

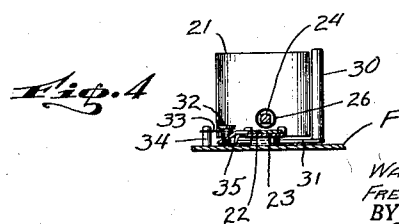
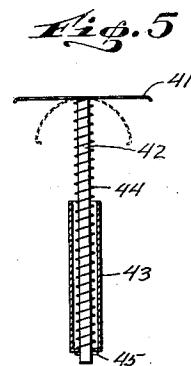
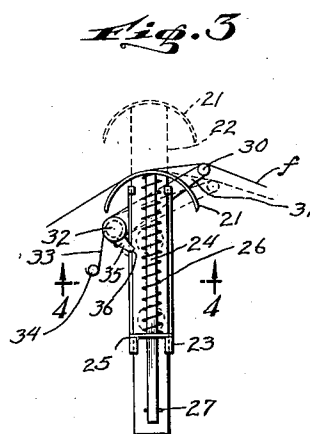
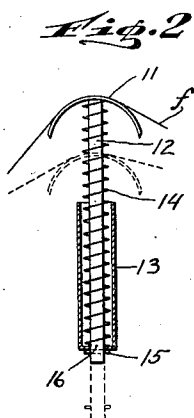
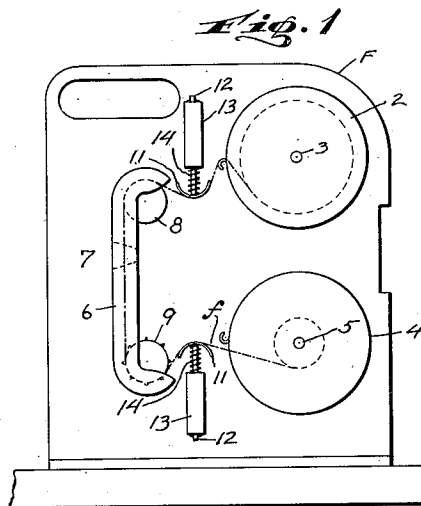
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1,998,453

APPARATUS FOR FEEDING MATERIAL

Filed Oct. 5, 1931



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1,998,453

APPARATUS FOR FEEDING MATERIAL

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rect and mesne assignments, to Kinatome Pat-
ents Corporation, a corporation of New York

Application October 5, 1931, Serial No. 567,103

26 Claims. (Cl. 88—17)

The present invention relates broadly to im-
proved apparatus for feeding material and par-
ticularly to apparatus especially adapted for the
feeding of film bearing thereupon pictorial or
5 sound images or for exposure to such images, al-
though the utility of the invention is not limited
in this respect.

One purpose of this invention is to present im-
proved apparatus for carrying out the method
10 of feeding described and claimed in the copending
application of Clarkson Ulysses Bundick and Bar-
ton Allen Proctor, Serial Number 44,482, filed
July 18, 1925. The Bundick and Proctor system
of feeding material, as described and claimed in
15 the above mentioned application, provides method
and apparatus whereby a strip of material may
be fed from one supporting member to another
and an intermediate portion maintained motion-
less for regularly recurring periods. In such sys-
20 tem of feeding, both the delivery and the taking
up carriers are driven continuously but at rates
of speed which vary in accordance with the inter-
mittency of movement of the intermediate sec-
tion of the material which is being worked upon,
25 all of the material being maintained under a
condition of substantially uniform tension. Under
this system of feeding, the intermittently
operable feeding member disposed between the
masses of material serves both to draw material
30 directly from the source of supply and, working
through the material, to operate an auxiliary
feeding and tensioning device disposed there-
between. The driven taking-up member serves
both to move the film away from this interme-
35 diate intermittently operating member and, also
working through the material, to operate an aux-
iliary feeding and tensioning device disposed
therebetween.

An object of the present invention is to pro-
vide improved apparatus for use with this sys-
40 tem of feeding and improvements in the con-
struction and arrangement of the auxiliary feed-
ing and tensioning devices. Another object is
the provision of improved auxiliary feeding de-
vices and improved tensioning devices for use
45 with material handling apparatus.

