

11902/88

AUSTRALIA
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601814 CONVENTION



APPLICATION FOR A STANDARD PATENT

I/We SECTION 34(4)(a) DIRECTION SEE FOLIO 7
of NAME DIRECTED KAYSERSBERG EMBALLAGES S.A.
68240 Route de Lapoutroie 68240 Kayserberg, France

hereby apply for the grant of a standard patent for an invention
entitled:

PLASTIC FILM FEEDING MACHINE, AS USED IN AGRICULTURE

which is described in the accompanying complete specification.

APPLICATION ACCEPTED AND AMENDMENTS

ALLOWED 12-7-90

Details of basic application

Number of basic application: 87 02047

Convention country in which
basic application was filed: FRANCE

Date of basic application : 17 February 1987

Address for Service:

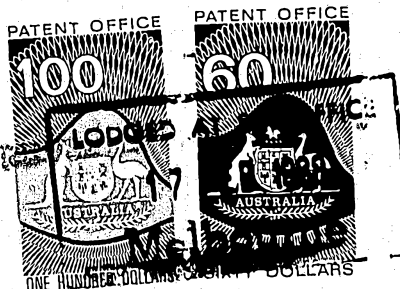
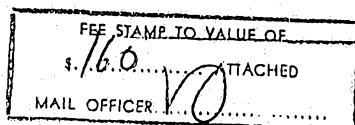
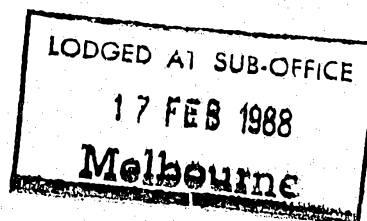
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Dated: 10 February 1988

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Attorneys for:
Kaysersberg SA

By:

Our Ref : 84399
POF Code: 44977/44977



6012q/1

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DECLARATION FOR A PATENT APPLICATION

▼ INSTRUCTIONS

- (a) Insert "Convention" if applicable
(b) Insert FULL name(s) of applicant(s)

In support of the (a) convention application made by (b)

KAYSERSBERG

- (c) Insert "of addition" if applicable
(d) Insert TITLE of invention

(hereinafter called "applicant(s)") for a patent (c) for an invention entitled (d)

"Process and machine for feeding plastic film used in agriculture"

- (e) Insert FULL name(s) AND address(es) of declarant(s) (See headnote*)

I/We (e)

D. DAVID
KAYSERSBERG
54 av. Hoche
75008 PARIS

do solemnly and sincerely declare as follows:

1. ~~I am/We are the applicant(s).~~
(or, in the case of an application by a body corporate)
1. I am/~~We are~~ authorized to make this declaration on behalf of the applicant(s).
2. ~~I am/We are the actual inventor(s) of the invention.~~
(or, where the applicant(s) is/are not the actual inventor(s))
2. (f)
HOEFT Benoît, of 9, rue du Val St Jean - 68240 KAYSERSBERG (France)

- (f) Insert FULL name(s) AND address(es) of actual inventor(s)

- (g) Recite how applicant(s) derive(s) title from actual inventor(s) (See headnote**)

is/~~are~~ the actual inventor(s) of the invention and the facts upon which the applicant(s) is/~~are~~ entitled to make the application are as follows:

- (g) Applicant is the assignee from the actual inventor

- (h) Insert country, filing date, and basic applicant(s) for the/or EACH basic application

(Note: Paragraphs 3 and 4 apply only to Convention applications)

3. The basic application(s) for patent or similar protection on which the application is based is/~~are~~ identified by country, filing date, and basic applicant(s) as follows:

- (h) France
17th February, 1987
KAYSERSBERG S.A.

4. The basic application(s) referred to in paragraph 3 hereof was/~~were~~ the first application(s) made in a Convention country in respect of the invention the subject of the application.

