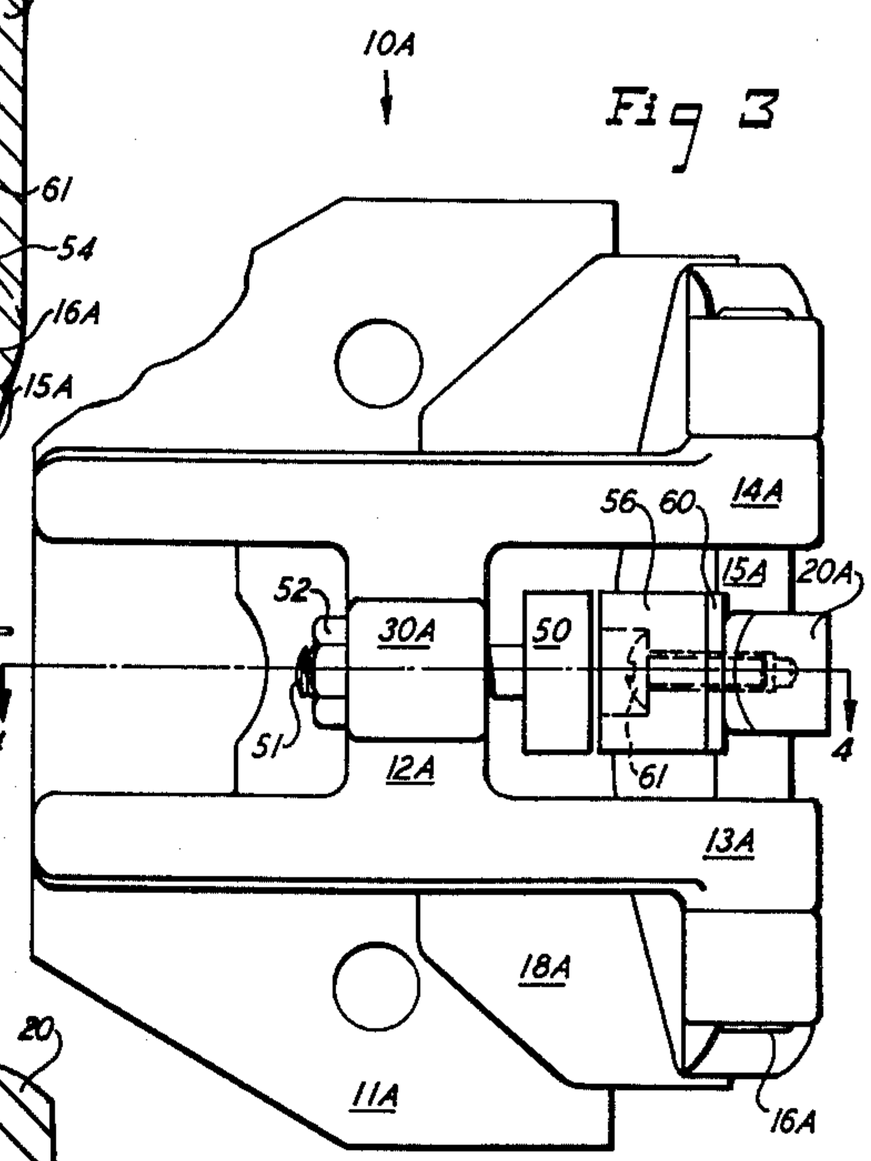
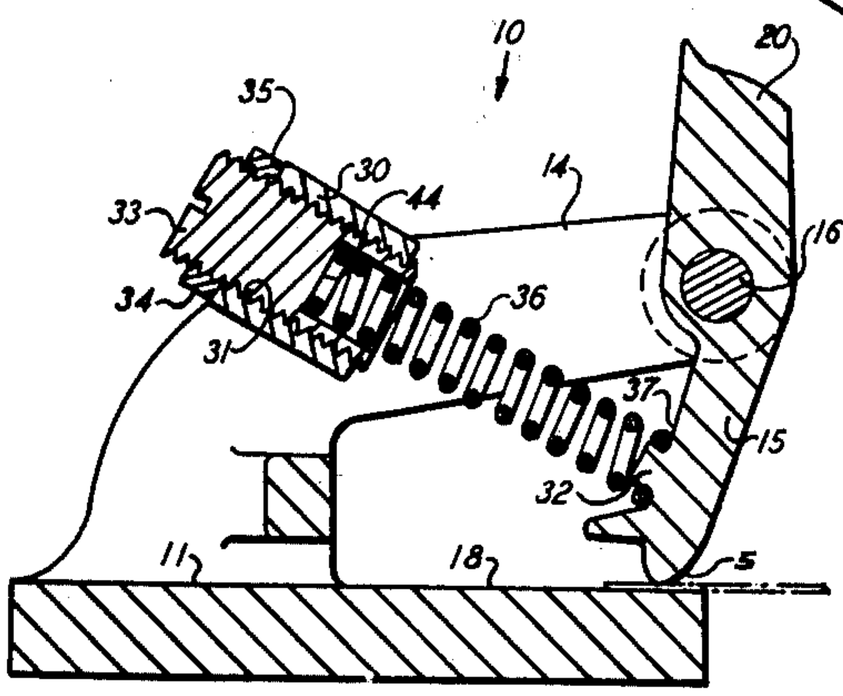



