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(54) **Device for folding cloths in two.**

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(56) References cited :
CH-A- 307 944
DE-C- 157 120
DE-C- 541 071

(56) References cited :
FR-A- 591 005
FR-A- 1 554 364
US-A- 1 499 254
US-A- 3 912 188

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Description

This invention relates to a device for folding cloths in two, especially to rewind cloths that are wound up at full weaving width on a cloth beam or any other kind of roller in smaller quantities in double folded condition.

The folding in two or wrapping of cloths, which extend to their full weaving width, and consequently their winding up in double folded condition is a universally known technique. However, the devices used for it have the disadvantages of being rather complicated, needing many mechanical guides as well as measuring and regulation apparatus to keep the cloth in the right path while being folded.

From the German patent no. 157.120 a device is known in which the cloth to be folded is conducted upwards from a roll in a vertical plane and whereby it is bent back over an inversely V-shaped guide, that also is situated in a vertical plane, after which the cloth halves brought together are conveyed behind the V-shaped guide in a vertical plane, and a horizontally directed motion. Near the top of the V-shaped guide the cloth to be folded executes several directional changes shortly after one another. As a consequence, at high winding speeds the great drawback shows up of the cloth having a tendency to move upwards, whereby it looses contact with the top of the V-shaped guide which makes the device's correct operation suffer. The device also has the disadvantage that it is rather difficult to adapt the cloth correctly when starting the folding process.

From the American patent no. 1.499.254 a device for folding cloths is known, in which the cloth to be folded is lead along two bent elements put up in V-shape and an horizontal stave following on, after which the folded cloth is moreover brought along several vertical guiding staves. Because of the guides' bent shape, the cloth does not remain straight while folding, which involves that deflections easily occur during the folding process, that have to be remedied by hand.

The French patent no. 591.005 describes a device for folding cloths in two mainly consisting of a tube structure and a number of roll-shaped guides. This device has the drawback that its construction is rather complicated and consequently expensive. The tube structure moreover prevents the cloth from being easily fitted on the device, which forces each time to fasten the end of one cloth roll to the beginning of the following one, thus involving loss of time.

From the German patent No 541.071 a folding structure is known that folds the cloth in two according to an intricated motion pattern. As a consequence, the construction has a complicated structure. During the folding process the same disadvantages occur as discussed with the DE 157.120.

The French patent No 1.554.364 discloses a device which is almost similar to that of the above cited French patent No 591.005 and which shows similar disadvantages.

That is why the present invention aims at providing a device for folding cloths in two which does not have the aforesaid drawbacks, that may in other words, by the assembly of a limited number of elements and without using expensive regulating apparatus, provide for the faultless folding in two and winding of cloths.

Therefore the device mainly consists, according to the invention, in the combination of several elements positioned closely to one another, respectively a roll holder which is adapted to hold a cloth roll horizontally ; a folding triangle which, in the direction of the width of the cloth to be folded, extends horizontally and which, in the sense of the motion of the cloth to be folded, is defined by an upwards slanting plane, the base of the triangle being situated along the roll holder ; cloth guiding means comprising an upright stave standing very close to the top of the folding triangle ; and an upstanding winding up mechanism driven by an electric motor, this winding mechanism being located to one side of the bisectrix of the top of the folding triangle, so that the cloth folded in two is guided over the aforesaid stave.

In a preferred form the guiding means comprise only one upright stave. Preferably the triangle is formed of a triangular plate.

The winding up mechanism consists in an cloth sword driven by an electric motor. The use of a cloth sword in itself is known from the Swiss patent no. 307.944.

To better substantiate the specifications according to the invention some preferred execution shapes are described, as examples having no restrictive character, they refer to the appended drawings in which :

figure 1 schematically sketches the device according to the invention ;

figure 2 represents a side-view of a practical execution of the device ;

figure 3 represents a view from above of the device according to figure 2 ;

figure 4 represents a perspective view of the execution shape's folding triangle according to figures 2 and 3 ;

figure 5 represents a view along arrow F5 in figure 2 ;

figure 6 represents a view along arrow F6 in figure 2 ;

figure 7 represents a perspective view of the cross-section along line VII-VIII in figure 3 ;

figure 8 to 10 represent several positions of the roll holder according to figure 7.

As indicated in figure 1 the device consists, according to the invention, in the immediate succession of a folding triangle 1, at the top 2 of the folding

triangle 1 — in other words at the angle where the cloth to be folded has to leave the folding triangle — one cloth guide placed mainly upright in the form of a stave 3 and a winding up mechanism 4 situated sideways of the folding triangle 1. Further, at the base of the winding side 5 of the folding triangle 1 a roll holder 6 is provided to adapt a cloth roll 7 horizontally. The path followed by the cloth 8 is schematically indicated in dotted lines. It has to be noted that the folding triangle 1 extends mainly horizontally along the width B of the path followed by the cloth 8.

Further details are now specified in the light of the practical execution shape according to figures 2 to 6.

In this practical execution shape the roll holder consists of a cloth container 9, which is provided at its end with notches 10 for holding an adapted rod 11. The rod 11 can be put through the roll 7, more specifically through a cardboard pipe on which the fabric or the cloth mostly is wound up.