A further object is the provision of improved
apparatus for controlling the operation of an
auxiliary feeding member or a tensioning mem-
50 ber, preferably through the film itself.

In the accompanying drawing there is shown,
for purposes of illustration only, one preferred
embodiment of the present invention, together
with two preferred modifications thereof, it being
55 understood that the drawing does not define the

limits of the invention, as changes in the con-
struction and operation disclosed therein may
be made without departing from the spirit of
the invention or the scope of the broader claims.

In the drawing:

Figure 1 is a side diagrammatic elevational
view illustrating one embodiment of the present
invention.

Figure 2 is a detailed view partly in section
of the construction of the auxiliary feeding and
10 tensioning unit of which use is made in the pres-
ent invention.

Figure 3 is a side elevational view of one pre-
ferred form of the present invention, and Fig-
ure 4 is a view taken on the lines 4—4 of Figure 3
15 looking in the direction of the arrows.

Figure 5 is a view corresponding to Figure 2
showing a preferred modification of the inven-
tion.

In carrying out the present invention in con-
20 nection, for example, with the feeding of film,
there may be provided an apparatus including a
feeding or delivery carrier 2 mounted for ro-
tation upon a delivery spindle 3 and a take-up
carrier 4 mounted for rotation upon a spindle
25 5. Such carriers are shown as single magazines.
Spindles 3 and 5 are mounted upon a main frame
F of an apparatus which is diagrammatically in-
dicated in Figure 1. Between these carriers is
positioned a gate generally indicated by 6 with
30 an aperture at 7. A guiding roller 8 may be pro-
vided at one end of such gate and a toothed
feeding member 9 at the other end thereof.
Power to drive the feeding member 9 and the
take-up spindle 5 may be applied in any de-
35 sired manner. Such application of power is
well known and since it forms no part of the
present invention, is not shown nor described.

Situated between the respective carriers and
the feeding member 9 are vertical auxiliary feed-
40 ing and tensioning units, which are shown in de-
tail in Figure 2.

Each of these units preferably comprises a
film engaging pad 11 mounted upon the rod or
45 plunger 12, preferably non-circular in cross-
section, which is positioned within the guiding
structure 13. Coiled about the rod 12 is a com-
pression spring 14 normally urging the pad 11
toward the film f, such upward movement, as
50 viewed in the drawing, being limited by the pin
15, mounted in the lower end of the rod 12 and
engaging the lower end of the guiding structure
13. The upper and lower portions of such sup-
porting structure may be formed with openings,
55 indicated at 16 in Figure 2, of such shape, rela-

tive to the cross-section of the rod 12, as to prevent rotation of the rod.

The operation of the device is as follows:

As power is applied to the feeding member 9, it 5
revolves and film is pulled from the carrier 2. The plunger 12 is depressed and energy is stored in the spring 14. While the feeding member 9 is at rest, the spring 14 moves the plunger 12 10
downwardly, as viewed in Figure 1, whereby an amount of film is pulled from the delivery carrier 2. Upon the next rotation of the feeding member 9, the portion of the film necessary to compensate for the displacement caused thereby is the length of film previously pulled from 15
the carrier 2 and such as at that moment is pulled directly from such carrier. The resiliently mounted film-engaging pad 11 serves to cushion this direct movement of film directly from the delivery carrier.

It will be noted that the parts of our apparatus are so arranged that the film, when the film-engaging pads are depressed, tends to assume a straight line between the sprocket 9 and the take-up carrier and between the guiding idler 8 and the delivery carrier and that the film engaging pads tend to work upon the film at substantially right angles to its line of travel. This arrangement has several advantages, among which is the quick response of the film and spring 20
pressed pad to the influence exerted thereupon by the other. When the tension member is positioned within an acute bent of the film, power—whether transmitted from or to the film—is wasted, skin friction is needlessly increased, as well as the possibility of static electricity, and the film subjected to strain because of its curvature. 25