Fig 5

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AUXILIARY CLOSING MECHANISM FOR TENTER CLIPS

Original Filed Dec. 21, 1961 2 Sheets-Sheet 2

Fig 6

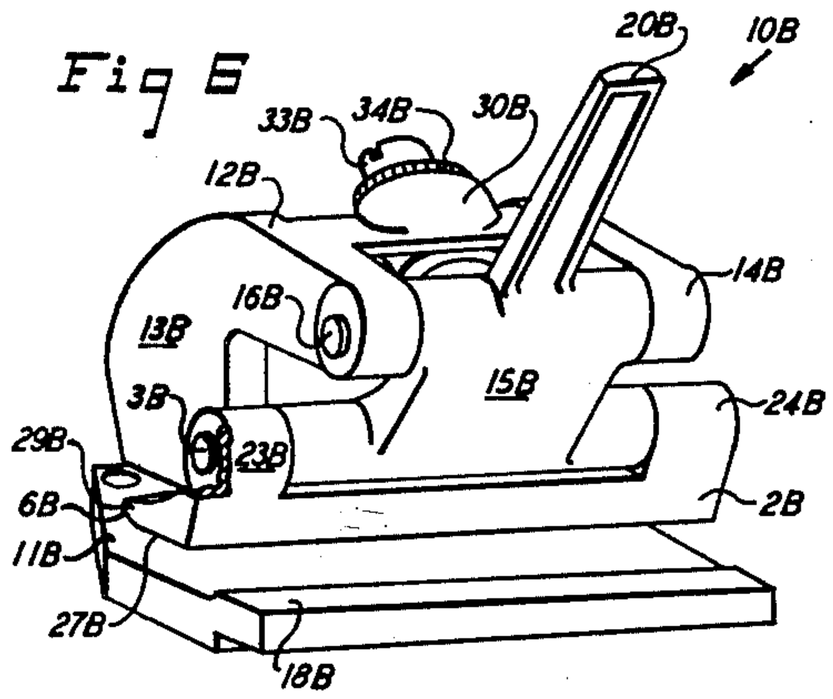



Fig 7

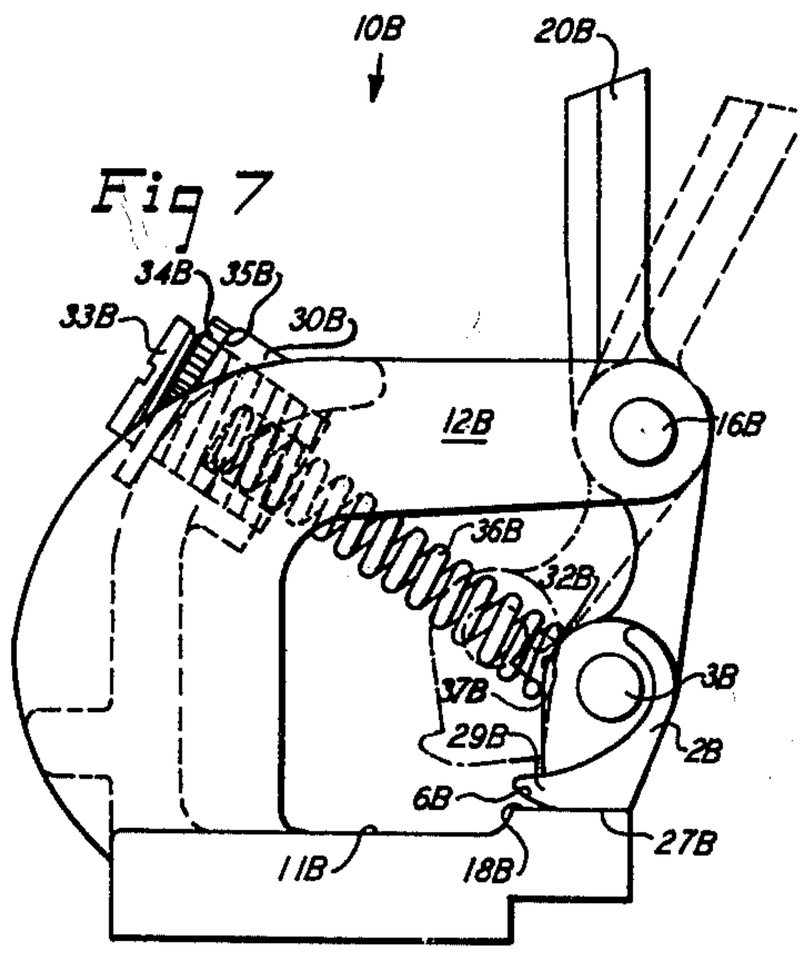



Fig 9

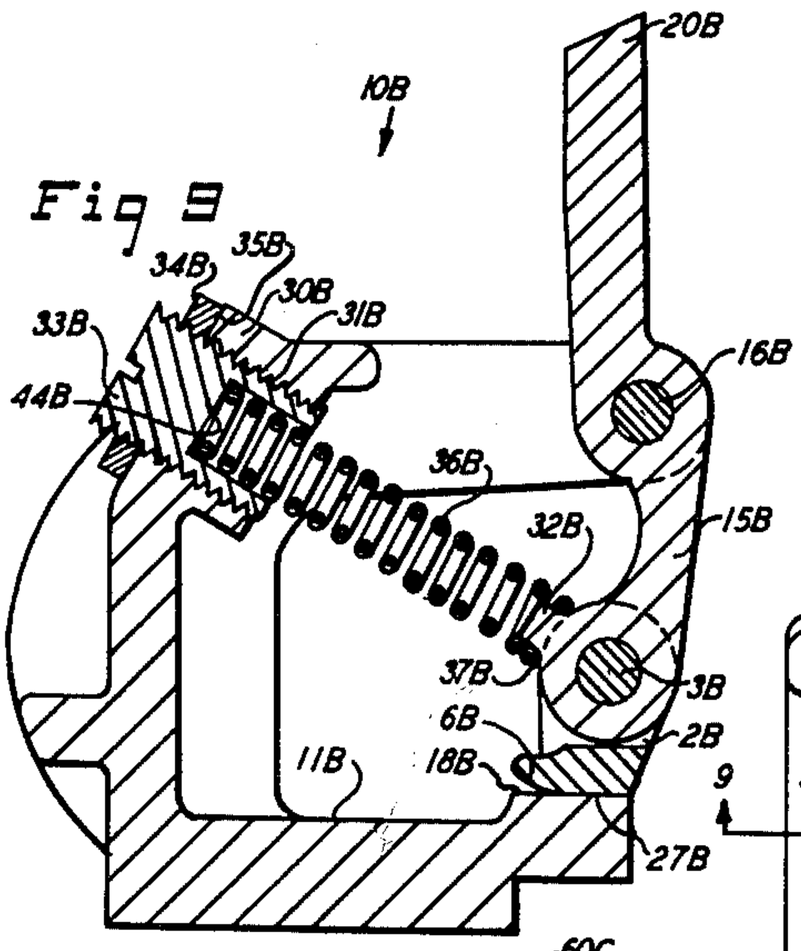
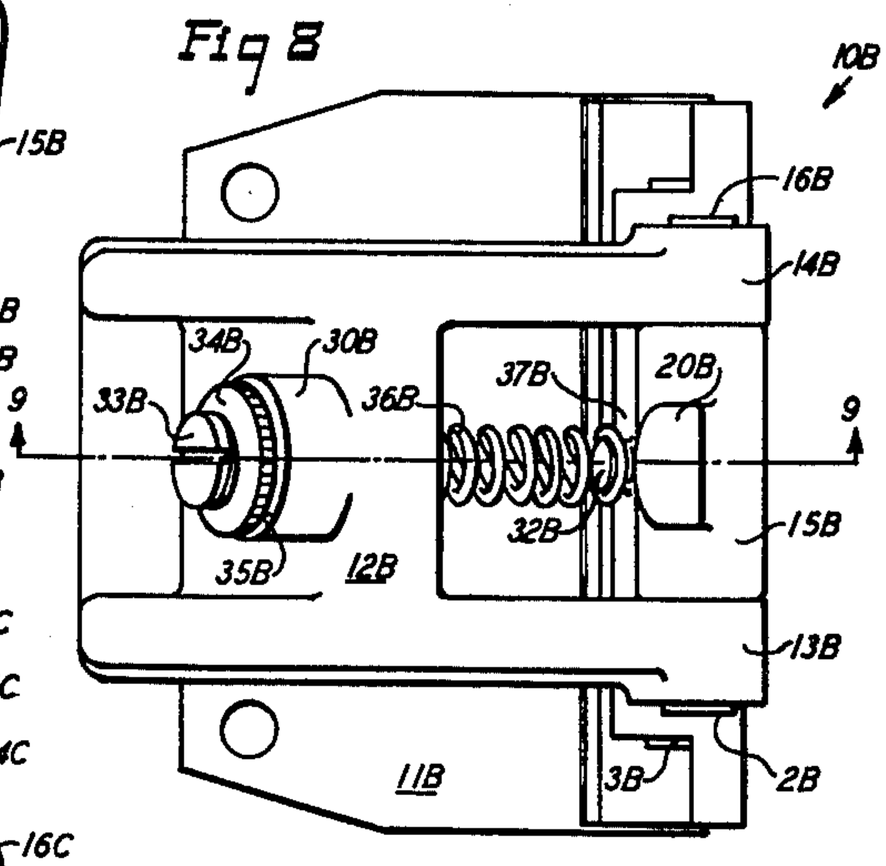