- (k) Insert PLACE of signing

- (l) Insert DATE of signing

- (m) Signature(s) of declarant(s)

Note: No legalization or other witness required

Declared at (k)

Dated (l)

Paris
April 11, 1988

(m)

To: The Commissioner of Patents

(12) PATENT ABRIDGMENT (11) Document No. AU-B-11902/88
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 601814

- (54) Title
PLASTIC FILM FEEDING MACHINE, AS USED IN AGRICULTURE
- International Patent Classification(s)
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- (21) Application No. : **11902/88** (22) Application Date : **17.02.88**
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- (43) Publication Date : **18.08.88**
- (44) Publication Date of Accepted Application : **20.09.90**
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- (56) Prior Art Documents
AU 50428/85 A01G 13/02
WO 86/00780
GB 1504967
- (57) Claim

1. A plastic film feeding machine for use in agricultural cultivation, such as market gardening cultivation, which is adapted to be towed by a traction device, such as a tractor, said machine comprising a chassis forming a box structure mounted on wheels, and a film storage or feed system provided within the said structure said system having a film storage or feed drum which is rotatable with respect to film feed devices comprising supporting rollers, said machine further comprising devices for opening a furrow in the soil at each edge of said film, devices for maintaining each edge of the film in a respective furrow as the film is fed from said drum and devices for burying each edge of the film in the respective furrow, wherein said drum is mounted to rotate on the supporting rollers and at least one of said wheels is a traction wheel by which drive is provided to at least one of the supporting rollers through drive transmission means comprising a mechanical variable speed

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drive which enables the transmission ratio between the traction wheel and the driven supporting rollers to be varied.

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COMPLETE SPECIFICATION
(ORIGINAL)

Application Number:
Lodged:

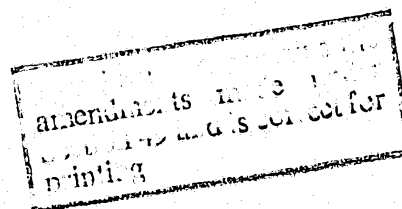
Class

Int. Class

Complete Specification Lodged:
Accepted:
Published:

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Related Art:



APPLICANT'S REFERENCE: DD/LP 9911B/124

Name(s) of Applicant(s):

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Address for Service is:

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Complete Specification for the invention entitled:

PLASTIC FILM FEEDING MACHINE, AS USED IN AGRICULTURE

Our Ref : 84399
POF Code: 44977/44977

The following statement is a full description of this invention, including
the best method of performing it known to applicant(s):

PLASTIC FILM FEEDING MACHINE, AS USED IN AGRICULTURE

Essentially, the present invention concerns a machine for the feeding of a plastic film used in agriculture, and in particular in market gardening, using a film storage or feed drum, driven in rotation by some of the drum supporting rollers, which behave as drive rollers.

Document FR-A-2 235 642 already describes a plastic film feeding machine used in agriculture, in flat market gardening, or in vine cultivation.

A machine of this type is intended to be pulled by a traction machine, such as a tractor, and consists of:

- a wheel-mounted chassis, forming a box structure, preferably with at least four wheels, the film storage device being inside and/or outside the said structure, and preferably comprising a film storage or feed spool mounted so as to rotate with respect to the chassis;
- devices for unwinding or feeding the film from the said film storage or feed drum, by rotating the said drum;
- devices for opening a furrow in the ground at each end of the said film
- devices for maintaining the edges of the film within the said formed furrows, and which may include sealing wheels; and
- devices for burying the film maintained in each furrow formed.

With a machine of this type, the film is drawn from the film storage or feed drum by the sealing wheels, drawing or pulling of the film giving rise to problems of irregularity of tension, while at the same time, it is necessary to prevent the formation of folds.

Now, in some cases, it is necessary that folds be formed in order to adapt the film to the shape of the furrow or ridge. In addition, the tension applied to the film must not be too high, but, on the contrary, as low as possible, which cannot be achieved if the film is pulled or drawn by the sealing wheels.

Similarly, document FR-A-2 452 871 describes an agricultural coating machine of similar design, in which the film is extracted from the storage drum by means of two band presser devices, which form the film drawing or pulling system.

Therefore, this invention is intended to resolve the new technical problem, which consists in the provision of the solution, not only enabling the film to be drawn, but, on the contrary, to deposit it on the ground, while at the same time varying the film feed speed as desired with respect to the machine speed.

~~Furthermore, this invention is intended to resolve the new technical problem consisting in the provision of a solution enabling feeding of a film, with formation of folds as desired.~~

Also, the present invention is intended to resolve the new technical problem consisting in the provision of a solution enabling feeding of a film of very wide width, for example equal to several meters, and in particular at least equal to 5 or 6 meters, while enabling the spread of the film to be altered as desired.