Preferably, but not necessarily, in the cloth container 9 an automatically regulating stretching device 12 is built in, this to slow down the unwound cloth and keep it stretched, as well as to absorb jolts.

The folding triangle 1 runs its base 5 in the direction of the motion of the cloth 8, preferably along a height H amounting to half of the aforesaid width B. As it is rendered in the perspective view of figure 4, the folding triangle 1 preferably has sides 13 directed vertically down from its edges. Further the upper surface of the folding triangle 1 and the sides 13 may be provided with marks or marking lines 14, allowing to check whether the unwound cloth 8 is guided in the correct direction along the folding triangle 1.

As shown on the drawings, it is clear that the folding triangle 1 is intended as an isoceles triangular element situated in one plane, and thus not bent, preferably a triangular plate.

The aforesaid stave 3 is positioned vertically and stands immediately behind the top 2 of the folding triangle, more specifically beside the angle through which the cloth 8 has to leave the folding triangle in double folded condition.

For the cloth 8 to be adapted easily between the stave 3 and the sides 13, the latter preferably do not extend along the full height of the folding triangle 1, but up to a short distance D of its top corner, as indicated in figure 2.

The winding up mechanism 4 mainly consists of a thin upright plate fixed at one end so that it can rotate, which shall be called hereafter the cloth sword 15. As indicated on figure 3 the cloth sword 15 is situated with its rotating axle in the extension of a side 13 of the folding triangle 1 and is provided at its bottom with a clutch and electric motor 16, as indicated on figure 2, that can be operated by a hand-switch 17, connected to the machine by a wire 18, so it can be switched on and off at a distance.

As shown on figure 5, beside the flat side of the cloth sword 15 an upward adjustable support 19 is provided, so that against the cloth sword 15 and on the said support 19 a winding core 20, consisting generally of a cardboard plate, may be adapted at the required height.

The functionning of the device may be simply gathered from the figures, and mainly is as follows : after providing the roll holder 6 with a cloth roll 7, the fabric or cloth 8 is guided over the folding triangle 1, it is pulled between the marking lines 14, afterwards guided along the stave 3 and finally wound on the winding up mechanism 4. Therefore, as can be seen on figure 6, a cardboard winding core 20 is placed onto the sword 15 and the first end of the cloth 8 is applied to it manually as required, until the double folded cloth 8 is wound up over one lap. Afterwards it can be further wound up automatically onto the winding core 20 by means of the electric motor 16. The quantity of cloth wound up is controlled with a winding meter 21. When the winding core 20 contains the required quantity of cloth 8, the latter is cut along its width and the winding core 20, with the quantity of cloth on it, is slid from the cloth sword 15 over its top.

It is important that, as shown on the figures the folding triangle 1, the cloth guiding stave 3 and next the cloth sword or similar item, be positioned closely after one another, without need for the cloth 8 to be conveyed along other guides.

As rendered on figure 7 the roll holder 6 may also be equipped with a stretching device 12 for the cloth 8. Therefore the cloth 8 may for instance be conveyed along movable guides 22, whose position can be either variably regulated or determined by means of springs acting on the guiding element.

In the execution shape according to figure 7, the stretching device 12 mainly consists of a stave-shaped guide 23 mounted in the cloth container 9, a lever 24 mounted at the extremity of this stave-shaped guide which supports at one end the aforesaid stave-shaped guide 22 and stretching elements 25 acting upon the other end of the lever 24. The stretching elements 25 thereby consist of a shock absorber 26, which is on the one hand coupled to the lever 24 so that it can hinge, and on the other hand fastened, by means of a turning point 27, to the side of the cloth container 9. Moreover the shock absorber 26 is equipped with a compression spring 28. Of course the guides 22 and 23 also are connected to each other at their extremities situated opposite the lever 24, for instance by a connexion 29 as indicated on figure 3.

It is clear that the guide 23 is situated between the stave 11 and the side 5 of the folding triangle 1, while the turning point 27 for the fastening of the shock absorber 26 is situated close to the stave 11.

It is clear that, according to figure 8, the stretching element 12 may be placed in a rest so that the cloth 8 can be simply slid between the guides 22 and 23. By tilting the lever 24 the device is brought in its work-

ing position as shown on figures 9 and 10.

Figure 9 renders the situation for a full roll 7, while figure 10 renders it for a nearly empty roll 7. The full roll is heavier and less easy to unwind than the nearly empty roll. Nevertheless the stretching element 12 provides that by displacing the movable guide 22 with regard to the guide 23, the tension in the cloth remains automatically regulated and nearly unchanged, this while according to the position of the stretching mechanism 12 the friction of the cloth 8 on the guides is altered.

It is clear that the edges 30 of the folding triangle may be rounded as is partly indicated on figure 7, this is to avoid that the cloth 8 would be damaged during its conveyance.

The present invention is by no means restricted to the execution shapes described as examples and shown on the figures, but similar devices for the folding of cloths in two can be realized in various shapes and dimensions.

