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(71) Applicant: **Zijlstra & Bolhuis B.V.**
Beneden Dwarsdiep 25
NL-9645 LA Veendam(NL)

(72) Inventor: **Pastoor, Hendrik**
Bocht Oosterdiep 10
9641 JK Veendam(NL)
Inventor: **Middel, Jan**
Paalslagen 5
9468 HL Annen(NL)

(74) Representative: **Smulders, Theodorus A.H.J., Ir. et al**
Vereenigde Octrooibureaux Nieuwe Parklaan 107
NL-2587 BP 's-Gravenhage(NL)

(54) **A roller screen unit.**

(57) A roller screen unit (7) for agricultural products comprising a plurality of elongated rollers (30-36) rotatably mounted between supporting arms (37, 38) at mutual intervals and parallel to each other, wherein the rollers (30-36) are separable rollers each comprising two end portions, which are each carried in a supporting arm section, and at least one central portion detachably mounted between the end portions.

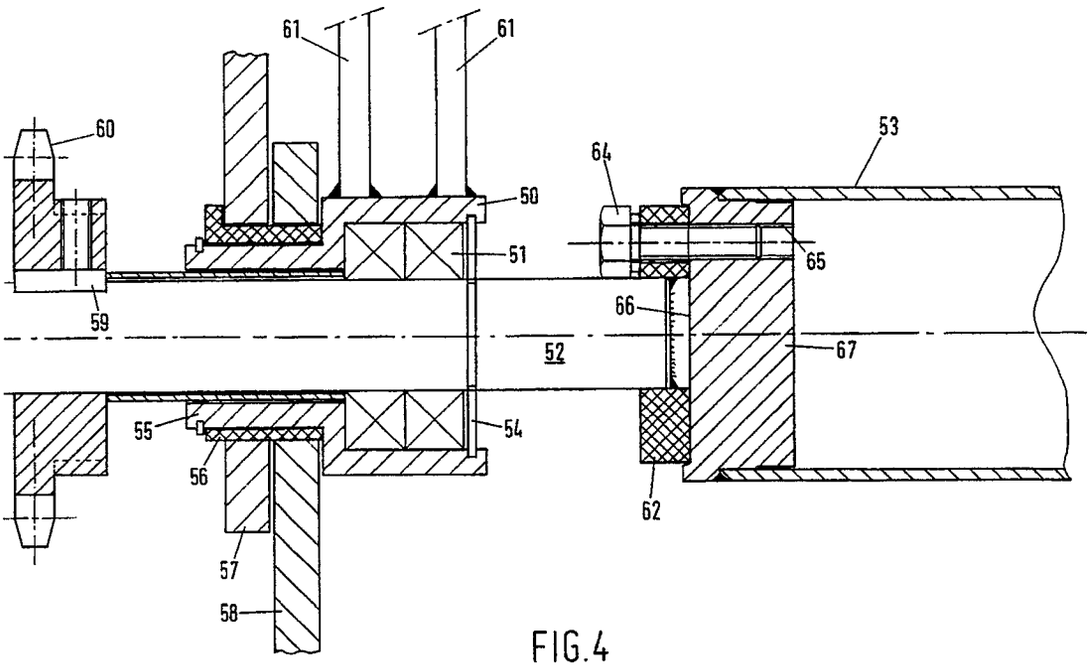

FIG.4

EP 0 418 981 A1

A ROLLER SCREEN UNIT

The present invention relates to a roller screen unit for agricultural products comprising a plurality of elongated rollers rotatably mounted between supporting arms at mutual intervals and parallel to each other.

Such roller screen units are used, e.g., in bulk bins for potatoes. A bulk bin for agricultural products provided with a roller screen is known from European patent 0 101 637. This prior bulk bin comprises a bottom slanting upwardly and capable of conveying agricultural products, such as potatoes, upwards to a substantially horizontal roller screen. The rollers of the roller screen extend transversely to the direction of transport and are mounted between supporting arms.

