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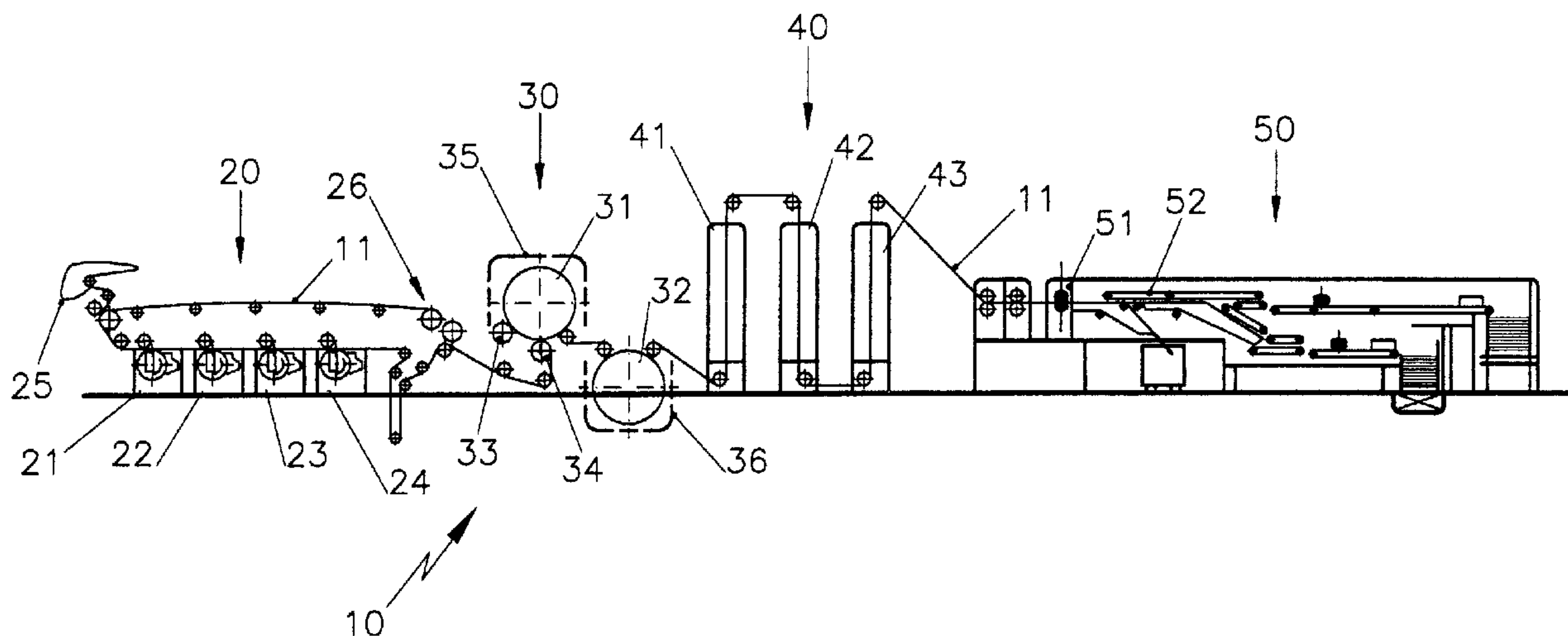
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(54) Title: CELLULOSE DEWATERING MACHINE



(57) Abrégé/Abstract:

A cellulose dewatering machine for producing paper has a sieve dewatering device, a pressing device, a drying device and a subsequent transverse cutter, and the dewatering device has a round sieve cylinder unit.

ABSTRACT OF THE DISCLOSURE

A cellulose dewatering machine for producing paper has a sieve dewatering device, a pressing device, a drying device and a subsequent transverse cutter, and the dewatering device has a round sieve cylinder unit.

BACKGROUND OF THE INVENTION

The present invention relates to a cellulose dewatering machine.

More particularly, it relates to a cellulose dewatering machine for producing of paper, with a sieve dewatering device, a pressing device, a drying device, and a subsequent transverse cutter.

Cellulose dewatering machines of the above mentioned general type are known in the art. In the prior art the maximum obtained speeds in such machines for paper production are in the range of 50-70 m/min.