Claims

1. Device for folding cloths in two, substantially consisting of a combination of several elements positioned closely to one another, respectively a roll holder (6) which is adapted to hold a cloth roll (7) horizontally ; a folding triangle (1) which, in the direction of the width of the cloth (8) to be folded, extends horizontally and which, in the sense of the motion of the cloth (8) to be folded, is defined by an upwards slanting plane, formed by a triangular plate, the base of the triangle (1) being situated along the roll holder (6) ; cloth guiding means comprising an upright stave (3) standing very close to the top (2) of the folding triangle ; and an upstanding winding up mechanism (4) driven by an electric motor (16), this winding mechanism being located to oneside of the bisectrix of the top of the folding triangle, so that the cloth folded in two is guided over the aforesaid stave (3).

2. Device according to claim 1, characterised in that the cloth guiding means consist in exactly one upright stave (3).

3. Device according to one of the preceding claims characterised in that the roll holder (6) is equipped with a stretching device (12).

4. Device according to one of the preceding claims, characterised in that the folding triangle (1) is provided at its edges with sides (13) going vertically down.

5. Device according to one of the preceding claims, characterised in that the winding up mechanism (4) consists of a cloth sword (15) standing upright and fixed at one end so that it can rotate.

6. Device according to claim 5, characterised in that the cloth sword (15) has at its lower end an upward adjustable support (19) for placing a winding core (20).

7. Device according to any of the preceding claims, characterised by the fact that the roll holder (6) consists of a roll container (9) provided at its respective ends with notches (10) and an adapted rod (11), intended to be put through a cloth roll (7).

8. Device according to claim 7, characterised in that it is provided with a stretching element (12) consisting mainly of a guide in the form of a stave (23) mounted in the cloth container ; at least one lever (24) which cooperates in its center with the aforesaid guide (23) and which supports at one end a second stave shaped guide (22) ; stretching devices (25) which exercise a force on the other end of the lever (24) ; and a connection (29) which links the ends of both aforesaid guides (22, 23) situated opposite the lever (24).

9. Device according to claim 8, characterised in that the stretching devices (25) consist of at least one shock absorber (26) which is connected at one end with the aforesaid lever (24) and fixed by its other end through a turning point (27) to the cloth container (9); while this shock absorber (26) also is provided with a compression spring (28).

10. Device according to claim 4, characterised in that on the folding triangle (1), as well as on the vertical sides (13) marks and/or marking lines (14) are provided.

Patentansprüche

1. Gerät zum Zusammenfalten von Tuch, wesentlich bestehend aus einer Kombination mehrerer nahe an einander aufgestellten Elemente, beziehungsweise (6) einem Rollenhalter (6) angepaßt um waagerecht eine Tuchrolle (7) zu halten ; einem Faltdreieck (1) das in die Breite des zu faltenden Tuches, sich waagerecht ausdehnt und das, im Sinne der Richtung der Bewegung des zu faltenden Tuches (8), bestimmt wird von einer schräg aufwärts angeordneten Fläche gebildet von einer dreieckigen Platte, die Basis des Dreiecks angeordnet am Rollenhalter (6) entlang ; Vorrichtungen zur Tuchführung bestehend aus einem aufrechten Stabe (3) sehr nahe an die Spitze (2) des Faltdreiecks angeordnet ; und einer aufrecht angeordneten Wickelvorrichtung (4) angetrieben von einem elektrischen Motor (16), diese Wickelvorrichtung sich befindend an einer Seite der Halbierungslinie aus der Spitze des Faltdreiecks, sodaß das zusammengefaltete Tuch über den vorhergenannten Stab (3) geführt wird.

2. Gerät laut Anspruch 1, dadurch gekennzeichnet daß die Anordnung zur Führung des Tuches aus genau einem aufrecht stehenden Stabe (3) besteht.

3. Gerät laut eines der vorhergehenden Ansprüche, dadurch gekennzeichnet daß der Rollenhalter (6) versehen ist mit einer Streckvorrichtung (12).

4. Gerät laut eines der vorhergehenden Ansprüche, dadurch gekennzeichnet daß das Faltdreieck (1) an den Rändern versehen ist mit senkrecht nach unten ragenden Seiten (13).

5. Gerät laut eines der vorhergehenden Ansprüche, dadurch gekennzeichnet daß das Wickelelement (4) besteht aus einem Tuchschwert (15) das aufrecht steht und an einem Ende derartig befestigt ist daß es drehen kann

6. Gerät laut Anspruch 5, dadurch gekennzeichnet daß das Tuchschwert (15) and seinem unteren Ende eine aufwärts einstellbaren Unterstützung (19) besitzt um einen Wickelkern (20) aufzustellen.

7. Gerät laut eines jeden beliebigen der vorhergehenden Ansprüche, dadurch gekennzeichnet daß der Rollenhalter (6) besteht aus einem Rollenbehälter (9) an seinen respektiven Enden versehen mit Ausschnitten (10) und einem angepaßten Stabe (11), dazu bestimmt durch eine Tuchrolle (7) gesteckt zu werden.