Although of particularly simple design, the present invention resolves these new technical problems satisfactorily, for the first time.

This invention concerns a plastic film feeding machine used in agriculture, and especially in market gardening, intended to be towed by a traction device, such as a tractor, and consisting of a chassis forming a box structure, preferably mounted on four wheels, film storage or feed devices being provided within the said box structure, and preferably comprising a film feed or storage drum which rotates with respect to the chassis; film feed devices from the said film storage or feed drum, by rotation of the drum itself, devices for

Although of particularly simple design, the present invention resolves these new technical problems satisfactorily, for the first time.

According to the present invention there is provided a plastic film feeding machine for use in agricultural cultivation, such as market gardening cultivation, which is adapted to be towed by a traction device, such as a tractor, said machine comprising a chassis forming a box structure mounted on wheels, and a film storage or feed system provided within the said structure said system having a film storage or feed drum which is rotatable with respect to film feed devices comprising supporting rollers, said machine further comprising devices for opening a furrow in the soil at each edge of said film, devices for maintaining each edge of the film in a respective furrow as the film is fed from said drum and devices for burying each edge of the film in the respective furrow, wherein said drum is mounted to rotate on the supporting rollers and at least one of said wheels is a traction wheel by which drive is provided to at least one of the supporting rollers through drive transmission means comprising a mechanical variable speed drive which enables the transmission ratio between the traction wheel and the driven supporting rollers to be varied.



~~opening a furrow in the ground, at each side of the said film, devices~~
for keeping the edges of the film inside each furrow formed, which may
consist of a sealing wheel, and devices for burying the film maintained
in each formed furrow, such that the said drum is capable of rotating
on supporting rollers; at least one of the chassis support wheels, and
preferably at least one of the chassis front wheels, in the towing
direction, forms a traction wheel which drives some of the drum
supporting rollers through a drive transmission system comprising a
mechanical variable speed drive, which enables the transmission ratio
10 ~~between the traction wheel and the drum drive rollers to be varied.~~

According to a preferred design method, at least two of the chassis
front wheels, at each end of the chassis, form the traction wheels.
Preferably, both traction wheels drive an intermediate common shaft,
appropriately splined, which in turn drives the drum drive rollers.

According to another particularly advantageous design method, this
machine is characterized by the fact that it comprises devices for
folding the film in the crosswise direction, thus enabling slack to be
given to the film, while in turn enabling raising of plants, and in
particular cereals. Preferably, these holding devices are located
under the chassis, and preferably consist of a set of at least three
20 angle-edge relieving tubes to prevent the film tearing, one tube being
located at a higher level and opposite the two other tubes, as near as
possible to the point of arrival of the film.

According to another special design method, this machine comprises
devices for displacement of all the devices, such as to alter the
spread of the film, preferably by raising the traction and sealing
wheels, the folding system, where fitted, and the burying equipment,
onto a fitted carriage which can be moved transversally along a guide.

According to another special design method, this machine comprises film
turnover or transfer tubes or rollers, located up-system from the
supporting and/or drive rollers, with respect to the direction of
movement of the film.



According to another design option, this machine comprises twisting or return rollers located down-system from the supporting and/or drive rollers, with respect to the direction of movement of the film.

From the above, it can be seen that a machine is obtained which is capable of depositing the film, whatever its width, and such that the machine forward speed is synchronized with the film feed speed, this machine being of particularly simple design.

In addition, the presence of a mechanical variable speed drive enables the film tension to be adjusted to the condition of the drum and the conformation of the terrain.

When it is deposited, the film is subjected to low tension, and can be adapted as desired to the shape of a channel or ridge, and this whatever the film width.

In addition, according to the present invention, folds can be made in the film due to folding devices which are advantageously located as near as possible to the sealing wheels, in this case under the chassis, so as not to deform the film, and enable it to be taken to the sealing wheels. Preferably, these film folding devices are also installed on the transversally movable carriage mounted on a guide.

In this manner, a simplified mechanical system is obtained enabling the spread of the film to be altered as desired, whatever the width of the film.