Fig 8



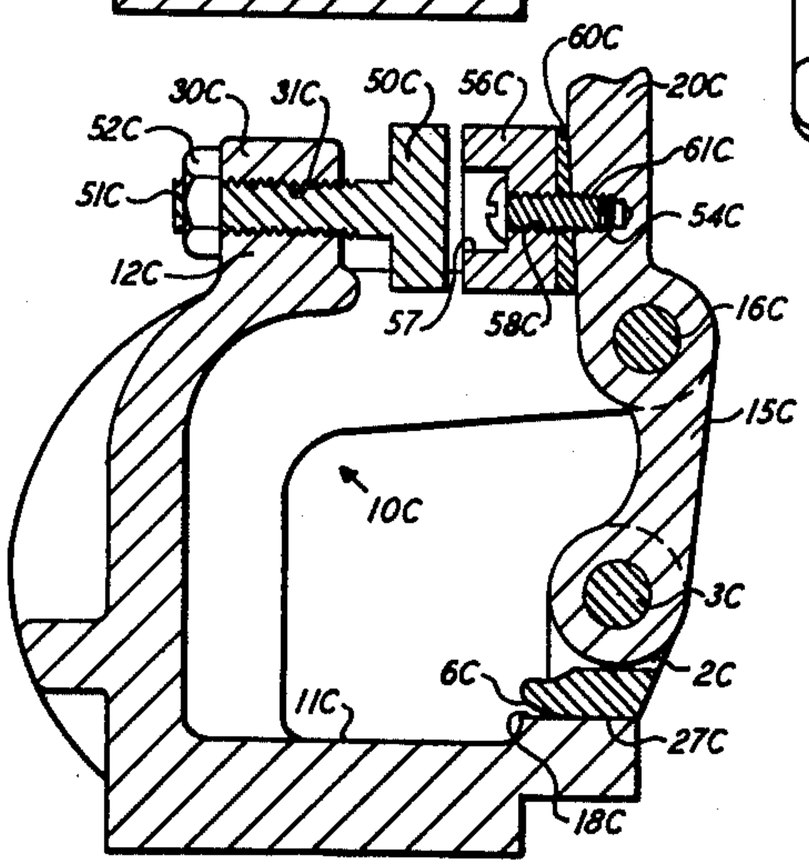




Fig 10

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# 3,180,002
# AUXILIARY CLOSING MECHANISM FOR TENTER CLIPS

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Original application Dec. 21, 1961, Ser. No. 161,177, now Patent No. 3,120,688, dated Feb. 11, 1964. Divided and this application July 30, 1963, Ser. No. 298,659

2 Claims. (Cl. 26—62)

This invention relates to improvements in tenter clips and more particularly to a construction which yieldingly urges the tenter clip jaw or gate into cloth gripping position.