The operating of the auxiliary feeding and tensioning unit which is placed between the intermittent feeding member 9 and the take-up carrier 4 is analogous to that of the corresponding unit associated with the delivery carrier. As the sprocket 9 revolves, a portion of the film equal to one frame is moved forwardly. The resiliently mounted pad 11 holds the film constantly under tension. The spindle 5, yieldingly but continuously driven, pulls the film forwardly and coils it up upon the take-up reel 4. This operation moves the supporting rod or plunger 30
12 against the pressure of the spring 14. Thus there is stored therein an amount of energy which is sufficient to move the film away from the sprocket and to maintain the tension upon the film during the next period of rest of the sprocket 9. As the spindle 5 revolves during the period of rest of the sprocket 9, the direct pull upon the perforations of the film seated upon the teeth of the sprocket is largely absorbed by the cushioning effect of the spring 14. 35

We have described this device as associated with an intermittently driven feeding member. As will be readily understood by those skilled in the art, our invention may be advantageously applied to a continuously driven feeding member for the purpose of securing an even and steady flow of the material irrespective of minor variations in the rate of movement of such member. 40

It is often desirable to move the film-engaging member of the feeding and tensioning unit away from the film so that space is provided for the threading operation and to provide apparatus which makes certain that when the feeding of the film is again initiated the tensioning device will become automatically operative thereupon. In carrying out this phase of our invention, as is 45

clearly shown in Figures 3 and 4, we may provide a film-engaging pad 21 which is mounted upon or formed with the plate 22 which operates within the sleeve 23 formed in or attached to the main plate F. Extending downwardly, as viewed in Figure 3, from the film-engaging pad 21 is the rod 24, preferably non-circular in cross-section, which passes through an opening of suitable contour in a right angled lower extension 25, as viewed in Figure 3, of the sleeve 23. A compression spring 26, coiled about the rod 24 and extending between the lower extension 25 and the film-engaging pad 21, tends to force the pad upwardly, the upward movement of the pad being limited by the engagement of a pin 27 inserted in the rod 24 with the lower extension 25 of the sleeve 23. 50

A latching device is provided to hold the pad 21 in its lower or inoperative position. A film-engaging member 30 is mounted upon a lever 31, rotatable upon a stud 32 and moved upwardly, as viewed in Figure 3, by a spring 33 extending between the stud and a pin 34. A dog 35 extending from the lever 31 passes through a suitable opening in the sleeve 23 and at 36 engages a suitable notch in the plate 22. 55

At the conclusion of the operation of the device, in order easily to remove the film from the apparatus, the user pushes the pad 21 to the position shown in full lines in Figure 3. When the film is next placed in operative position in the apparatus and the rotation of the take-up spindle 5 begun, the film will be pulled taut, and will move the member 30 and the lever 31 upon which it is mounted from the full line position shown in Figure 3, to the dotted line position shown therein, thus releasing the plate 22 from the holding influence of the dog 35 and placing the tensioning device in full operation, as previously described. 60

If desired, instead of manually moving the pad 21 out of operative relation with the film, it may be moved out of such relation by a connection between the slide 22 and a control mechanism interlocking such slide with the other operable elements of the apparatus in the manner described and claimed in the co-pending application of Barton Allen Proctor, Serial Number 54,910, filed September 8, 1925, or by a connection between such slide and a movable gate section. 65

In Figure 5 we show a simple modification of our device. A film-engaging pad 41, instead of being rigid as shown in Figures 2 and 3, is made from a flat spring and attached to a plunger 42 as by spot welding. This plunger is maintained, as previously described, in the supporting structure 43 and urged toward the film by a compression spring 44 which is wound about the plunger 42, the upward movement of the plunger, as viewed in Figure 5, being limited by the pin 45. This resilient film-engaging surface performs a cushioning function in addition to that performed by the spring 44. Under the influence of the film as the film is fed, it is moved from the full line position of Figure 5 to that shown in the dotted line. The resilience of this spring 41 supplements that afforded by the coiled spring 44. Preferably, these springs are constructed of different magnitudes, the spring 41 preferably performing the cushioning function and the spring 44 the auxiliary feeding function. 70

In all forms of the invention the film-engaging pad may be formed with a central portion relieved so that the image bearing portion of the film does not come into contact with the pad. 75

Many of the advantages of the present invention have been stated above or will be obvious from a reading of the previous portion of this specification and the subjoined claims. Other advantages arise from the provision of improved apparatus whereby a film or other material may be fed from an idling delivery carrier to a driven take-up carrier by means of an intermittent feeding member placed therebetween and auxiliary feeding and tensioning means operated by the film itself.