8. Gerät laut Anspruch 8, dadurch gekennzeichnet daß es versehen ist mit einer Streckvorrichtung (12) hauptsächlich bestehend aus einer stabförmigen Führung (23) befestigt im Tuchbehälter ; zumindest einem Hebel (24) die in seiner Mitte zusammenarbeitet mit der vorhergenannten Führung (23) und die an einem Ende eine zweite stabförmige Führung (22) unterstützt ; Streckvorrichtungen (25) die eine Kraft auf das andere Ende des Hebels (24) ausüben ; und eine Verbindung (29) welche die Ende der vorhergenannten, dem Hebel (24) gegenüberstehenden, Führung (22, 23) mit einander verbinden.

9. Gerät laut Anspruch 8, dadurch gekennzeichnet daß die Streckvorrichtungen (25) bestehen aus zumindest einem Stoßdämpfer (26) welche an einem Ende verbunden ist mit dem vorhergenannten Hebel (24) und an seinem anderen Ende durch eine Drehstelle (27) befestigt ist an dem Tuchbehälter (9) ; während dieser Stoßdämpfer (25) auch versehen ist mit einem Druckfeder (28).

10. Gerät laut Anspruch 4, dadurch gekennzeichnet daß auf dem Faltdreieck (1), wie auf den senkrechten Seiten (13) Marken und/oder Markierungslinien (14) vorgesehen sind.

Revendications

1. Dispositif pour plier des étoffes en deux, consistant substantiellement en une combinaison de divers éléments placés proches l'un de l'autre, respectivement un support de rouleau (6), lequel est apte à soutenir un rouleau d'étoffe (7) horizontalement ; un triangle de pliage (1) qui, dans le sens de la largeur de l'étoffe (8) à plier, s'étend horizontalement et qui, dans le sens du mouvement de l'étoffe (8) à plier, est déterminé par un plan incliné vers le haut, formé par une plaque triangulaire, la base du triangle (1) étant située le long du support de rouleau (6) ; des moyens de guidage d'étoffe comprenant une barre en position debout (3) placée très proche du sommet (2) du triangle de pliage ; et un mécanisme d'enroulement en position debout (4) commandé par un moteur électrique (16), ce mécanisme d'enroulement étant situé d'un côté de la bissectrice du sommet du triangle de pliage, de façon que l'étoffe pliée en deux soit guidée par-dessus la barre susmentionnée (3).

2. Dispositif suivant la revendication 1, caractérisé en ce que les moyens de guidage de l'étoffe consistent en exactement une barre en position debout (3).

3. Dispositif suivant une des revendications précédentes, caractérisé en ce que le support de rouleau (6) est équipé d'un dispositif d'étirage (12).

4. Dispositif suivant une des revendications précédentes, caractérisé en ce que le triangle de pliage (1) est pourvu, à ses bords, de côtés (13) descendant verticalement.

5. Dispositif suivant une des revendications précédentes, caractérisé en ce que le mécanisme d'enroulement (4) consiste en un sabre à étoffe (15) en position debout et fixé à une extrémité de façon à pouvoir tourner.

6. Dispositif suivant la revendication 5, caractérisé en ce que le sabre à étoffe (15) présente, à son extrémité du bas, un support ajustable vers le haut (19) pour le placement d'un noyau d'enroulement (20).

7. Dispositif suivant une quelconque des revendications précédentes, caractérisé en ce que le porteur de rouleau (6) consiste en un conteneur à rouleau (9) pourvu, à ses extrémités respectives, d'encoches (10) et d'une barre appropriée (11), faite pour être passée dans un rouleau d'étoffe (7).

8. Dispositif suivant la revendication 7, caractérisé en ce qu'il est pourvu d'un élément d'étirage (12) en forme de barre (23) monté dans le conteneur d'étoffe ; au moins un levier (24) qui coopère dans son centre avec le guide susmentionné (23) et qui supporte à une extrémité un second guide en forme de barre (22) ; des dispositifs d'étirage (25) lesquels exercent une force sur l'autre extrémité du levier (24) ; et une connection (29) accouplant les extrémités des deux guides susmentionnés (22, 23) situés du côté opposé au levier (24).

9. Dispositif suivant la revendication 8, caractérisé en ce que les dispositifs d'étirage (25) consistent en au moins un amortisseur d'à-coups (26) connecté à une extrémité au levier susmentionné (24) et fixé, à son autre extrémité, par un pivot (27) au conteneur d'étoffe (9) ; et en ce que cet amortisseur d'à-coups (26) est également pourvu d'un ressort de compression (28).

10. Dispositif suivant la revendication 4, caractérisé en ce que sur le triangle de pliage (1), de même que sur les côtés verticaux (13), il y a des signes et/ou

de lignes de repère (14).