The supporting arms are preferably of such construction that the distance between successive rollers can be varied. For this purpose, the supporting arms may be of (semi-)lazy tongs construction, as also described in European patent 0 101 637.

A drawback of the prior roller screen units sometimes felt in practice resides in that replacement of the rollers is not easy. Sometimes, for instance, it is necessary to replace a damaged roller or it is advisable to replace the rollers by rollers of another type, such as spiral rollers, sorting rollers or star rollers. In the case of the prior roller screen units it is then often necessary to largely disassemble and subsequently reassemble the roller screen unit, e.g., when the rollers are carried in parts of the supporting arms by means of journals etc. formed at the roller ends.

It is an object of the present invention to provide an improved roller screen unit of such construction that the rollers can be easily and quickly replaced. More in general, it is an object of the present invention to provide a simple, rugged and effective roller screen unit.

According to the present invention a roller screen unit of the above type is characterized in that the rollers are separable rollers each comprising two end portions, which are each carried in a supporting arm section, and at least one central portion detachably mounted between the end portions.

The present invention will hereinafter be described in more detail with reference to the accompanying drawings. In these drawings,

Fig. 1 diagrammatically shows an example of a prior art bulk bin;

Fig. 2 diagrammatically shows an example of a prior roller screen unit;

Fig. 3 diagrammatically shows, in top view, an example of a roller screen unit according to the present invention;

Fig. 4 shows, in vertical section through the axis of a roller, an example of a practical embodiment of a unit according to the present invention.

The bulk bin diagrammatically shown in Fig. 1 in side-elevational view comprises a frame 1, which is mobile owing to the provision of wheels 2 and a drawbar 3. The bulk bin proper is formed by upright sidewalls 4,4', between which is disposed an endless conveyor bottom having an elevation path slanting upwards and a lower return part designated by 5. The conveyor bottom is driven by a drive unit 6 arranged adjacent to the upper end of the elevation path. Disposed beyond the upper end of the elevation path is a roller screen unit, diagrammatically shown at 7. Disposed underneath the roller screen unit is a transverse conveyor 8 for discharging material passed through the roller screen unit. In operation, the rollers of the roller screen unit are driven in such a manner that the products are transported by the rollers to a second transverse conveyor 9 capable of transporting the products further.

Fig. 2 shows a diagrammatic exploded view of an example of a roller screen unit. The roller screen unit shown comprises a plurality of rollers 10 each provided with a sprocket 11 capable of cooperating with a drive chain, not shown, arranged to rotate the rollers.

The shafts of the rollers are secured at both ends to the free ends of strips 12 through 16 of various lengths, which, together with a connecting strip 17, form a composite mechanism 18, (semi-)parallelogram mechanism or an arm of (semi-)lazy tongs construction. One end 19 of the connecting strip is fixedly, but pivotally connected to a fixed frame member 20. In the embodiment shown, this end 19 is adjacent to the roller located closest to the conveyor bottom (on the right-hand side in Fig. 2).

The adjustment of the mutual spacing between the rollers is effected by moving the shaft of one of the other rollers, preferably the shaft of the roller located closest to the product conveyor 9 (on the left-hand side in Fig. 2), transversely to its longitudinal direction. Owing to the operation of the above composite mechanism 18 the other rollers will then be moved as well, and the interspace is changed.

Fig. 3 diagrammatically shows, in top view, an example of a roller screen unit according to the present invention. The unit shown comprises seven rollers 30 through 36 mounted between two supporting arms 36 and 37. The supporting arms are preferably of (semi-)lazy tongs construction or telescoping arms or the like, so that the interspace

between successive rollers is adjustable. For this purpose, operating means, not shown in Fig. 3, are present, which, if required, may also comprise means for continuously varying the spacing between the rollers during operation, as described in European patent 0 101 637.

Rollers 30 through 36 are carried in supporting arms 37, 38 by means of journals 40.