Still further advantages arise from the provision of an auxiliary tensioning and feeding device which secures a more even and steady flow of the material.

Another advantage of our invention arises from the provision of an auxiliary feeding and tensioning member which is placed into operative relation with the film by the film itself, upon the initiation of the feeding operation.

We claim:

1. In a film handling apparatus, an idling delivery carrier, a continuously driven take-up carrier, an intermittently driven toothed film-feeding member positioned between said carriers for drawing film from said delivery carrier and moving it toward said take-up carrier, a movable member engaging the film between said delivery carrier and said feeding member, a mounting for said film-engaging member which guides the movement thereof in a direction substantially right-angled to the film, said apparatus including spaced film engaging and guiding surfaces so placed in relation to said film engaging member that the film as it passes over said film engaging member is not sufficiently displaced from a straight line to subject said film engaging member to substantial pressure in a direction angular to said right-angled direction of its movement, a spring urging said film-engaging member toward the film, said film-engaging member being so positioned relatively to said feeding member and to said carrier that each feeding impulse of said feeding member as it draws film directly from said delivery carrier is cushioned by said spring and also stores power in said spring, for moving the film directly from said carrier during each period of idleness of said feeding member and for maintaining said carrier continuously in rotation, a movable member engaging the film between said feeding member and said take-up carrier, a mounting for said film engaging member which guides the movement thereof in a direction substantially right-angled to the film, said apparatus including spaced film engaging and guiding surfaces so placed in relation to said film engaging member that the film as it passes over said film engaging member is not sufficiently displaced from a straight line to subject said film engaging member to substantial pressure in a direction angular to said right-angled direction of its movement, and a spring for urging said film-engaging member toward the film, said film-engaging member being so positioned in relation to said take-up carrier and said feeding member that the direct pull of said continuously driven take-up carrier upon the film in engagement with said toothed intermittent feeding member during the period of idleness of said intermittent feeding member is cushioned by said film-engaging member and power stored in said spring for moving the film away from said intermittent feeding member during the period of operation of said intermittent member and for maintaining the section of the film between said intermittent feeding

member and said take-up carrier continuously in motion.

2. In a film handling apparatus, an idling delivery carrier, an intermittently driven toothed member for drawing film directly from said delivery carrier and a movable member engaging the film between said delivery carrier and said feeding member, a mounting for said film-engaging member which guides the movement thereof in a direction substantially right-angled to the film, said apparatus including spaced film engaging and guiding surfaces so placed in relation to said film engaging member that the film as it passes over said film engaging member is not sufficiently displaced from a straight line to subject said film engaging member to substantial pressure in a direction angular to said right-angled direction of its movement, a spring urging said film-engaging member toward the film, said film-engaging member being so positioned relatively to said feeding member and to said carrier and the magnitude of the spring being such that said film engaging member continuously maintains the section of the film therebetween under tension and that each feeding impulse of said feeding member as it draws film directly from said delivery carrier is cushioned by said spring and also stores power in said spring whereby said spring is effective to move the film directly from said carrier during each period of idleness of said feeding member.

3. In a film handling apparatus, a continuously driven take-up carrier, an intermittently driven toothed feeding member for moving film toward said take-up reel, a movable member engaging the film between said feeding member and said take-up carrier, a mounting for said film engaging member which guides the movement thereof in a direction substantially right-angled to the film, said apparatus including spaced film engaging and guiding surfaces so placed in relation to said film engaging member that the film as it passes over said film engaging member is not sufficiently displaced from a straight line to subject said film engaging member to substantial pressure in a direction angular to said right-angled direction of its movement, and a spring for urging said film-engaging member toward the film, said film-engaging member being so positioned in relation to said take-up carrier and said feeding member and said spring being of such magnitude that the direct pull of said continuously driven take-up carrier upon the film in engagement with said toothed intermittent feeding member during the period of idleness of said intermittent feeding member is cushioned by said film-engaging member and power stored in said spring, whereby said film-engaging member during the period of operation of said intermittent member moves the film away from said intermittent feeding member.