Fig.1

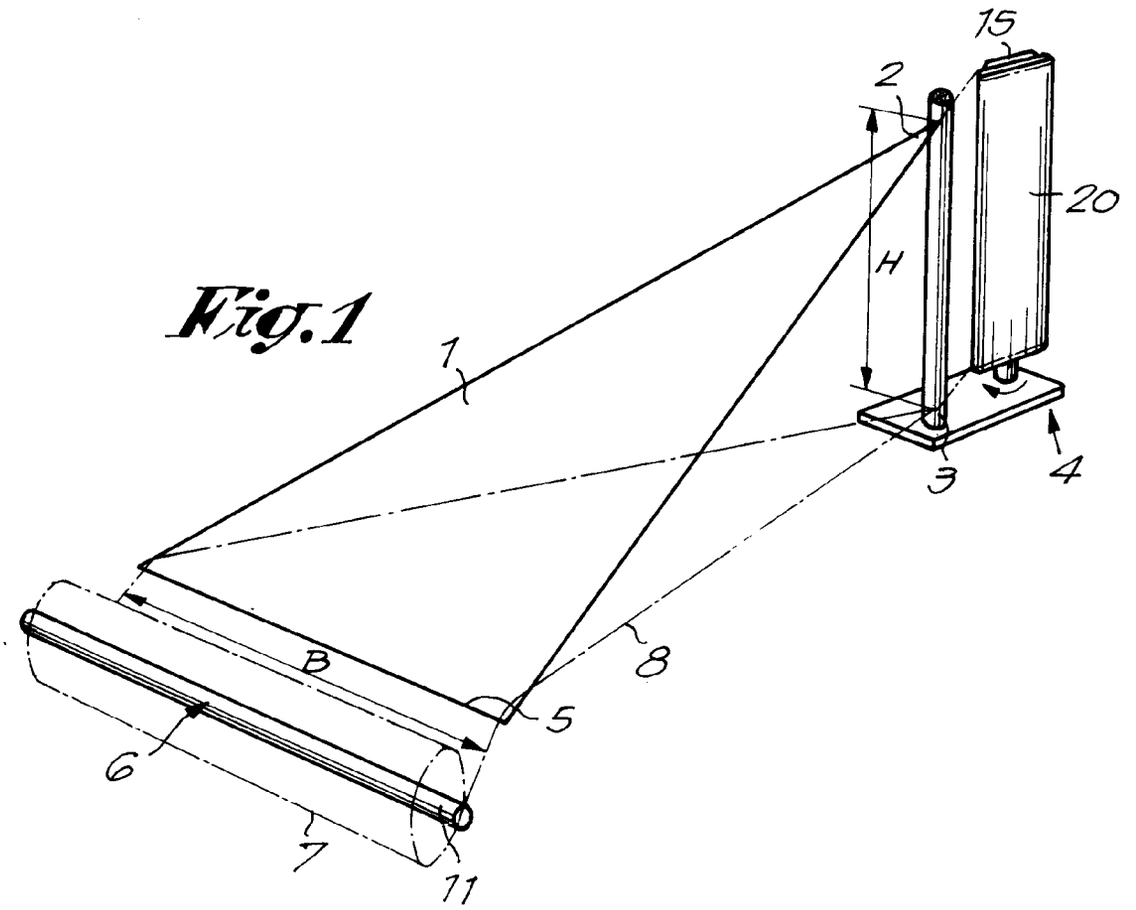