According to another preferred feature, each traction wheel is located along the axis of the device opening the furrow in the ground, such as an opening disk, which enables a reduction in lateral dimensions, and the earth in front of the disk to be packed, thus facilitating opening of the furrow.

Moreover, this machine is designed with wheel supporting devices, offering high ground clearance for the machine.

It will also be understood that the invention is such that a film feeding machine offering a clear technical advance, totally unexpected by a craftsman, is obtained.

It should be noted that the term "film" or "plastic film" covers all products which may be presented in the form of continuous bands of consequent length. Naturally, this includes films containing orifices or cutouts, which may present themselves after unrolling of the film, with openings which give the resemblance of a net or similar device. Similarly, the film may be of any type, but it is agreed that it must be adapted to the application envisaged, which is fully within the capacities of a craftsman.

Other objectives, characteristics and advantages of the invention will appear more clearly in the light of the description to follow, and which refers to appended drawings representing the invention design method at present preferred, and according to two main options, which are given for illustrative purposes only, and which therefore cannot, in any way, limit the range of the invention. In the drawings:

- figure 1 is a schematic perspective view of the design method as at present preferred, for a film feed machine, according to the present invention and showing the essential devices or components;
- figure 2 is a front elevation view, also schematic, of the machine shown in figure 1.
- figure 3 is an elevation, lateral view, as a partial cross-section of the machine shown in figure 1, according to the first design option.
- figure 4 is a detailed view of the film folding devices, according to the invention;
- figure 5 represents a view similar to that of figure 3, for a second design option; and

- figure 6 gives a detailed and large view of the devices enabling modification of the spread, by means of a carriage which can be moved crosswise along a guide rail.

In particular, and referring to figures 1 to 3, a machine according to the present invention and represented by the general reference number 1, for unwinding or feeding of a film (e.g. plastic), schematically represented by reference Number 2, as used in market gardening cultivation, is intended to be towed by a traction device such as a tractor. In order not to complicate the drawings, the coupling device for the traction facility has not been shown. Preferably, this is a conventional three-point coupling.

This machine (1) consists of a chassis (4) forming a box structure mounted on wheels such as (6, 8, 10 and 12), and preferably at least four wheels, as shown; film storage or feed devices (14) are provided inside the structure (4) and advantageously consist of the film feed or storage drum (16), which is mounted to rotate with respect to the chassis.

This machine also comprises devices (18) for feeding the film from the film storage or feed drum (16), by rotation of drum (16), devices such as (20, 22) for opening a furrow in the soil at each edge (2a, 2b) of film (2); devices (24, 26) for maintaining the edges (2a, 2b) of film (2) in each furrow formed; and, devices (28, 30) for burying edges (2a, 2b) of the film (2) maintained in each furrow formed.

According to the present invention, this machine is characterized by the fact that drum (16) is mounted to rotate on two supporting rollers (32, 33); (34, 35); (36, 37); and at least one (6, 8) of the supporting wheels (6, 8, 10, 12) and preferably at least one (6, 8) of wheels (6, 8), located at the front of the chassis in the towing direction, consisting of a traction wheel which, through appropriate drive mechanisms (40), drives some of the supporting rollers (such as 32 and 36) of drum (16), which then form the drive rollers for drum (16). In the design example shown, the drive devices (40) can consist of a gear wheel (42, 44) coupled to traction wheel (6, 8), which meshes with a

drive transmission chain (46, 48) terminating in a lay shaft (50), which, if two traction wheels (6, 8) are used, as shown, is a common lay shaft (50) which is appropriately splined and in turn drives a transmission chain or belt, for example (52), figure 3, terminating in a corresponding gearwheel, such as (54), coupled to the corresponding drive roller, such as (36) simultaneously forming a supporting roller.

Advantageously, it is provided that the drive transmission devices (40) include a conventional mechanical variable speed drive (60) inserted between shaft (50) and the drive rollers such as (32, 36), thus enabling the transmission ratio between the traction wheels (6 and 8) and the drive rollers (32, 36) to be varied. It can be conceived that film (2) is drawn off the drum (16) due to rotation of the drive rollers (32, 36). Film (2) can then advantageously pass over the twisting or transfer tubes or rollers, such as (62, 64), figure 3, which are in this case located up-system from the supporting rollers (33, 35, 37 and 34) and/or drive rollers (32, 36) with respect to the towing direction as shown by arrow M. This film (2) passes under chassis (4) through a crosswise opening (66), the length of which is matched to the widest possible width of the film to be unwound from drum (16). Film (2) then reaches application devices (24 and 26), preferably consisting of "sealing" wheels, as shown, which maintain the film in the furrows formed by opening devices (20, 22), generally consisting of disks or similar devices.

