COMMONWEALTH of AUSTRALIA
Patents Act 1952

APPLICATION FOR A STANDARD PATENT

I/We
Kverneland Underhaug AS
of
PO Box 70, Naerbo, N-4350, Norway

hereby apply for the grant of a Standard Patent for an invention entitled:

Support stand for film dispenser reel

which is described in the accompanying complete specification.

Details of basic application(s):–

<table>
<thead>
<tr>
<th>Number</th>
<th>Convention Country</th>
<th>Date</th>
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<tr>
<td>8924807.4</td>
<td>United Kingdom</td>
<td>3 November 1989</td>
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<tr>
<td>8928099.4</td>
<td>United Kingdom</td>
<td>12 December 1989</td>
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The address for service is care of DAVIES & COLLISON, Patent Attorneys, of 1 Little Collins Street, Melbourne, in the State of Victoria, Commonwealth of Australia.

DATED this TENTH day of OCTOBER 1990

To: THE COMMISSIONER OF PATENTS

.......................................................

a member of the firm of
DAVIES & COLLISON for
and on behalf of the
applicant(s)

Davies & Collison, Melbourne
Commonwealth of Australia
The Patents Act 1952

DECLARATION IN SUPPORT

In support of the (Convention) Application made by:

KVERNELAND UNDERHAUG AS

for a patent for an invention entitled:

"SUPPORT STAND FOR FILM DISPENSER REEL"

I (We):

NJAAL FYKES

of and care of the applicant company do solemnly and sincerely declare as follows:

a) I am (We are) the applicant(s) for the patent.
b) I am (We are) authorised by the applicant(s) for the patent to make this declaration on its behalf.

delete the following if not a Convention Application.
The basic application(s) as defined by section 141 (142) of the Act was (were) made

on 3rd November 1989 in Great Britain

on 12th December 1989 in Great Britain

by Kverneland Underhaug AS

The basic application(s) referred to in this paragraph is (are) the first application(s) made in

a Convention country in respect of the invention the subject of the application.

a) I am (We are) the actual inventor(s) of the invention.
b) Jahn Haugstad and Bjorne Obrestad, both of

PO Box 70, N-4350 Naerbo, Norway.

is (are) the actual inventor(s) of the invention and the facts upon which the applicant

is (are) entitled to make the application are as follows:

by virtue of employment of the inventors by Kverneland Underhaug AS

whereby the applicant would, if a patent were granted on an application

made by the said actual inventors, be entitled to have the patent

assigned to it.

Declared at this 20th day of November 1990

Signed Status. Technical Development Manager and

Authorised Signatory for Kverneland Underhaug AS

Declarant's Name Njaal Fykse
SUPPORT STAND FOR FILM DISPENSER REEL

A support stand for mounting a film dispenser reel in a substantially vertical attitude, said reel comprising a hollow cylindrical former and a band of plastics film wound around the former, and said stand comprising:

- an upright support;
- a lower reel holder mounted on the support and arranged to support a lower end of the reel; and,
- an upper reel holder mounted on the support and arranged to engage an upper end of the reel;

characterized in that one of said holders is adjustably mounted on the support for movement between an operative position of engagement with the respective end of the reel and a release position permitting the reel to be mounted in or dismounted from engagement with the other of the holders.

13. A support stand for mounting a film dispenser reel in a substantially vertical attitude, said reel comprising a hollow cylindrical former and a band of plastics film wound around the former, and said stand comprising:
an upright support;

a lower reel holder mounted on the support and
arranged to support a lower end of the reel;

an upper reel holder mounted on the support and
arranged to engage an upper end of the reel; and,

means for adjusting the height of the support stand so
as to adjust the height of the film dispenser reel relative
to a bale which is to be wrapped:

characterised in that the adjusting means comprises a
screw threaded adjustment mechanism coupled with the
upright support.
NAME & ADDRESS
OF APPLICANT:

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NAME(S) OF INVENTOR(S):

Jan HAUGSTAD

ADDRESS FOR SERVICE:

DAVIES & COLLISON
Patent Attorneys
1 Little Collins Street, Melbourne, 3000.