An object of the present invention is to provide a tenter clip with an auxiliary force to yieldingly assist the forces of gravity which swing the jaw or gate into cloth gripping position.

Another object of the present invention is to produce a tenter clip with auxiliary means assisting the forces of gravity to cause the swing jaw or gate to engage the cloth or film with increasing initial force and to engage the cloth or film with increasing force the farther the swing jaw or gate is swung into clamping position.

Still another object of the present invention is to provide adjustable auxiliary means for assisting the forces of gravity to more quickly place a swing jaw or swing gate in cloth or film gripping position.

Other objects of the present invention will become apparent in part and be pointed out in part in the following specification and claims.

In the past a magnet was used as means to cause the swing jaw to engage the cloth with increasing force the harder the cloth pulled upon the gripping action of the switch jaw. United States Patent #1,119,824 dated December 8, 1914 discloses the magnet and a spring for this purpose. This patent discloses a swing jaw used with a controller.

The nature of the material processed in a tentering machine has greatly changed since 1914. This necessitated a change in the structure and functional operation of the tenter clip swing jaw or gate. The present invention is directed to a structure adapted to accomplish proper gripping or holding of modern web materials.

This application is a division of U.S. application Serial #161,177 filed December 21, 1961 now U.S. Patent No. 3,120,688.

In this specification cloth or film refers to any type of web material such as very thin slippery plastic film, thin hard finished textiles or webs of paper.

The modified forms of the present invention illustrated in FIGURES 6 through 10 are continuations-in-part of United States application Serial #823,886 filed June 30, 1959 for a Tenter Clip Gate by John Crandon Nash, the present applicant, and now U.S. Patent No. 3,023,479.

This application is directed to the problem of tentering and therefore gripping very thin slippery plastic film or very thin and very hard cloth.

The terms film, sheet or web are deemed synonymous in this specification.

Referring to the drawings in which similar characters of reference indicate corresponding parts in all the figures:

FIGURE 1 is a perspective view of a tenter clip embodying the new and improved adjustable auxiliary swing jaw closing mechanism.

FIGURE 2 is a perspective view of a tenter clip embodying a modified form of a new and improved adjustable auxiliary swing jaw closing mechanism.

FIGURE 3 is a plan view of FIGURE 2.



FIGURE 4 is a vertical cross sectional view taken on line 4—4 of FIGURE 3.

FIGURE 5 is a vertical cross sectional view taken on line 5—5 of FIGURE 1.

FIGURE 6 is a perspective view of a modified form of tenter clip embodying the new and improved adjustable auxiliary swing jaw closing mechanism illustrated in FIGURE 1.

FIGURE 7 is a side elevational view of FIGURE 6.

FIGURE 8 is a plan view of FIGURE 6.

FIGURE 9 is a vertical cross sectional view taken along line 9—9 of FIGURE 8.

FIGURE 10 is a vertical cross sectional view of the modified form of tenter clip shown in FIGURE 6 with the modified form of a new and improved adjustable auxiliary swing jaw closing mechanism.

FIGURES 1 and 5 illustrate a tenter clip generally indicated by reference numeral 10, comprising a horizontally disposed base 11, a vertically upstanding bracket 12, a pair of arms 13, 14 which project sidewise from upstanding bracket 12 to overlie said horizontally disposed base 11, and a movable jaw 15. A pintle 16 is mounted in a bearing provided in said pair of arms 13, 14. Jaw 15 is freely or loosely hinged to pintle 16 to be normally free to move automatically into vertical relation with horizontally disposed base 11, under the action of gravity.

A clamping area 18 is provided in the section of horizontally disposed base 11 underlying movable jaw 15.

Movable jaw 15 is provided with an operating leg 20 adapted to be actuated by a cam (not shown) which pivots jaw 15 into film release position, and a film engaging edge 5.