The upper limit of the speed of such machines deals substantially with two factors, namely the dewatering capacity of the sieve dewatering device and the speed of the transverse cutter. During the production of paper longitudinal sieves are used as a rule, and their length is decisive for the dewatering capacity. The dewatering capacity increases with the length of the longitudinal sieve, however an elongation of the longitudinal

sieve by several meters brings an increase of the speed only to a few m/min.

The transverse cutters normally also do not have higher speeds than the above mentioned. For obtaining higher speeds, the transverse cutters must be provided with an overlapping of the cellulose sheets, which however is not possible due to the surface roughness of the cellulose sheets.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a cellulose dewatering machine, which eliminates the disadvantages of the prior art.

More particularly, it is an object of the present invention to provide a cellulose dewatering machine which allows a significant increase of the speeds when compared with the existing cellulose dewatering machines.

In keeping with these objects and with others which will become apparent hereinafter, one feature of the present invention resides, briefly stated, in a cellulose dewatering machine of the above mentioned general type, in which the sieve dewatering device has a round sieve cylinder unit.

The round sieves provide significantly higher speeds in the region of approximately 90m/min than the longitudinal sieves.

Special round sieves formed as so-called suction round sieves allow the speeds up to 450 m/min. For obtaining a higher dewatering capacity, the round sieve cylinder unit can have a plurality, preferably four suction round sieves. The round sieve

cylinder unit can also have a turning press, for dewatering the cellulose web from both sides, as well as a dandy roll press.

For further increase of the speed, the pressing device can be provided with at least one smooth cylinder, which with its ground polished surface acts as a one-side smooth cylinder, and the contact side of the rotating cellulose web mirror-symmetrically takes the own surface finish. The one-side smoothness of the cellulose web can be sufficient to provide an overlapping of the cellulose sheets in the transverse cutter. The at least one smooth cylinder can cooperate with one or several suction press rolls for additional improvement of the dewatering power.

Preferably, for smoothing of both surfaces of the cellulose sheets, two smooth cylinders can be provided. With the both-side improvement of the surface finish of the cellulose web, an overlapping of the cellulose sheets can be obtained in the transverse cutter without objections and problems. Thereby the speeds in the region of 150-160 m/min can be obtained.

In order to enhance the subsequent drying, preferably both smooth cylinders can be provided with dryer hoods.

After the pressing out and smoothing, the cellulose web is supplied for residual drying to the drying device. The drying device preferably can be provided with at least one drying tower.

A plurality of vertical flow nozzles are arranged in this drying tower. A swing tower for heating or cooling of cellulose web can follow the at least one drying tower. Thereafter a cooling tower, can be provided, which ensures that the cellulose web is cooled to a few degrees under the room temperature before entering the transverse cutter. Thereby static charging in the transverse cutter is avoided, which otherwise can lead to a damage of the vibrating element.

In a second embodiment of the present invention, the drying device can be provided with a horizontally arranged drying passage for the cellulose web. Preferably the drying passage can have three portions, wherein in the first portion the drying with hot air is performed. The second portion of the drying passage can be analogous to the swing tower for heating or cooling, while the last portion can be provided only for cooling of the cellulose web. Preferably, the drying passage can have an autonomous web edges control.

A dancer roll can be arranged between the last smooth cylinder and the driving device. It compensates a longitudinal shrinkage of the cellulose web during drying.

For centered orientation of the web tip, a clamping bar which is electromagnetically fixable on the web tip can be provided. It can be mounted on two lateral guiding chains. Moreover, a knockover frame can be provided between the last smooth cylinder and the drying device. It can have a knockover rocker which is turnable at both sides by 45° for knocking over the web tip on approximately 500-1000 mm width. For guiding the web edges, soft running displacement coulisses can be arranged. They can be brought from a 45° position to a 90° position and have contact switches which, upon reaching the 90° position, release the discharge of the upper clamping bar strip.

Further advantages are provided when a demagnetizing track is provided after the last cooling tower together with a lifting device for the upper clamping strip. The upper clamping strip can subsequently be transported back before the first drying tower by a crane for discharge in picking up machines.

For unloading of the feed press of the transverse cutter during long machine stoppages or during eventual leaving the web in the machine, for avoiding a repeated putting on of the web, advantageously a clamping press can be provided for the full web width between the last cooling tower and the transverse cutter.

For facilitating the work of the machine operator, the cellulose dewatering machine can be provided for example with a digital measuring and indicating device for the residual moisture and the temperature of the cellulose webs, at least before the entrance in the transverse cutter.