COMPLETE SPECIFICATION FOR THE INVENTION ENTITLED:

Support stand for film dispenser reel

The following statement is a full description of this invention, including the best method of performing it known to me/us:-
FIELD OF INVENTION

This invention relates to a support stand for mounting a film dispenser reel, and has been developed primarily, though not exclusively, in connection with a support stand which forms part of a bale wrapper apparatus.

BACKGROUND TO INVENTION

One known form of a bale wrapper apparatus comprises a platform which has a pair of laterally spaced horizontal support rollers on which a cylindrical bale of e.g. straw, cut grass or hay can be supported, and which rollers rotate the bale about its horizontal axis while the entire platform is rotated about a vertical axis. During this simultaneous rotation of the bale about both the vertical and horizontal axes, a stretchable plastics film is withdrawn from a film dispenser reel and is caused to form a substantially air tight spirally wound wrapping around the bale. The film is self-adhesive on one side, and forms an overlapping spiral winding around the bale which progressively envelopes the bale.

In this one known form of bale wrapper apparatus, the film dispenser reel is carried by a support stand which is fixed, so that the film is withdrawn (after initial attachment of the film end to the bale) by the rotation of the platform.

The present invention has been developed primarily in connection with a support stand for mounting a film dispenser reel to be used with this known form of bale wrapper apparatus.

A special type of stretchable plastics film has been developed for use in wrapping cylindrical bales, and having self-adhesive properties on one side, and for a number of years this film has been supplied in supply reels which are 500mm long i.e. the width of the film band withdrawn from the reel is 500mm. Dispenser reels of this size can be handled manually without much difficulty, and so as to be
mounted readily as replacement reels on existing support stands. The reels have a hollow cylindrical former on which the film band is wound, and the existing stands have a vertical mounting spindle on which the cylindrical former can be mounted.

However, it is desirable to be able to use films of greater width than 500mm reels, since this will enable the wrapping operation to be carried out more quickly as this will reduce the number of turns that the film band must be taken around the bale in order to envelope the bale. Bearing in mind that successive turns must partially overlap each other, and the fact that any undesirable air and/or water ingress to the wrapped bale is most likely to take place along the region of any improperly overlapping edges, the risks of this occurring will be reduced by the use of a wider band of film.

There would therefore be clear technical advantage in using a wider film band, but the increase to, say, a 750mm reel would make the reel harder to handle, and particularly much more difficult to load onto the mounting spindle of existing support stands, in that the entire reel will have to be raised so that the lower end of the reel is positioned above the upper end of the mounting spindle, before the reel can be allowed to descent as a sliding fit over the spindle.

Therefore, in one aspect, the invention has therefore been developed with a view to providing an improved design of support stand which enables longer reels of plastics film readily to be mounted thereon.

SUMMARY OF INVENTION

According to one aspect of the invention there is provided a support stand for mounting a film dispenser reel in a substantially vertical attitude, said reel comprising a hollow cylindrical former and a band of plastics film wound around the former, and said stand comprising:

an upright support:
a lower reel holder mounted on the support and
arranged to support a lower end of the reel; and,
an upper reel holder mounted on the support and
arranged to engage an upper end of the reel;
characterised in that one of said holders is
adjustably mounted on the support for movement between an
operative position of engagement with the respective end of
the reel and a release position permitting a reel to be
mounted in or dismounted from engagement with the other of
the holders.

Thus, by virtue of the adjustable mounting of said one
holder on the support, it is a simple matter to manipulate
even long reels into the support stand, as it is only
necessary initially to line up one end of the reel with
said other one of the holders i.e. the non-adjustable
holder.

Usually, the film dispenser reels are supplied with
hollow cylindrical formers, and therefore the holders may
be shaped to fit into the ends of the formers. The holders
are therefore preferably cup-shaped, so as to be received
by the upper and lower ends of the former. However, if
different types of reels are used, evidently the design of
the holders will be altered to enable the holders to
function so as to rotatably mount the reel in the support
stand.

Preferably, it will be the upper holder which is
pivotally adjustably mounted, so that the lower end of the
reel can be moved first into engagement with the lower
holder (with the upper holder pivotally adjusted to the
release position), and then the upper holder can be moved
to its engaged position with the upper end of the reel.