Horizontally disposed base 11 is connected to and forms part of an endless chain which links 21, 22 form a part. Links 21, 22 are pivotally connected to horizontally disposed base 11 in a manner old in the art.

The present invention relates to a means for assisting the forces of gravity in more quickly pivoting the movable jaw 15 from film release position to film gripping position. Such means are illustrated in FIGURES 1 and 5 as being adjustable spring means. In FIGURES 2, 3 and 4 the means illustrated is a permanent magnet.

In FIGURES 1 and 5 bracket 12 is provided with a lug or boss 30 located on a line passing through the center of the length of the tenter clip 10. Lug 30 is provided axially with a screw thread 31. (See FIGURE 5.) A projection 32 is provided on movable jaw 15. A cap screw 33 provided with a spring seating recess 44 is rotatively mounted in screw thread 31. A lock nut 34 is rotatively mounted upon cap screw 33 and abuts surface 35 of lug 30 to lock cap screw 33 in adjusted position in lug 30. A coil spring 36 engages projection 32 and abuts surface 37 of movable jaw 15 on one end. The other end of coil spring 36 is located and seated in spring seating recess 4.

As the tenter chain travels around the sprockets (not shown) in a manner well known in the art, operating leg 20 moves away from the cam (not shown) which held the movable jaw 15 in film release position. As soon as leg 20 disengages the cam (not shown) gravity assisted by spring 36 causes leg 20 and movable jaw 15 to swing or pivot toward vertical or film gripping position. The present new and improved tenter clip is particularly adaptable to slimy plastic sheets, webs or film. It is necessary for the movable jaw to swing quickly into film gripping position and grip the film with a strong bite or the slimy slippery film will pull through the grip exerted by the film engaging edge 5 on the clamping area 18.

If the bite is too strong the extremely thin slippery film will tear and tentering will fail. It is therefore imperative

to be able to adjust the spring tension exerted on the movable jaw 15 as the movable jaw swings or pivots into film gripping position.

In the past when the movable clamping jaw 15 swung down upon and engaged the cloth against the clamping area 18, the friction exerted by the cloth on the edge 5 of the movable jaw tended to pull the movable jaw 15 forward so as to pinch the cloth between clamping area 18 and the film or cloth engaging edge 5.

The slimy slippery plastic film exerts no frictional contact on the film engaging edge 5 of the movable jaw 15. Therefore, some form of assistance must be provided. Applicant has solved the problem with the auxiliary closing mechanism.

As the tenter clips travel around the sprockets (not shown) the nip exerted upon the film by the film engaging edge 5 of the movable jaw 15 and clamping area 18 must be exactly right. Too little nip results in the slipping away of the film from nipped or gripped position. Too much force tears the film. Yet the tenter clip is subject to strain as it travels. The strains are vibration, expansion and contraction due to atmospheric heat changes and the pull of the film. The gripping action must allow for some yielding in the firmness of grip. A coil spring provides for such a yielding action. Slippery plastic film or very thin hard cloth or paper must be gripped more quickly and firmly than cotton cloth for example because the plastic film will not draw film engaging edge 5 into clamping position as cotton cloth will do.

In FIGURES 2, 3, 4 applicant illustrates the use of an adjustable magnetic field in place of an adjustable coil spring 36. A tenter clip, generally indicated by reference numeral 10A has substantially the same construction as tenter clip 10, and consists of a horizontally disposed base 11A, a vertically upstanding bracket 12A, a pair of arms 13A, 14A which project sidewise from upstanding bracket 12A to overlie horizontally disposed base 11A, and a movable jaw 15A. A pintle 16A is mounted in said pair of arms 13A, 14A. Jaw 15A is loosely hinged to pintle 16A to be normally free to move automatically into vertical relation with horizontally disposed base 11A, under the action of gravity. A clamping plate 18A may be secured to horizontally disposed base 11A in accordance with past custom in the art. Movable jaw 15A is provided with an operating leg 20A adapted to be actuated by a cam (not shown) which pivots movable jaw 15A into film release position. Movable jaw 15A is provided with a blade 5A in accordance with past custom in the art.

Bracket 12A is provided with a lug 30A. Lug 30A is provided axially with a screw thread 31A. A permanent magnet or a magnetically attractive metal plate 50 is provided with an externally threaded projection 51 adapted to be rotatively mounted in screw thread 31A. A nut 52 locks magnet or metal plate 50 in selected adjusted position.