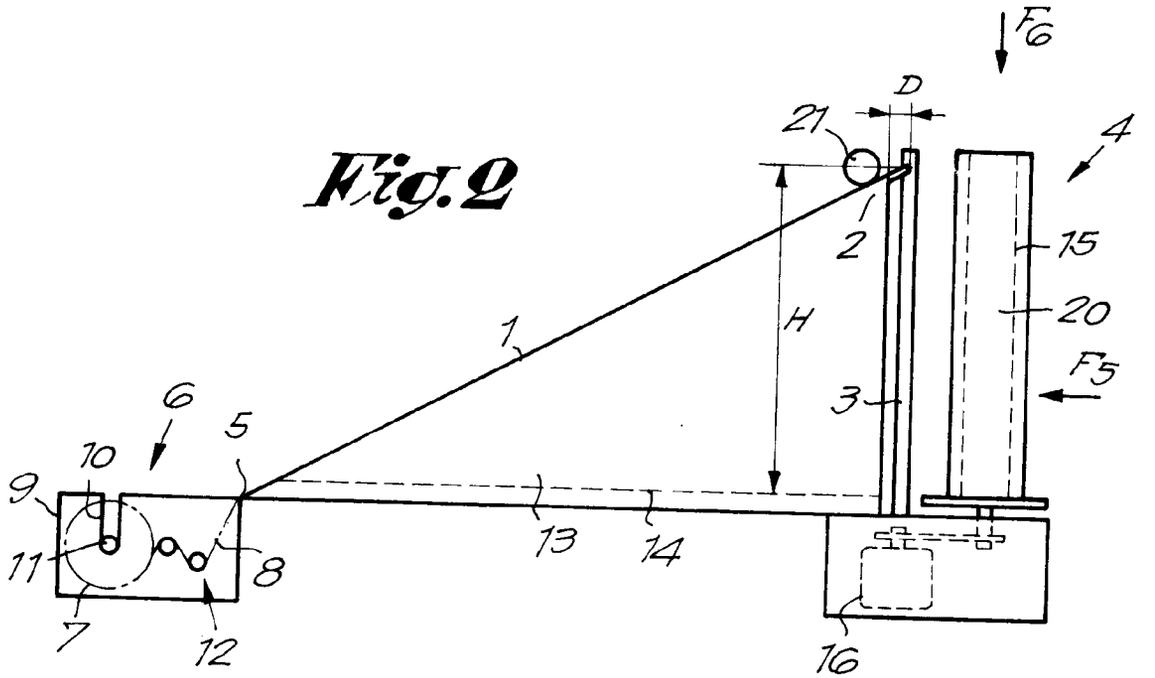
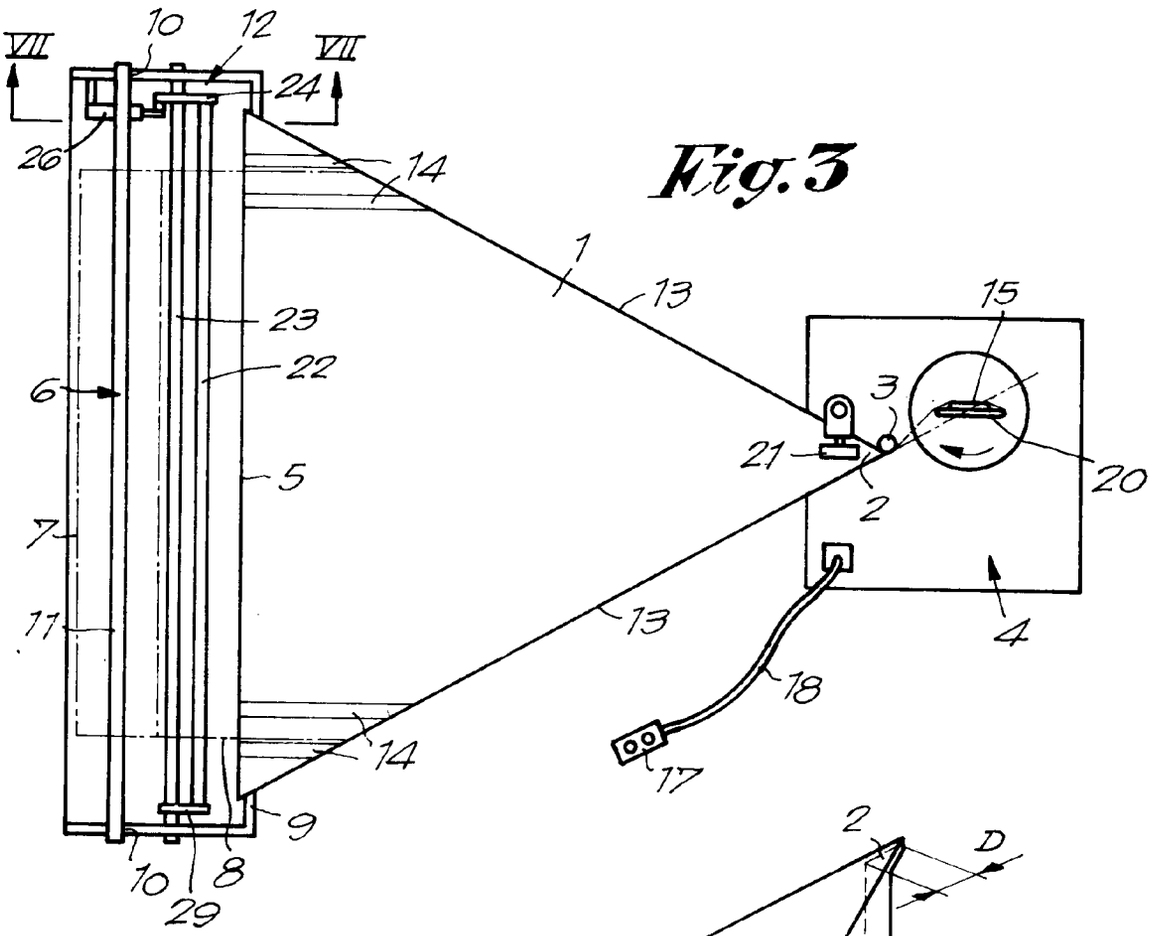