The novel features which are considered as characteristic for the present invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a schematic view of a first embodiment of a cellulose dewatering machine in accordance with the present invention;

Figure 2 is a schematic view of a second embodiment of a cellulose dewatering machine in accordance with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 1 schematically shows a first embodiment of an inventive cellulose dewatering machine 10 with a sieve dewatering device 20, a pressing device 30, a driving device 40 and a subsequent transverse cutter 50.

The sieve dewatering device 20 has a round sieve cylinder unit with four suction round sieves 21, 22, 23 and 24, a turning press 25 and a dandy roll press 26. The cellulose web 11 after the first passage through the suction round sieves 24-21 is supplied to the turning press 25, is turned there, and again is guided through the suction round sieves 21-24 for dewatering of the second web side. Then it is further supplied through the dandy roll press 26 and subsequently to the pressing device 30.

The pressing device 30 has two smooth cylinders 31 and 32. Two suction press rolls 33 and 34 are arranged on the smooth cylinder 31 for improvement of the dewatering efficiency. In order to support the subsequent drying, both smooth cylinders 31 and 32 are provided with dryer hoods 35 and 36. The use of two smooth cylinders 31 and 32 in an S-loop allows the handling of both sides of the cellulose web 11, so that they are not only

dewatered but also smooth. Therefore a reliable overlapping of the sheets on the transverse cutter 50 and thereby speeds 150-160 m/min can be guaranteed.

The pressing device instead of two smooth cylinders, can also have only one smooth cylinder. In this case, only one web side is smooth. In some cases this can be sufficient for obtaining high speeds by allowing an overlapping of the sheets.

From the pressing device 30, the cellulose web 11 is supplied to the drying device 40. The drying device 40 has a drying tower 41, a swing tower 42 for heating or cooling, and a cooling tower 43 for cooling of the cellulose web 11. The drying in the drying tower 41 is performed by means of vertical flow nozzles which are not shown in the drawings. The swing tower 42 is used selectively for heating or cooling of the cellulose web 11. The last tower 43 serves exclusively for cooling. The cellulose web 11 is cooled before the entrance to the transverse cutter 50 to a few degrees below room temperature to avoid static charging in the transverse cutter 50. The transverse cutter 50 has in a standard form a reject lock 51 and a changeover switch 52 for bale or staple operation.

Figure 2 schematically shows a second embodiment of a cellulose dewatering machine 10' in accordance with the present invention. It has a sieve dewatering device 20', a pressing device 30', a drying device 45 and a subsequent transverse cutter 50'. This second embodiment differs from the first embodiment shown in Figure 1 in that the drying device 45 for the cellulose web 11' has a horizontally arranged drying passage with three portions 46, 47 and 48. The first portion 46 is provided for drying with hot air, the second portion 47 is provided for heating or cooling, and the third portion 48 is provided for cooling of the cellulose web 11'.

A cellulose dewatering machine in accordance with the first embodiment shown in Figure 1 with a working width of for example 2800 mm and four uses for example 4 x 700 mm width, 1000 mm length, during a staple operation with a staple height of approximately 1400 mm and a speed of approximately 150 m/min has a maximum theoretical production of 672000 year tons, in the case of a continuous operation with 350 working days per year.

In a bail operation with a speed of for example 75 m/min and with a bail height of approximately 500-600 mm, the production is approximately the half of the above mentioned

value, while it should be considered that the transverse cutter is open or in other words operates without overlapping.

During the staple operation with a speed of 150 m/min, the delivery cycle time is approximately three minutes for each of four uses. Thereby for example two foil shrinkage heaters can be provided for staple packing after the device. During bale operation with a speed of 75 m/min the delivery cycle time is approximately two minutes. It is completely within the range for providing for example four bail tying machines with the use of wire or synthetic plastic.

A conversion of the above described variants from the bale operation to the staple operation and vice versa is possible any time without reduction of the speed, by driving on the transverse cutter on the gaps. The thusly locked sheets are supplied by the discharge lock into a release vat located underneath, where it together with the edge strips of the cellulose web is released by the outer longitudinal cutters and pumped back into the machine vat.

It is advantageous also when each of the above described variants can be driven with a dragging application

construction in the initial time, or in time application breaks only with the two inner uses to half power.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of constructions differing from the types described above.

While the invention has been illustrated and described as embodied in cellulose dewatering machine, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims.