Operating leg 20A is provided with a tapped orifice 54. A second permanent magnet 56 provided with a counterbore 57 has an axially threaded area 58. A non-magnetic collar 60 may be placed against operating leg 20A. A screw 61 secures second permanent magnet 56 and collar 60 to operating leg 20A through rotatable engagement with threaded area 58 and tapped orifice 54.

As the tenter chain travels, operating leg 20A moves away from a cam (not shown). As soon as leg 20A disengages the cam (not shown) gravity and the force of the magnetic field cause leg 20A and movable jaw 15A to pivot toward a vertical position. Second permanent magnet 56 will move toward metal plate or permanent magnet 50. The influence of the magnetic field will cause second permanent magnet 56 to be attracted toward permanent magnet or metal plate 50 but they will never engage. If they engaged blade 5A would be locked or wedged in engagement with clamping plate 18A and the yielding influence of the magnetic field would be lost.

With reference to FIGURE 4, the poles of the magnets



50, 56 are located to the rear of a vertical line through pintle 16A. It will be observed that as movable jaw 15A moves in clamping direction the second permanent magnet 56 approaches permanent magnet 50 so as to increase the effective magnetic field. The magnet field force increases as the magnets 50, 56 approach each other. They never meet. There must always be a small space or gap between them. It will be noted that permanent magnet 50 is adjustably secured in lug 30A through threaded projection 51 and nut 52.

In FIGURES 6, 7, 8 and 9 there is shown a modified form of tenter clip constructed in accordance with United States Patent application Serial #823,886 filed June 30, 1959 for a Tenter Clip Gate and in the instant inventor's name.

These figures illustrate a tenter clip generally indicated by reference numeral 10B, comprising a horizontally disposed base 11B, a vertically upstanding bracket 12B, a pair of arms 13B, 14B which project sidewise from upstanding bracket 12B to overlie said horizontally disposed base 11B, and a movable jaw 15B. A pintle 16B is mounted in said pair of arms 13B, 14B. Jaw 15B is loosely hinged to pintle 16B to be normally free to move automatically into vertical relation with horizontally disposed base 11B, under the action of gravity. A clamping area 18B is provided in the section of horizontally disposed base 11B underlying movable jaw 15B.

Movable jaw 15B is provided with an operating leg 20B adapted to be actuated by a cam (not shown) which pivots jaw 15B into film release position.

Tenter clip 10B forms part of an endless chain in the same manner as tenter clip 10 or tenter clip 10A and tenter clip 10C, presently to be described.

A gate 2B is pivotally mounted to movable jaw 15B by means of a shaft 3B. Gate 2B comprises a counterweighted body member having as oppositely aligned bearings 23B, 24B. Gate 2B as the body member is provided with a shoe face 27B terminating in an arcuate surface 6B the radius of which is on the vertical center of gravity of gate 2B. The vertical center of gravity is located to the rear of the vertical center of shaft 3B. Inspection of FIGURES 6, 7 and 9 will show that gate 2B engages clamping area 18B in a toggle action provided by means of pintle 16B and shaft 3B.

Gate 2B is provided with a heel 29B which is of sufficient size and weight to form a counterbalance so that as gate 2B pivots freely upon shaft 3B heel 29B will hand downwardly as shown in dot and dash lines in FIGURE 7 to initially engage clamping area 18B and pivot shoe face 27B into engagement with clamping area 18B.

Bracket 12B is provided with a lug or boss 30B located on a line passing through the center of the length of tenter clip 10B. Lug 30B is provided axially with a screw thread 31B. A projection 32B is provided on movable jaw 15B. A cap screw 33B provided with a spring seating recess 44B is rotatively mounted in screw thread 31B. A lock nut 34B is rotatively mounted upon cap screw 33B and abuts surface 35B on lug 30B to lock the cap screw in adjusted position in lug 30B. A coil spring 36B engages projection 32B and abuts surface 37B of movable jaw 15B on one end. The other end of coil spring 36B is located and seated in spring seating recess 44B.

In operation coil spring 36B quickly pivots movable jaw 15B into film engaging position as operating leg 20B disengages the cam (not shown) which holds movable jaw 15B in film release position. Gate 2B is then free under the action of gravity and in a toggle type of movement to engage clamping area 18B or a film or web interposed between shoe face 27B and clamping area 18B.