Fig.2




VII
10
12
VII
24
26
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1
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15
23
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29

Fig. 3

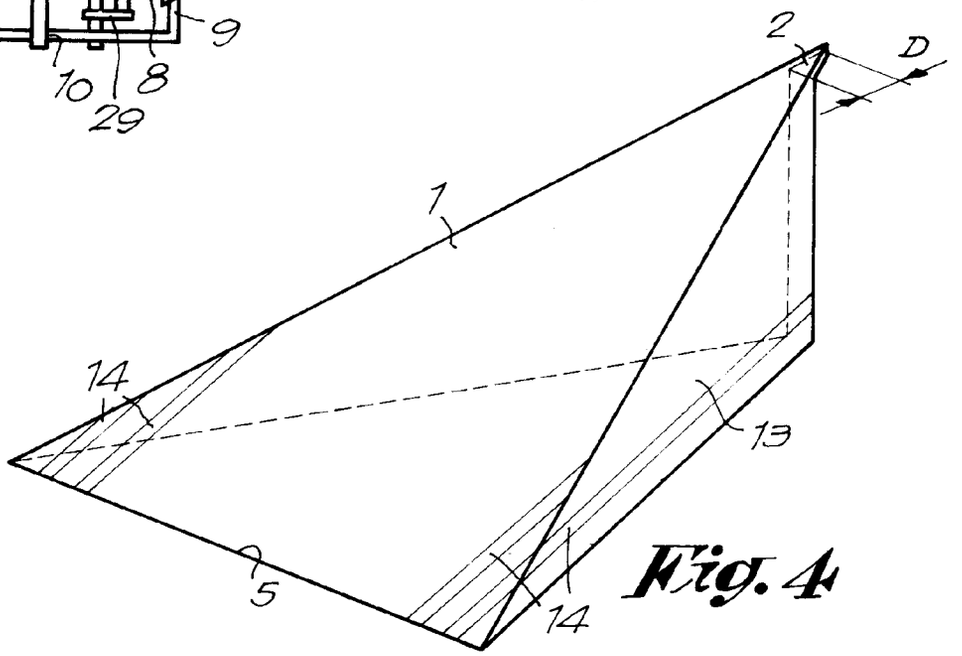
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Fig. 4