4. In a film handling apparatus, a delivery member, a take-up member, a feeding member positioned therebetween for drawing film from said delivery member and moving it toward said take-up member, said delivery member being positioned in vertically and horizontally spaced relation to said feeding member, a guiding member engaging the film between said feeding member and said delivery member and so positioned in relation to each of the same that the path of the film therebetween forms an angle at the apex of which said guiding member is disposed, said take-up member being positioned in horizontally spaced relation to said feeding member and at an angle

to the path of the film between said feeding member and said guiding member, a first movable tensioning member engaging the film between said guiding member and said delivery member, a mounting for said first tensioning member for guiding the same in a direction substantially right-angled to the line of the film as it extends between said guiding member and said delivery member, a spring urging said first tensioning member toward the film, a second movable tensioning member engaging the film between said feeding member and said take-up member, a mounting for said second tensioning member for guiding the same in a direction substantially right-angled to the line of the film as it extends between said guiding member and said delivery member, and a spring urging said second tensioning member toward the film and in opposition to said spring associated with said first tensioning member.

5. Apparatus according to claim 4, said guiding member being so positioned that the angle formed thereby in the path of the film between said delivery member and said feeding member is of the order of ninety degrees and said take-up member being so positioned in relation to said feeding member that the angle formed by the path of the film between said feeding member and said take-up member and the path of the film between said guiding member and said feeding member is also of the order of ninety degrees whereby said opposed spring loaded film engaging tensioning members move in line with each other.

6. In a film handling apparatus, two film supporting members, means for applying power to one of said supporting members for feeding a film from one of said members toward the other, a resiliently mounted reciprocating plunger engaging the film between said supporting members, said members and said plunger being so disposed in relation to each other that said resilient plunger and the feeding influence upon the film are alternatively effective without interference from film engaging elements intermediate said members to move the entire stretch of film between said members between an arcuate position and one approaching the chord thereof whereby a relatively small degree of resilience applied to said plunger and a relatively small degree of excess power applied by said feeding means to the film are able quickly to affect the entire stretch of the film between said supporting members.

7. In a film handling apparatus, two film supporting members, means for applying power to one of said supporting members for feeding a film from one of said supporting members toward the other, a film-engaging tensioning element, a spring urging said element toward the film, and a mounting for said element which guides the movement of said element in a direction substantially normal to the path of the film between said supporting members, said supporting members and said film engaging tensioning element being so disposed in relation to each other that said element and the feeding influence upon the film are alternatively effective without interference from film engaging members intermediate said supporting members to move the entire stretch of the film between said supporting members between an arcuate position and one approaching the chord thereof whereby a relatively small degree of tension in said spring and consequently of excess power applied by said feeding means to the film are able quickly to affect said entire stretch of film.

8. In a film handling apparatus, a toothed feeding member, a carrier, said carrier and said toothed feeding member being so disposed that a film travels therebetween in approximately a straight line, and a resilient plunger an end of which engages the film between said toothed feeding member and said carrier and is effective for displacing the film from said straight line, said resilient plunger being so disposed in relation to said toothed member and said carrier that its movement under the influence of its resilience immediately affects the entire stretch of the film between said feeding member and said carrier, the right-angled relation of said plunger to said straight line preventing said plunger from binding because of decided angular pressure from the film as it travels over said end thereof.

9. In a film handling apparatus, a smooth roller and a carrier, said carrier and said roller being so disposed upon said apparatus that the film extends therebetween in a substantially straight line unhindered by engagement with an intermediate toothed member, means for feeding the film between said roller and said carrier, and a resilient plunger engaging the film in substantially right-angled relation to said straight line, the movement of said plunger due to its resilience being effective immediately to condition the feeding of the stretch of the film between said carrier and said roller.