Fig. 3 diagrammatically shows a drive motor 39 driving roller 32. The two journals of roller 32 are provided with sprockets 41, 42 or pulleys located outside the supporting arms and designed for plain or toothed belts or ropes. The driven sprockets 41, 42 drive, by means of chains or the like, idler sprockets and sprockets mounted on the journals of the other rollers.

Fig. 3 clearly shows that replacement of the rollers is possible only if at least one of the supporting arms is detached completely, which is very time-consuming in a practical situation.

According to the present invention separable rollers are used comprising two end portions, which show the two journals, and at least one central portion detachably mounted between the end portions. Although the separation between the central portion and the end portions may be effected in different places, e.g., in the roller proper, as indicated in roller 30 by broken lines 43, or in the journals, as indicated at 44 for roller 31, yet in a practical embodiment the separation can advantageously be effected at the junction between the journals and the roller body proper.

An example of a practical embodiment is diagrammatically shown in Fig. 4 in vertical section.

Fig. 4 shows a bearing bush 50, in which are disposed one or more bearings 51. A journal 52 of a roller 53 extends through the bearings. The bearing bush comprises a chamber containing bearing 51 and closed in this example by a spring washer 54 or the like. In this example, the spring washer also engages in a groove in journal 52 and thus determines the position of the journal in the axial direction. The bearing bush further has a portion having a smaller diameter 55 on the side away from the roller. By means of a bush 56, which may be made of, e.g., a suitable plastics material, the portion having a smaller diameter is carried in sections 57, 58 of a supporting arm, e.g., of a lazy tongs construction. At the end of the journal extending beyond bush 56 a sprocket 60 is mounted by means of a key 59.

In this example the bearing bush further carries strips 61 capable of being coupled to an operating means, e.g., a telescopic tube, for varying the distance between the rollers.

In the example shown, journal 52 is provided at the end facing roller 53 with a concentric ring 62 fixedly secured to the journal. Ring 62 is provided with a plurality of bores 63, so that by means of bolts 64 and corresponding threaded bores 65 the ring can be held against the end face 66 of roller 53.

Therefore, if a roller 53 is to be removed, only bolts 64 need to be loosened at both ends of the roller.

In the example shown, roller 53 is a hollow roller with inserted end portions 67 containing the threaded bores 65. However, the rollers may also be massive.

It is observed that, after the foregoing, various modifications are obvious to those skilled in the art. Thus, rings 62 can be welded to the journals, as shown in Fig. 4. In principle, it is sufficient to secure the rings against rotation about the journals. Consequently, the rings may also be axially slidable on the journals by means of one or more keys or keyways.

Furthermore, the central portion may be provided with journal ends extending, in mounted arrangement, through the bores in rings 62.

The rollers may be of any type, such as massive or hollow rollers, plain rollers, spiral rollers, presorting rollers having a profiled shape, such as the so-called diabolo rollers, steel rollers, plastics rollers etc.

It will be understood that these and similar modifications fall within the scope of the present invention.

Claims

1. A roller screen unit for agricultural products comprising a plurality of elongated rollers rotatably mounted between supporting arms at mutual intervals and parallel to each other, characterized in that the rollers are separable rollers each comprising two end portions, which are each carried in a supporting arm section, and at least one central portion detachably mounted between the end portions.

2. A roller screen unit according to claim 1, characterized in that the two end portions of each roller form journals and that the at least one central portion forms the roller body proper.

3. A roller screen unit according to claim 1 or 2, characterized in that each end portion carries at the end facing the central portion at least one fastening member extending radially to the end portion, said fastening member being provided with one or more axially extending bores and that the corresponding end faces of the central portion are provided with corresponding threaded bores.

4. A roller screen unit according to any of the preceding claims, characterized in that the at least one central portion is a hollow roller provided at the

ends with end portions closing the roller.