According to the invention, film folding devices (70) are provided, preferably at least two devices (70) located symmetrically with respect to the machine transverse plane of symmetry. Preferably, these folding devices are located underneath chassis (4) as shown, so as to be as near the ground as possible, and therefore to holding devices (24, 26) formed by the sealing wheels. These folding devices (70) preferably comprise at least one set of three relieving tubes, which can be clearly seen from figures 2 to 4, and respectively identified (72, 74 and 76). The edges of these tubes are bent to prevent tearing of film (2). A tube (76) in the drawing is located between the other two tubes, in this case (72 and 74) at a higher level and opposite and as near as possible to the film arrival point, thus enabling the film to be folded, as can be clearly seen from consulting figure 4. It will be

understood that it is possible to have as many film folding devices (70) as there are crosswise or transverse folds to be made in the film.

According to the design option shown in figure 5, it is possible to provide twisting or idler tubes (62', 64') located behind the support and/or drive rollers. This enables film (2) to be passed through opening (66'), also located behind the partition forming the bottom (4b) of chassis (4), but it is then necessary to provide a supplementary idler roller (68) in front of the folding devices (70). Advantageously, this supplementary idler roller (68) can also be driven by a chain or belt, not shown, via the drive transmission system (40). Therefore, each of these options offers its own advantages, which will be fully comprehensible to the craftsman.

According to a design particularity, as shown in figure 6, devices enabling the film spread to be modified as desired are provided; these preferably consist of a carriage, defined by items such as (80, 82), which can move transversally along a corresponding guide rail, defined, for example in this case, by bars such as (84, 86) defining the longitudinal edges of chassis (4). According to the design examples shown, at least traction wheels (6 and 8) are mounted to rotate on bars (88, 90, 92 and 94) combined to form pairs, and coupled to the above-mentioned items (80, 82) forming part of the above-mentioned carriage. These devices (80, 82) being installed so as to move transversally with respect to running direction M, and being movable with respect to the lengthwise edges (84, 86) of chassis (4).

According to another preferred design method, the opening devices, such as disks (20, 22), are installed on the center line of traction wheels (6, 8) and can be moved transversally by being coupled to the same devices such as (80), figure 6, forming a part of the transversally movable carriage. Similarly, the folding devices can be coupled to these devices, such as (80), so as to be moved simultaneously. This also applies to devices (24, 26) retaining the edges of film (2) and the burying devices (28, 30).

Therefore, it can be seen that it is very simple to move all the devices used to modify the film spread simultaneously, thus enabling it to be correctly deposited and buried.

In particular, this is obtained by making provisions for drive wheels (6 and 8) and support (10, 12) of chassis (4) to be outside the wheel base of chassis (4), as shown, while providing a high ground clearance, so that all types of terrain can be crossed.

It will be understood that the operation of a device of this type is particularly simple, and that it enables the process described above to be realised.

Naturally, the invention comprises all devices constituting technical equivalents of the devices described and their various combinations. Thus, drum (16) can be a film storage drum (2). According to an option, this drum (16) could be a transfer drum for used film accordion-folded on the ground, or on a supporting device externally fitted to chassis (4), as shown in figure 5 of FR-A-2 235 642. Naturally, the simplest solution, and especially for wide films, is to use a film storage drum (2) which has never been used, but reuse of film (2) can be envisaged without exceeding the scope of the invention.

The claims defining the invention are as follows:

1. A plastic film feeding machine for use in agricultural cultivation, such as market gardening cultivation, which is adapted to be towed by a traction device, such as a tractor, said machine comprising a chassis forming a box structure mounted on wheels, and a film storage or feed system provided within the said structure said system having a film storage or feed drum which is rotatable with respect to film feed devices comprising supporting rollers, said machine further comprising devices for opening a furrow in the soil at each edge of said film, devices for maintaining each edge of the film in a respective furrow as the film is fed from said drum and devices for burying each edge of the film in the respective furrow, wherein said drum is mounted to rotate on the supporting rollers and at least one of said wheels is a traction wheel by which drive is provided to at least one of the supporting rollers through drive transmission means comprising a mechanical variable speed drive which enables the transmission ratio between the traction wheel and the driven supporting rollers to be varied.