It is absolutely imperative to be able to adjust the tension of coil spring 36B so that the gravitational movement of movable jaw 15B is in timed relation to the pivotal movement of gate 2B into film engaging position. If the timing is out of sequence shoe face 27B will engage clamping area 18B before the film is placed over clamp-

ing area 18B. Tenter clip 10B will then fail to perform its function.

In FIGURE 10 there is illustrated a tenter clip generally indicated by reference numeral 10C, comprising a horizontally disposed base 11C having a clamping area 18C, a vertically upstanding bracket 12C, a pair of arms which project sidewise from upstanding bracket 12C to overlie clamping area 18C, and a movable jaw 15C. A pintle 16C is mounted in said pair of arms. Jaw 15C is loosely hinged to pintle 16C to be normally free to move automatically into vertical relation with clamping area 18C, under the action of gravity. Movable jaw 15C is provided with an operating leg 20C adapted to be actuated by a cam (not shown) which pivots jaw 15C into film release position.

A gate 2C is pivotally mounted to movable jaw 15C by means of a shaft 3C. Gate 2C and gate 2B are identical in construction.

Bracket 12C is provided with a lug or boss 30C. Lug 30C is provided axially with a screw thread 31C. A permanent magnet or a magnetic plate 50C is provided with an externally threaded projection 51C adapted to be rotatively mounted in screw thread 31C. A nut 52C locks magnet 50C in selected adjusted position.

Operating leg 20C is provided with a tapped orifice 54C. A second permanent magnet 56C provided with a counterbore 57 has an axially threaded area 58C. A non-magnetic collar 60C may be placed against operating leg 20C. A screw 61C secures second permanent magnet 56C and collar 60C to operating leg 20C through rotatable engagement with threaded area 58C and tapped orifice 54C.

As previously described with reference to FIGURES 6, 7, 8 and 9, the magnets 50C, 56C of FIGURE 10 serve the same function as spring 36B.

Having shown and described preferred embodiments of the present invention by way of example, it should be realized that structural changes could be made and other examples given without departing from either the spirit or scope of this invention.

What I claim is:

1. A tenter clip comprising a horizontally disposed base having a clamping area, a vertically upstanding bracket having a lug, a pair of arms projecting sidewise from said upstanding bracket and overlying said clamping area, a movable jaw having an operating leg, a pintle mounted in said pair of arms, said movable jaw freely hinged to said pintle to be normally free to move automatically into vertical relation with said clamping area under the action of gravity, a screw thread provided axially in said lug, a projection provided on said movable jaw, a cap screw provided axially with a spring seating recess, said cap screw rotatively connected to said screw thread to be moved toward and away from said lug, a lock nut rotatively mounted upon said cap screw to lock



said cap screw in adjusted position in relation to said lug, a coil spring located at one end in said spring seating recess and at the other end over said projection on said movable jaw whereby said coil spring in selected adjusted position assists the forces of gravity to yieldingly and rapidly pivot said movable jaw into vertical position in relation to said clamping area.

2. A tenter clip comprising a horizontally disposed base having a clamping area, a vertically upstanding bracket having a lug provided axially with a screw thread, a pair of arms projecting sidewise from said upstanding bracket and overlying said clamping area, a movable jaw provided with an upstanding leg and a shaft bearing, a pintle mounted in said pair of arms, said movable jaw pivotally connected to said pintle to be normally free to move into vertical relation with said clamping area under the action of gravity, a gate comprising a counterweighted body having oppositely aligned bearings, said body provided with a shoe face terminating in an arcuate surface, a shaft mounted in said shaft bearing and said oppositely aligned bearings, said gate loosely hinged through said oppositely aligned bearings to said shaft and said movable jaw to be normally free under the influence of gravity to move into position with said arcuate surface engaging said horizontally disposed base, a projection provided on said movable jaw, a cap screw provided axially with a spring seating recess, said cap screw rotatively connected to said screw thread to be moved toward and away from said lug, a lock nut rotatively mounted upon said cap screw to lock said cap screw in adjusted position in relation to said lug, a coil spring located at one end in said spring seating recess and at the other end over said projection on said movable jaw whereby said coil spring in selected adjusted position assists the forces of gravity in pivoting said movable jaw into vertical position and said shoe face into engagement with said clamping area.


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