Preferably, a lever is coupled with the upper holder
and is adjustable between two positions corresponding with
the release and engaged positions of the upper holder.
Conveniently, means is provided to enable the lever to be
releasably retained in either of its two positions.
When a long reel is to be fitted in the support stand, such as a film reel of 750mm band width, the ends of the cylindrical former may form suitable mounting sockets into which the cup-shaped holders can be received. However, if it should be required to use smaller reels with the support stand, such as the existing 500mm band width film reels, then this can readily be achieved without modification of the support stand being required, provided that tubular adapters are coupled with each end of the cylindrical former of the smaller film reel. Each adapter takes the form of an extension piece to bring the overall length of the smaller reel up to that of the longer reel, but each adapter also has an end socket in which the respective cup-shaped holder can be received.

The upright support preferably comprises a column which can be rigidly mounted in an upright position on a bale wrapper apparatus, and pre-stretch rollers may be arranged alongside the film reel in known manner, for example as disclosed in EP 0291483. To enable film to be withdrawn from the film reel against resilient opposition after engagement by the pre-stretch rollers, preferably the upper and lower holders, and also the pre-stretch rollers, form a unitary assembly which is capable of pivoting about the axis of the support column, and one or more springs are arranged to bias the unit about the axis of the column in a direction which is opposed to the direction of withdrawal of film from the reel.

According to a further aspect of the invention there is provided a support stand for mounting a film dispenser reel in a substantially vertical attitude, said reel comprising a hollow cylindrical former and a band of plastics film wound around the former, and said stand comprising:

- an upright support;
- a lower reel holder mounted on the support and arranged to support a lower end of the reel;
an upper reel holder mounted on the support and
arranged to engage an upper end of the reel; and
means for adjusting the height of the support stand so
as to adjust the height of the film dispenser reel relative
to a bale which is to be wrapped:
in which the adjusting mechanism comprises a screw
threaded adjustment mechanism coupled with the upright
support.

The support stand according to the further aspect of
the invention facilitates the height adjustment of the film
dispenser reel, to suit different sizes of bale. Bearing
in mind that the entire support stand and film dispenser
reel have to be vertically adjusted, it is advantageous for
this to be able to be carried out using a screw threaded
adjustment mechanism, which can be operated with ease by
people of small stature.

Preferably, a hand operated crank is coupled with the
adjustment mechanism.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a side view of a support stand according
to the invention for mounting a film dispenser reel in a
substantially vertical attitude, without showing either of
the two sizes of film dispenser reel which can be mounted
therein;

Figure 2 is a detailed view showing one of the two
sizes of film dispenser reel mounted in the support stand;

Figure 2a is a detail view of part of the film reel
mounting shown in Figure 2;

Figure 3 is an exploded view of means for adjusting
the height of the support stand: and.

Figure 4 is a schematic illustration of a bale wrapper
apparatus of the rotating turntable type, and on which a
support stand of the invention can be mounted.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now Figures 1 and 2 of to the drawings, a
support stand according to the invention is designated
generally by reference 10 and is intended for mounting either one of two sizes of film dispenser reel in a substantially vertical attitude, with the reel comprising a hollow cylindrical former and a plastics film wound around the former.

The support stand 10 is intended to be mounted on a rotating turntable type of bale wrapper apparatus, such as the Silawrap bale wrapper machine made by Kverneland Underhaug AS and sold in Great Britain by Volac Limited. One example of this type of bale wrapper apparatus is disclosed in more detail in GB 2159489B. Also, Figure 4 of the accompanying drawings shows schematically a rotating turntable type of bale wrapper apparatus on which the support stand can be mounted.

Referring now to Figure 4 of the drawings, the bale wrapper apparatus is designated generally by reference 100, and comprises a chassis 101 which can be supported by ground wheels (not shown) to enable the apparatus to be towed behind a tractor or other propelling vehicle, or alternatively it may be coupled directly on the rear of the propelling vehicle, such as a tractor, via the usual rear three point hitch.