2. A machine according to claim 1, wherein at least one of said wheels is located in front of the chassis and comprises said traction wheel preferably driving a common lay shaft which is advantageously splined, and which in turn causes the supporting rollers of the drum to rotate.

3. A machine according to claim 1, wherein two of said wheels are located in front of the chassis, each of said two wheels comprising a respective said traction wheel and providing drive to a common lay shaft for rotating said supporting rollers and said drum.

4. A machine according to any one of claims 1 to 3, including devices for folding film transversally, so as to provide slack for the film which enables lifting of plants.

5. A machine according to claim 4, including a supplementary idler roller in front of the folding device, if necessary, this roller being driven by at least one of



the drive transmission means.

6. A machine according to claim 4 or claim 5, wherein the folding devices are located under the chassis and comprise at least one assembly of three bent relieving tubes, one of of said tubes being placed between the other two tubes at a higher level and in opposition to these, and as near as possible to the inlet of film.

7. A machine according to any one of claims 1 to 6, including film transfer or twisting tubes or rollers,
10 located at an outlet from the supporting and/or drive rollers, with respect to the feed direction of the film.

8. A machine according to any one of claims 1 to 7, including film transfer or twisting tubes or rollers located at the inlet of the supporting and/or drive rollers, with respect to the feed direction of the film.

9. A machine according to any one of claims 1 to 8, including adjustment means providing transverse direction movement facilities for all the devices enabling the spread of film to be altered.

20 10. A machine according to claim 9, wherein said adjustment means are mounted on a carriage movable transversally along a guide rail.

11. A machine according to claim 1, substantially as herein before described with reference to Figures 1 to 4, or Figures 1 to 4 as modified in accordance with Figure 5 or 6, of the accompanying drawings.

DATED: 5 JULY, 1990

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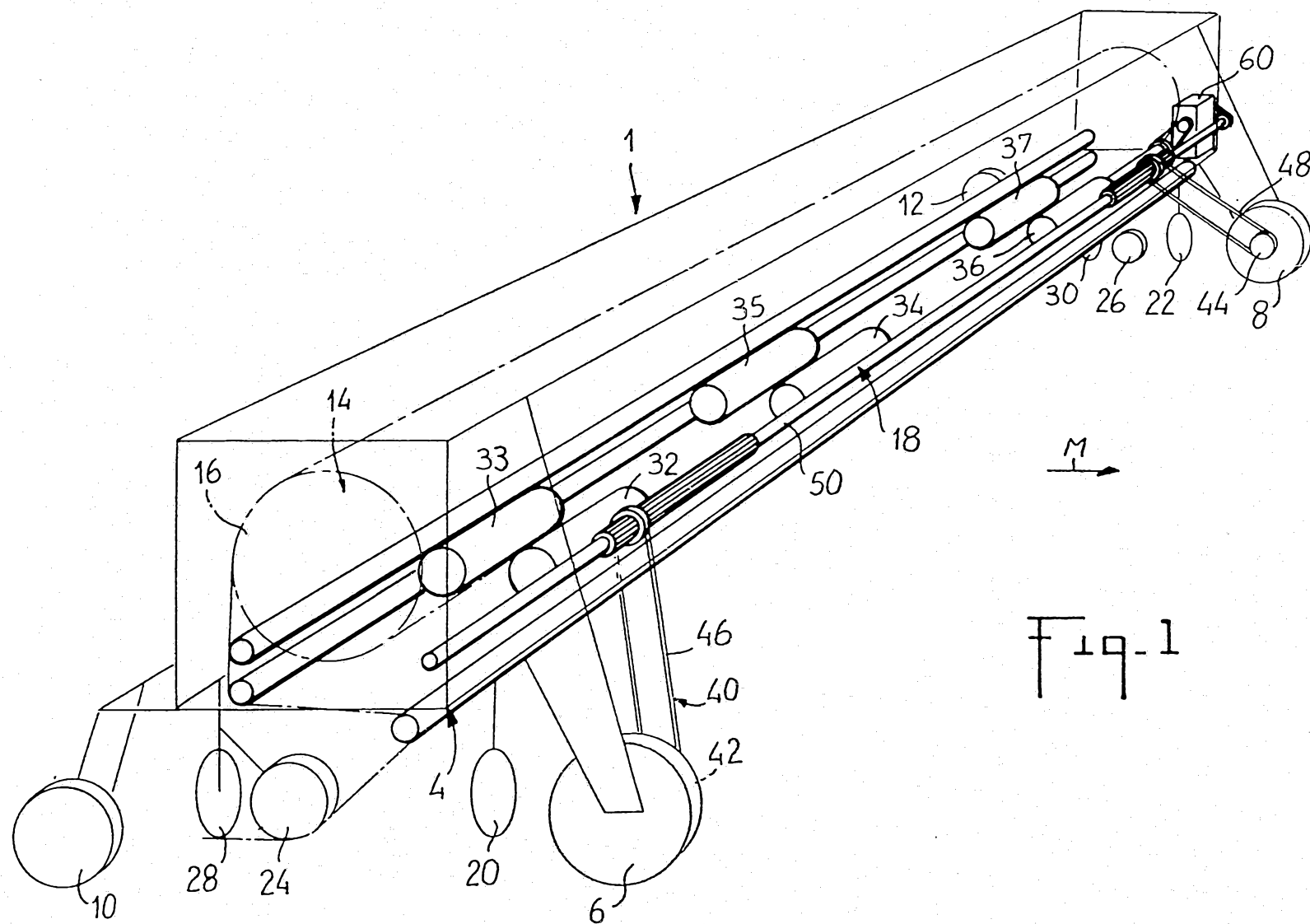