10. In a film handling apparatus, a smooth roller and an idling carrier, said carrier and said roller being so disposed upon said apparatus that the film extends therebetween in a substantially straight line unhindered by engagement with an intermediate toothed member, means engaging the film upon the side of said smooth roller other than that upon which said carrier is disposed for drawing the film over said roller and from said carrier, and a resilient plunger engaging the film in substantially right-angled relation to said straight line, the movement of said plunger due to its resilience being effective immediately to condition the feeding of the stretch of the film between said carrier and said roller.

11. In a film handling apparatus, a toothed feeding member, a carrier, said carrier and said toothed feeding member being so disposed that film travels therebetween in approximately a straight line, means for applying power to said carrier for winding up the film which is advanced thereto by said toothed feeding member, and a resilient plunger, an end of which engages the film between said toothed feeding member and said carrier and is effective for displacing the film from said straight line, said resilient plunger being so disposed in relation to said toothed member and said carrier that its movement under the influence of its resilience immediately affects the entire stretch of the film between said feeding member and said carrier, the right-angled relation of said plunger to said straight line preventing said plunger from binding because of decided angular pressure from the film as it travels over said end thereof.

12. In a film handling apparatus, two vertically spaced film carriers, a member engaging a film between said carriers for feeding it from one of said carriers toward the other, said feeding member being vertically spaced from one of said carriers and horizontally spaced from both thereof and so arranged that the portions of the film adjacent said carriers are mainly straight, and two opposed resiliently mounted reciprocating film tensioning plungers one engaging the relatively

straight line of the film between said feeding member and one of said carriers, and the other engaging the relatively straight line of the film between said feeding member and the other of said carriers, said carriers and said feeding members being so disposed that each of said plungers is directly operative upon the entire stretch of the film between said feeding member and the move adjacent of said carriers without interference from intermediate elements which hamper the easy and immediate movement of the film under the influence of said plungers.

13. In a film handling apparatus, two film carriers, a member engaging the film between said carriers for feeding it from one of said carriers toward the other, and two movable film engaging tensioning elements, said apparatus including spaced film engaging and guiding surfaces so disposed in relation to each of said film engaging elements that the film as it passes over said film engaging elements is so disposed that the line of the force to which it subjects said film engaging elements is substantially coincidental with said right-angled direction of movement of said film engaging member, one of said elements being disposed between said feeding member and one of said carriers and the other of said elements being disposed between said feeding member and the other of said carriers, a mounting for each of said elements so positioned that said elements are movable in opposition to each other and in directions substantially normal to the film, and springs for moving each of said elements toward the film.

14. In a film handling apparatus, a gate, a feeding member disposed upon one side thereof adjacent thereto for feeding a film therethrough, a delivery carrier for supporting the film so fed, said delivery carrier being disposed in horizontally spaced relation to one end of said gate, a take-up carrier for winding up film fed through said gate by said feeding member, said take-up carrier being disposed in horizontally spaced relation to said gate, two resiliently mounted reciprocating film tensioning plungers one of which engages the straight line of the film extending between said delivery carrier and the relatively adjacent end of said gate and the other of which engages the straight line of the film as it extends between said feeding member and said take-up carrier, such arrangement of said plungers making them immediately effective upon said section of the film in opposition to each other.

15. In a film handling apparatus, a gate, a feeding member disposed upon one side thereof adjacent thereto for feeding a film therethrough, a delivery carrier for supporting the film so fed, said delivery carrier being disposed in horizontally spaced relation to one end of said gate and so disposed in relation thereto that the line of the film extending between said carrier and said gate makes an angle therewith of the order of ninety degrees, a take-up carrier for winding up film fed through said gate by said feeding member, said take-up carrier being disposed in horizontally spaced relation to said gate and so disposed in relation thereto that the line of the film extending between said carrier and said gate makes an angle therewith of the order of ninety degrees, and two resiliently mounted reciprocating film tensioning plungers one of which engages the straight line of the film extending between said delivery carrier and the relatively adjacent end of said gate and the other of which engages the straight line of the film as it extends between said feeding member and said take-up carrier,

such arrangement of said plungers making them immediately effective upon the film in opposition to each other.