C L A I M S

1. A cellulose dewatering machine for producing paper, comprising a sieve dewatering device, a pressing device, a drying device and a subsequent transverse cutter, said dewatering device having a round sieve cylinder unit.

2. A cellulose dewatering machine as defined in claim 1, wherein said round sieve cylinder unit has four suction round sieves.

3. A cellulose dewatering machine as defined in claim 1, wherein said round sieve cylinder unit has at least one turning press and a dandy roll press.

4. A cellulose dewatering machine as defined in claim 1, wherein said pressing device has at least one smooth cylinder.

5. A cellulose dewatering machine as defined in claim 4; and further comprising suction press rollers with which said at least one smooth cylinder cooperates.

6. A cellulose dewatering machine as defined in claim 4, wherein said pressing device has a second smooth cylinder, said smooth cylinders being arranged so as to provide treatment of both surfaces of a cellulose web.

7. A cellulose dewatering machine as defined in claim 6, wherein said smooth cylinder are provided with dryer hoods.

8. A cellulose dewatering machine as defined in claim 1, wherein said drying device has at least one drying tower.

9. A cellulose dewatering machine as defined in claim 8, wherein said at least one drying tower has vertical flow nozzles.

10. A cellulose dewatering machine as defined in claim 8, wherein said drying device also has a swing tower for heating or cooling a cellulose web, and a cooling tower, which towers follow said at least one drying tower.

11. A cellulose dewatering machine as defined in claim 1, wherein said drying device has a horizontally arranged drying passage for a cellulose web.

12. A cellulose dewatering machine as defined in claim 11, wherein said drying passage has three portions including a first portion for drying with hot air, a second portion for

heating or cooling, and a third portion for cooling the cellulose web.

13. A cellulose dewatering machine as defined in claim 11, wherein said drying passage has an automatic web running edge control.

14. A cellulose dewatering machine as defined in claim 4; and further comprising a dancer roller arranged between said smooth cylinder and said drying device.

15. A cellulose dewatering machine as defined in claim 1; and further comprising measuring and indicating devices for a residual moisture and a temperature of a cellulose web before an entry to said transverse cutter.