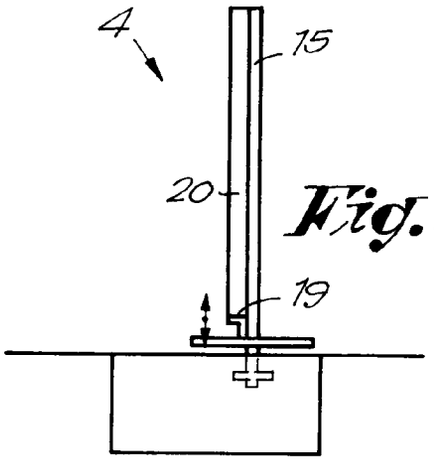

Fig.5

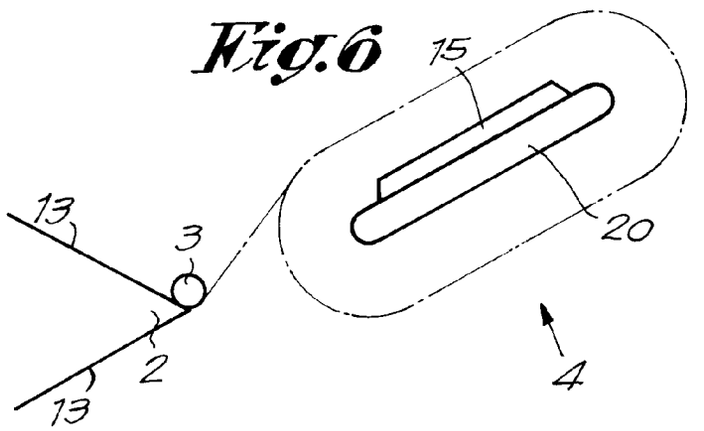

Fig.6

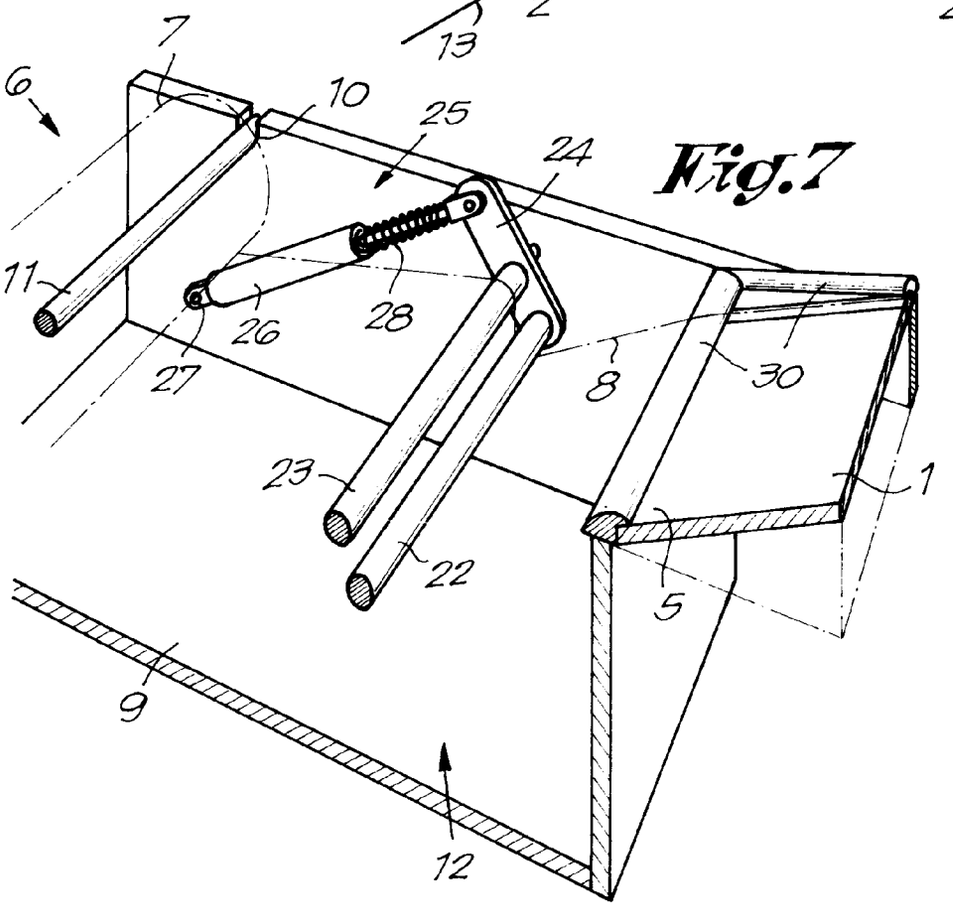

Fig.7

Fig.8

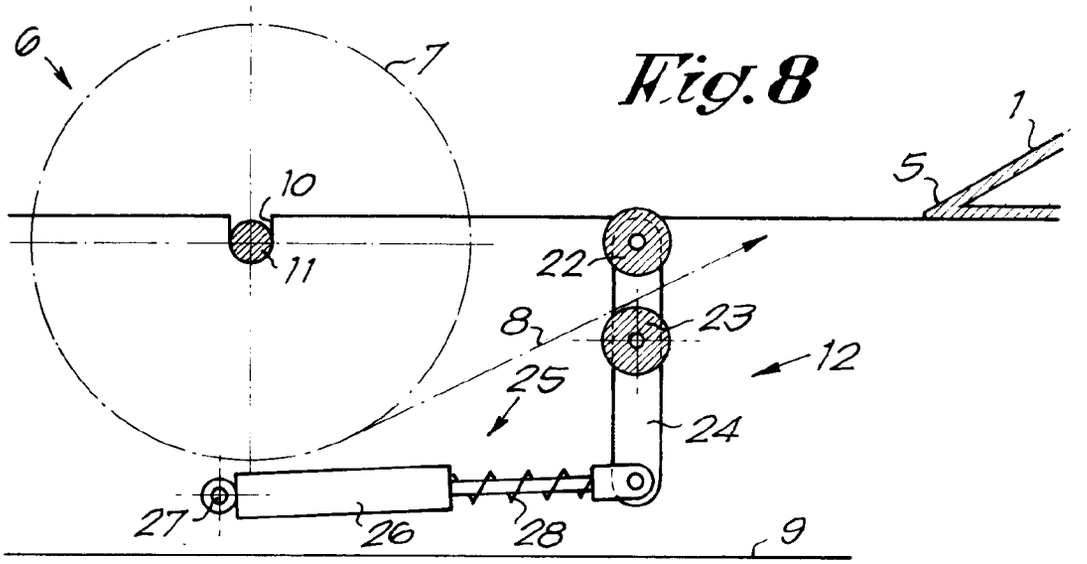

Fig.9

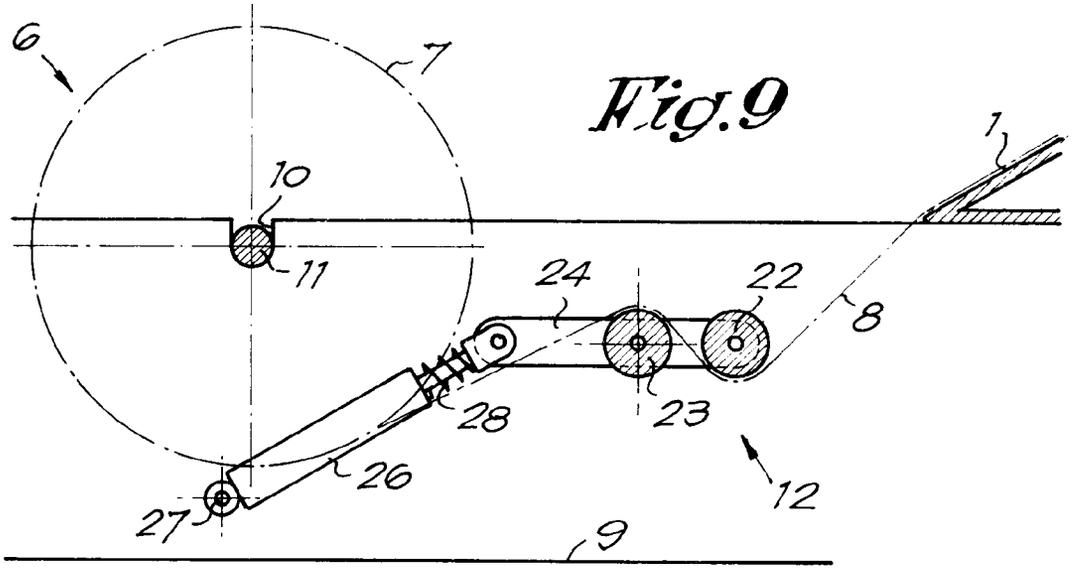

Fig.10