The apparatus 100 has a turntable 118 rotatably mounted on the chassis 101 for rotation about a substantially vertical axis 102 in the direction of the arrow 103. A cylindrical bale 115 is mounted on the turntable 118 with the longitudinal axis of the bale extending substantially horizontal, the bale being supported by a pair of laterally spaced horizontal support rollers 116 and 117 which are mounted on the turntable 118.

Simultaneous with the rotation of the turntable 118 about vertical axis 102, the rollers 116 and 117 are operated to drive the bale 115 in a clockwise direction, as indicated by arrow 104, about its horizontal axis.

A support stand 121 is mounted on the chassis 101 and comprises a film pre-stretcher unit 120, as disclosed in
more detail in EPA-0291483, and which includes a mounting for a film dispenser reel of stretchable plastics film, from which can be withdrawn a continuous band 119 of film to be wrapped around the bale 115. By virtue of the combined rotation of the bale 115 about both horizontal and vertical axes simultaneously, a helical wrapping of plastics film is applied around the bale with progressively overlapping turns, until such time as the bale has been completely wrapped twice.

The support stand which is shown in Figures 1 to 3, and which will be described in more detail below, can be mounted on the chassis of a bale wrapper apparatus, in generally similar manner, to the mounting of the unit 121 on chassis 101 in Figure 4.

Referring now to Figures 1 to 3, the film dispenser reel used with the bale wrapper apparatus comprises a stretchable plastics film which is self adhesive on one side, and by virtue of the rotation of the cylindrical bale about its horizontal axis, while simultaneously causing relative rotation between the film dispenser reel and the bale about a vertical axis, film withdrawn from the reel undergoes pre-stretching and is then applied in a spiral around the bale in order progressively to envelope the bale.

The support stand 10 is able to mount film dispenser reels of different size therein, without any modification being required to the support stand itself. Thus, in Figure 2, there is shown a relatively small film reel 11, which is a 500mm band width reel having a hollow cylindrical former 12 on which a band of plastics film 13 is wound. As can be seen clearly from Figure 2, the length of the former 12 is appreciably less than the spacing apart of lower reel holder 14 and upper reel holder 15 which are carried by the support stand 10. However, film dispenser reels of greater band width than band 13 can readily be mounted between the holders 14 and 15, as will be described
in more detail below.

The support stand 10 comprises an upright support in the form of post or column 16 which can be mounted rigidly on the bale wrapper apparatus. As shown in Figure 1, the lower part of column 6 has holes 16a which enable the height of the column to be adjusted in a suitable mounting on the apparatus, to provide adjustment of the height of the pre-stretch unit to suit different sizes of bale. This adjustment may be necessary, because it is important to ensure, as far as possible, that the withdrawn band of film is located substantial symmetrically with respect to the longitudinal axis of the bale which is being wrapped.

Alternatively, a screw threaded adjustment (not shown in Figure 1) may be provided for adjusting the height of the pre-stretch unit. Lower reel holder 14 is mounted on the support column 16 via a lower cradle arm 17 which is pivotally mounted on column 16 for movement about the axis 18 of the column, and which is biased about axis 18 in a direction opposed to the direction of withdrawal of film from the reel during a bale wrapping operation. This enables the withdrawn film to be pre-stretched before it is applied to the bale, after engaging pre-stretching rollers 19 and 20, in a manner which is disclosed in more detail in EP 0291483.

The upper reel holder 15 is also mounted on the support column 16 via carrier arm 21, and is shown in Figure 1 in full lines in a reel-engaging position, and in dashed outline in a release position.

As can be seen from the drawing, each holder 14, 15 is cup-shaped so as to receivable by a respective mounting socket provided at each end of a cylindrical former of a film dispenser reel. Each cup-shaped holder therefore comprises a stub axle mounting which can be mounted in a respective end of the film dispenser reel to locate and to rotatably support the film dispenser reel. Thus, each holder 14, 15 is mounted on bearings 22 which permit
rotation of the cylindrical former of the film dispenser reel.