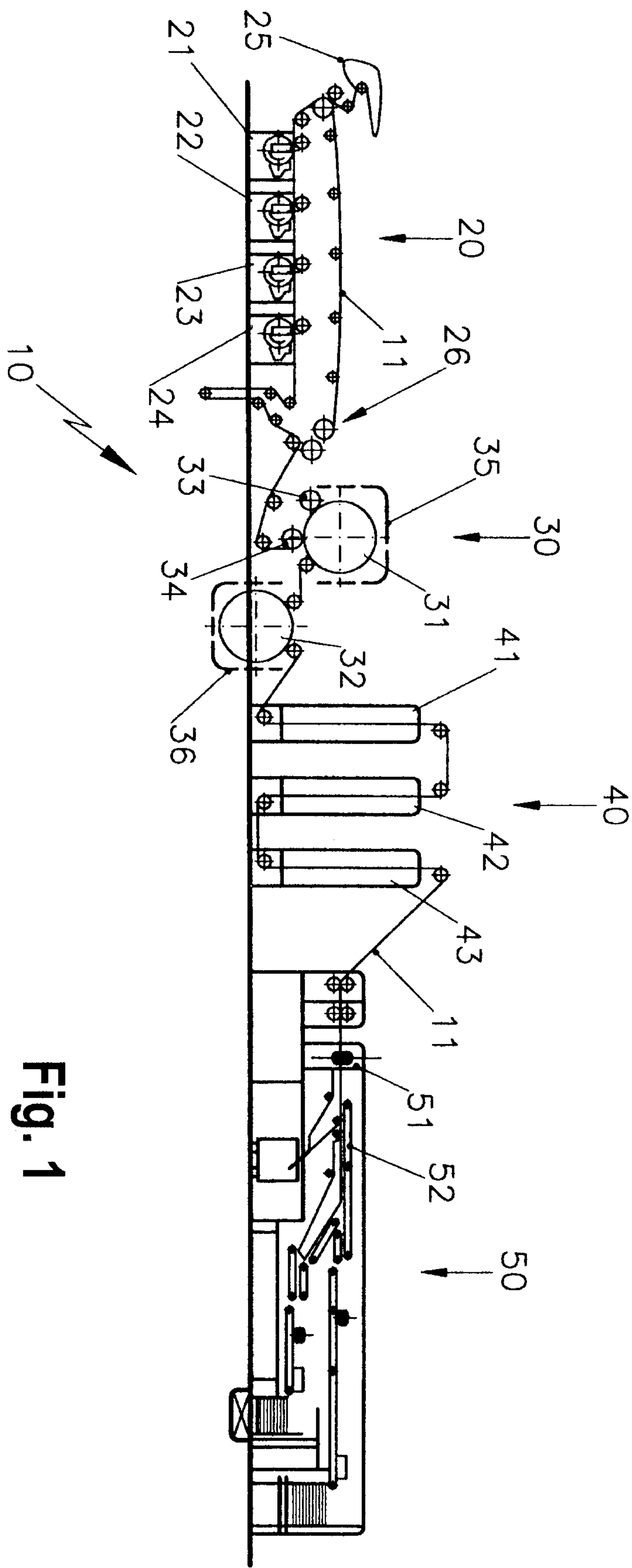


Fig. 1

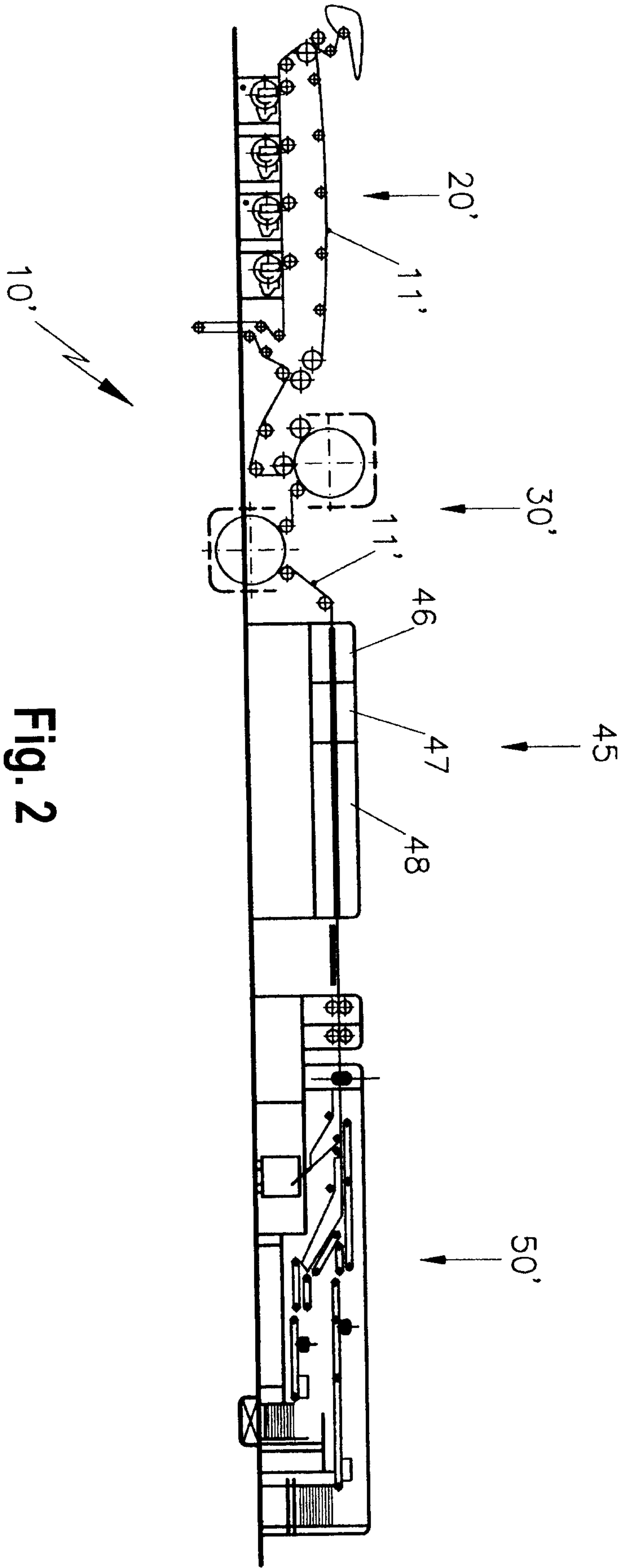


Fig. 2