Fig. 1

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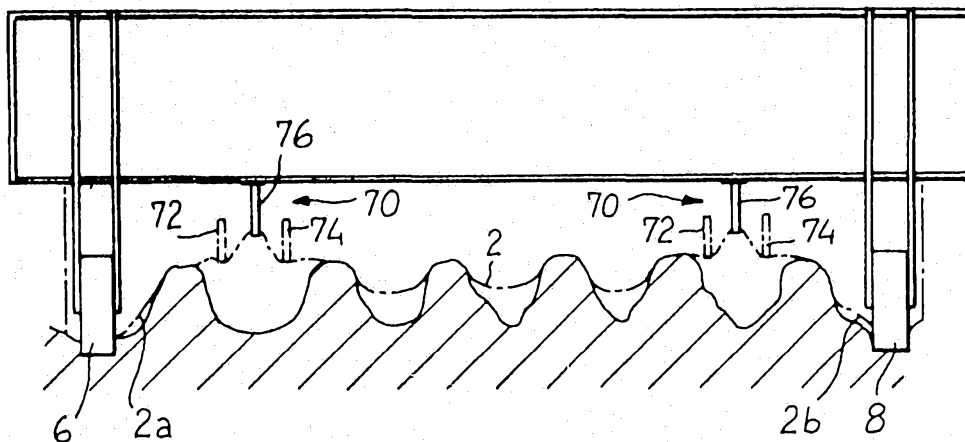


Fig. 2

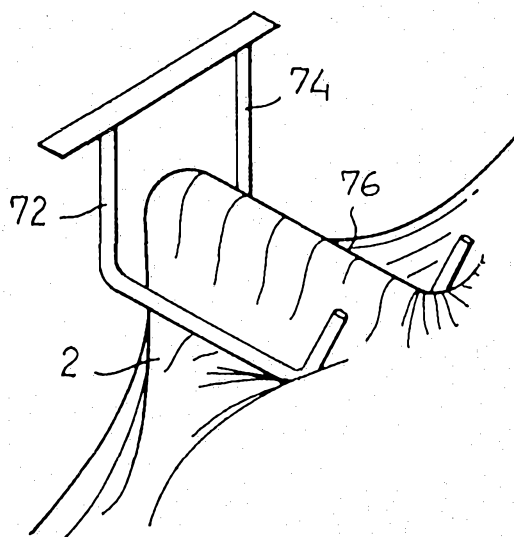


Fig. 4