16. In a film handling apparatus, two film supporting members, means for feeding a film from one of said members to the other, a film tensioning element engaging the film between said supporting members, a rod on which said element is mounted, a housing about said rod, and a spring within said housing and operatively connected thereto and to said element for urging said element toward the film.

17. In a film handling apparatus, two film supporting members, means for feeding a film from one of said members to the other, a film tensioning element engaging the film between said supporting members, a rod on which said element is mounted, a housing about said rod, a spring within said housing and operatively connected thereto and to said element for urging said element toward the film, and means for mounting said rod within said housing, said mounting means preventing a turning movement of said rod within said housing.

18. In a film handling apparatus, two film supporting members, means for feeding a film from one of said members to the other, a film tensioning element engaging the film between said supporting members, a spring for urging said film engaging element toward the film, a spring within said housing and operatively attached to said film engaging element, and means for mounting said film engaging element for reciprocating movement under the influence of said spring.

19. In a film handling apparatus, two film supporting members, means for feeding a film from one of said members to the other, a film tensioning member engaging the film between said supporting members, a plunger upon which said film engaging member is mounted, a housing for said plunger, and resilient means within said plunger whereby said film engaging member may be moved relatively to the film.

20. In a film handling apparatus, two film supporting members, means for feeding a film from one of said members to the other, a member engaging the film between said supporting members, a slide upon which said film engaging member is mounted, a sleeve for guiding said slide so that said film engaging member may move reciprocatingly in relation to the film, a spring urging said slide toward the film, a latch for holding said slide away from the film so that said film engaging member is disposed instantly from the path of the film so that the film may be conveniently threaded, and a release for said latch, said release including an actuating member which extends into the path in which the film is threaded whereby after the film has been threaded the tension thereof releases said latch so that said slide under the influence of said spring moves said film engaging member into operative relation to the film.

21. In a film handling apparatus, two film supporting members, means for feeding a film from one of said members toward the other, a member for controlling the tension of that section of the film that extends between said supporting members, a spring for moving said tension controlling member into operative relation with the film, and a latch for holding said member against the power of said spring out of such operative relation with the film whereby the film may be conveniently threaded in said apparatus.

22. In a film handling apparatus, two film sup-

porting members, means for feeding a film of one of said members toward the other, a film tensioning member, and control means for said film tensioning member, said control means including means for maintaining said film engaging member in a first or threading position wherein said film engaging member is out of operative relation with the film and its path so that the threading operation can be conveniently carried out and a second or operating position wherein said tensioning member is disposed in operative contact with the film, means for disabling said maintaining means, and a spring which is effective upon the disabling of said maintaining means both for moving said film engaging member from said first or threading position into said second or operating position and for thereafter operating said film engaging member while in said operating position.

23. In a film handling apparatus, two film supporting members, means for feeding a film from one of said members toward the other, a member for controlling the tension of that section of the film that extends between said supporting members, a spring for moving said member into operative relation with the film, a latch for holding said member against the power of said spring out of such operative relation with the film, and a control member operated by the film for releasing said latch when the tension upon the film exceeds a predetermined point.

24. In a film handling apparatus, two film supporting members, means for feeding a film from one of said members toward the other, means for controlling the tension of that section of the film which extends between said supporting

members, said means including a film engaging element, a member by which said element is carried, resilient means urging said carrying member toward the film, a mounting for said carrying member which guides said carrying member in a movement normal to the direction of travel of the film between said supporting members, a latch for holding said carrying member against the action of said resilient means, and means controlled by the film for releasing said latch.

25. In a film handling apparatus, two film supporting members in line with each other, means for feeding a film from one of said members toward the other, a member engaging the film between said supporting members, a spring for moving said engaging member from one position wherein the film is disposed in a relatively direct path between said supporting members to another position wherein it disposes the film in a relatively long path between said supporting members, a latch for said spring, and means controlled by the film for releasing said latch.

26. In a film handling apparatus, two film supporting members, means for feeding a film from one of said members toward the other, a flat tensioning spring engaging the film between said supporting members, a movable member upon which said flat spring is mounted, a mounting for said movable member which guides said movable member in a direction substantially normal to the film, and a spring for urging said member toward the film and said flat spring into engagement therewith.

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