The lower holder 14 is pivotally movable in a horizontal plane during film withdrawal against spring biasing provided by springs 23, but is incapable of vertical movement i.e. movement in a direction parallel to the axis 18 of support column 16. However, the upper holder 15 is pivotally adjustable relative to support column 16 by adjustable movement of carrier arm 21 about pivot 24 mounted on the upper end of column 16. Pivotal adjustment of carrier arm 21 can take place under the action of a lever arm 25 which can take up either one of two positions shown in Figure 1, the full line position representing a releasably retained position corresponding to the engaged position of the holder 15, and the dashed outline position showing the retained position of the lever 25 corresponding to the release position of holder 15. In the release position of the holder 15, a spent reel can readily be removed from the support stand by disengagement from the lower holder 14, and a replacement reel can readily be mounted in its place by first making engagement with the lower holder 14, and then the upper holder 15 is returned to its engaged position.

Therefore, by virtue of the adjustable mounting (preferably a pivotable mounting) of the upper holder 15, and the simple cup-shaped engagements of the holders 14 and 15 with the ends of the reel, it is a simple matter to manipulate even long reels into the support stand, as it is only necessary initially to line up one end of the reel with the non-adjustable cup-shaped holder. In the illustrated embodiment, it is the lower holder 14 which is non-adjustable, and the upper holder 15 which is pivotally adjustable, and this is a preferred arrangement as it will assist persons of small stature to fit long replacement film dispenser reels. However, it is within the scope of the invention for the roles to be reversed so that the
upper holder 15 is fixed vertically, and the lower holder 14 can be pivotally adjusted to a release position.

The vertical spacing apart of the holders 14 and 15 is such as to enable a long film dispenser reel (not shown) to be mounted directly in engagement therewith, and taking the form of a 750mm band width film dispenser reel. However, if the smaller film dispenser reels (see Figure 2) presently used widely to wrap bales are required to be installed in the stand 10, namely 500mm band width reels, this can readily be carried out without any modification being made to the support stand 10. Thus, as shown in Figure 2, 500mm band width reel 11 is located in position by engagement with the holders 14 and 15, and also rotatably mounted thereon, by providing tubular adapters 26 (see also Figure 2a). Each tubular adapter 26 can be received securely as a press fit in one of the ends of cylindrical former 12, and has a locating flange 27 which limits the depth of insertion of the adapter 26 and which seats against one of the end faces of the former 12. Each adapter 26 therefore forms an extension piece to bring the overall length of the reel 11 up to that of the longer type of reel (not shown) which can be mounted directly on holders 14 and 15. Thus, each tubular adapter 26 has an end socket 28 in which the respective cup-shaped holder 14, 15 can be received.

Referring now to Figure 3 of the drawings, there is shown an alternative adjusting means for adjusting the height of the film dispenser reel 11 relative to a bale which is to be wrapped. In the arrangement shown in Figure 1, the support 16 can be vertically adjusted by being slid vertically upwardly or downwardly relative to a fixed tubular mounting, and when the required height adjustment has been reached, a locking pin can be taken through any required one of the holes 16a and through mounting holes provided in the tubular mounting. However, this can be a difficult task for a person of small stature, as the weight
of the support stand, and a film dispenser reel can be considerable, and therefore the arrangement shown in Figure 3 is proposed to facilitate the raising and lowering operation.

The adjustment mechanism is designated generally by reference 30 and comprises a screw threaded adjustment mechanism 31 which is coupled with the upright support 16. The support 16 can be slid vertically relative to a fixed tubular mounting 32, and a lower end 33 of the support 16 is coupled with the adjustment mechanism 31 via an internally threaded support block 34.

A hand operated crank 35 is rotatably mounted on a support bracket 36 which is secured to the upper end of the mounting 32, and the crank 35 has a gear 37 which meshes in the manner of bevel gears with a crown wheel 38 secured to the upper end of the adjustment mechanism 31.

Evidently, rotation of the crank 35 will cause rotation of the adjustment mechanism 31, which comprises an externally threaded rod, and this then causes the block 34 to be raised or lowered along the length of the rod, and thereby to adjust the height of the support 16.

The adjusting means shown in Figure 3 provides a mechanism which can be operated easily even by people of small stature, and enables the entire support stand 10 and film dispenser reel to be vertically adjusted, to suit different bale diameters. In this respect, it should be borne in mind that satisfactory bale wrapping can only be carried out by locating the mid region of the dispenser reel substantially in line with the horizontal axis of rotation of the bale which is to be wrapped. The adjustment mechanism enables height adjustments to be carried out in simple manner, and also enables small adjustments to be carried out, which is not possible with the arrangement shown in Figure 1, in which stepped adjustments only are possible, by virtue of the spacing apart of the holes 16a.
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A support stand for mounting a film dispenser reel in a substantially vertical attitude, said reel comprising a hollow cylindrical former and a band of plastics film wound around the former, and said stand comprising:
   - an upright support;
   - a lower reel holder mounted on the support and arranged to support a lower end of the reel; and,
   - an upper reel holder mounted on the support and arranged to engage an upper end of the reel;
   characterised in that one of said holders is adjustably mounted on the support for movement between an operative position of engagement with the respective end of the reel and a release position permitting the reel to be mounted in or dismounted from engagement with the other of the holders.

2. A support stand according to Claim 1, characterised in that each holder is cup-shaped so as to be receivable by a respective mounting socket provided at each end of the cylindrical former.

3. A support stand according to Claim 1, characterised in that the upper holder is pivotally adjustably mounted on the support.

4. A support stand according to Claim 3, characterised in that a lever is coupled with the upper holder and is adjustable between two positions corresponding with the release and engaged positions of the upper holder.

5. A support stand according to Claim 4, characterised in that means is provided to enable the lever to be releasably retained in either of its two positions.

6. A support stand according to Claim 2, characterised in that a long reel can be fitted in the support stand with the ends of the cylindrical former defining mounting sockets into which the cup-shaped holders
can be received.

7. A support stand according to Claim 2, characterised in that a small reel can be mounted in the support stand and including tubular adapters which can be coupled with each end of the cylindrical former of the reel to form an extension piece which brings the overall length of the smaller reel up to that of a longer reel, with each adapter having an end socket in which the respective cup-shaped holder can be received.

8. A support stand according to Claim 1, characterised in that the upright support comprises a column which can be rigidly mounted in an upright position on a bale wrapper apparatus.

9. A support stand according to any one of Claim 1, characterised in that pre-stretch rollers form a unitary assembly with the upper and lower holders which is capable of pivoting about the axis of the columns against spring action during withdrawal of film from the reel.

10. A support stand according to Claim 1, characterised in that the upright support is adjustable in height so as to permit adjustment in height of the film dispenser reel relative to a bale which is to be wrapped.

11. A support stand according to Claim 10, including a screw threaded adjustment mechanism for adjusting the height of the support.

12. A support stand according to Claim 11, including a hand operated crank coupled with the adjustment mechanism.

13. A support stand for mounting a film dispenser reel in a substantially vertical attitude, said reel comprising a hollow cylindrical former and a band of plastics film wound around the former, and said stand comprising:
   an upright support;
   a lower reel holder mounted on the support and arranged to support a lower end of the reel;
an upper reel holder mounted on the support and arranged to engage an upper end of the reel; and,
means for adjusting the height of the support stand so as to adjust the height of the film dispenser reel relative to a bale which is to be wrapped;
characterised in that the adjusting means comprises a screw threaded adjustment mechanism coupled with the upright support.

14. A support stand according to Claim 13, characterised in that a hand operated crank is coupled with the adjustment mechanism.
a hollow cylindrical former and a band of plastic film wound around the former, and said stand comprising:

an upright support:

15. A support stand substantially as hereinbefore described with reference to the drawings.

16. The steps, features, compositions and compounds disclosed herein or referred to or indicated in the specification and/or claims of this application, individually or collectively, and any and all combinations of any two or more of said steps or features.

DATED this TENTH day of OCTOBER 1990

Kverneland Underhaug AS

by DAVIES & COLLISON
Patent Attorneys for the applicant(s)
an upright support;

a lower reel holder mounted on the support and

arranged to support a lower end of the reel:
Referring now to Figures 1 and 2 of the drawings, a support stand according to the invention is designated...
A support stand 121 is mounted on the chassis 101 and comprises a film pre-stretcher unit 120, as disclosed in
carried by the support stand 10. However, film dispensers of greater band width than band 13 can readily be mounted between the holders 14 and 15, as will be described.

FIG. 4