5. A roller screen unit according to claim 3 or 4, characterized in that the at least one fastening member comprises a ring secured to the end portion at least against rotation.

6. A roller screen unit according to claim 3 or 4, characterized in that the fastening member comprises a plurality of radial ears.

7. A roller screen unit according to any of the preceding claims, characterized in that the end portions of each roller are supported in a bearing bush, which itself is carried in at least one part of a supporting arm.

8. A roller screen unit according to claim 7, characterized in that the supporting arm comprises a plurality of sections hinged together and that the bearing bush forms the hinge point between two sections of the supporting arm.

9. A roller screen unit according to claim 6 or 7, characterized in that the bearing bush is provided with fastening members, which, in operation, are coupled to operating means for adjusting and/or varying the interspace between successive rollers.

10. A bulk bin for agricultural products provided with a roller screen unit according to any of the preceding claims.

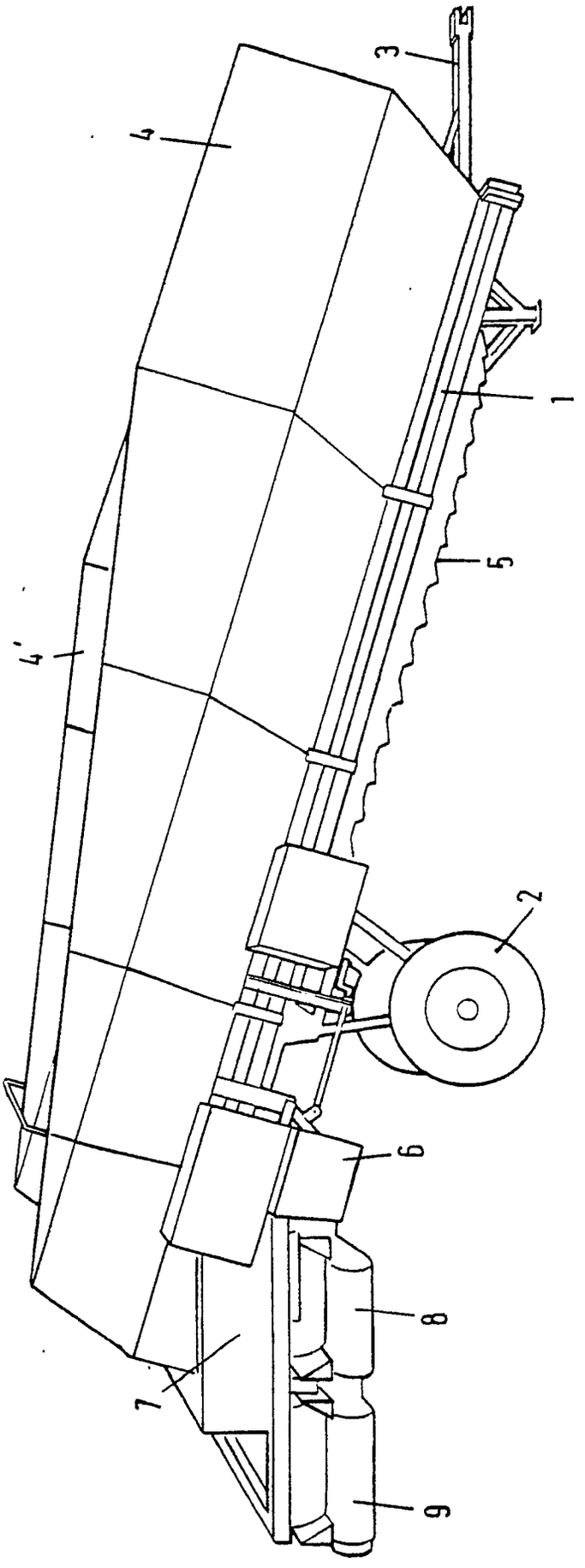

FIG.1

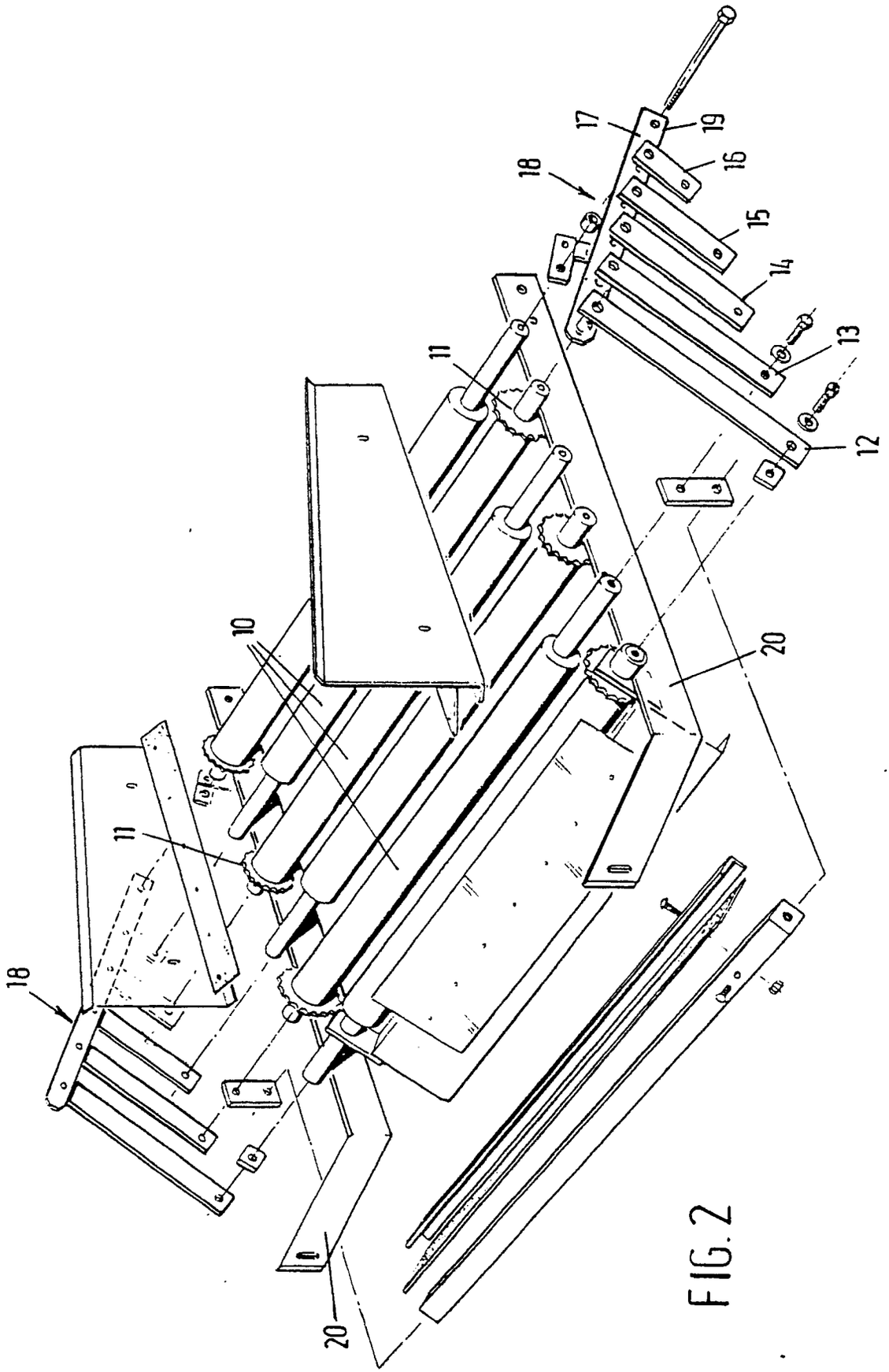

FIG. 2

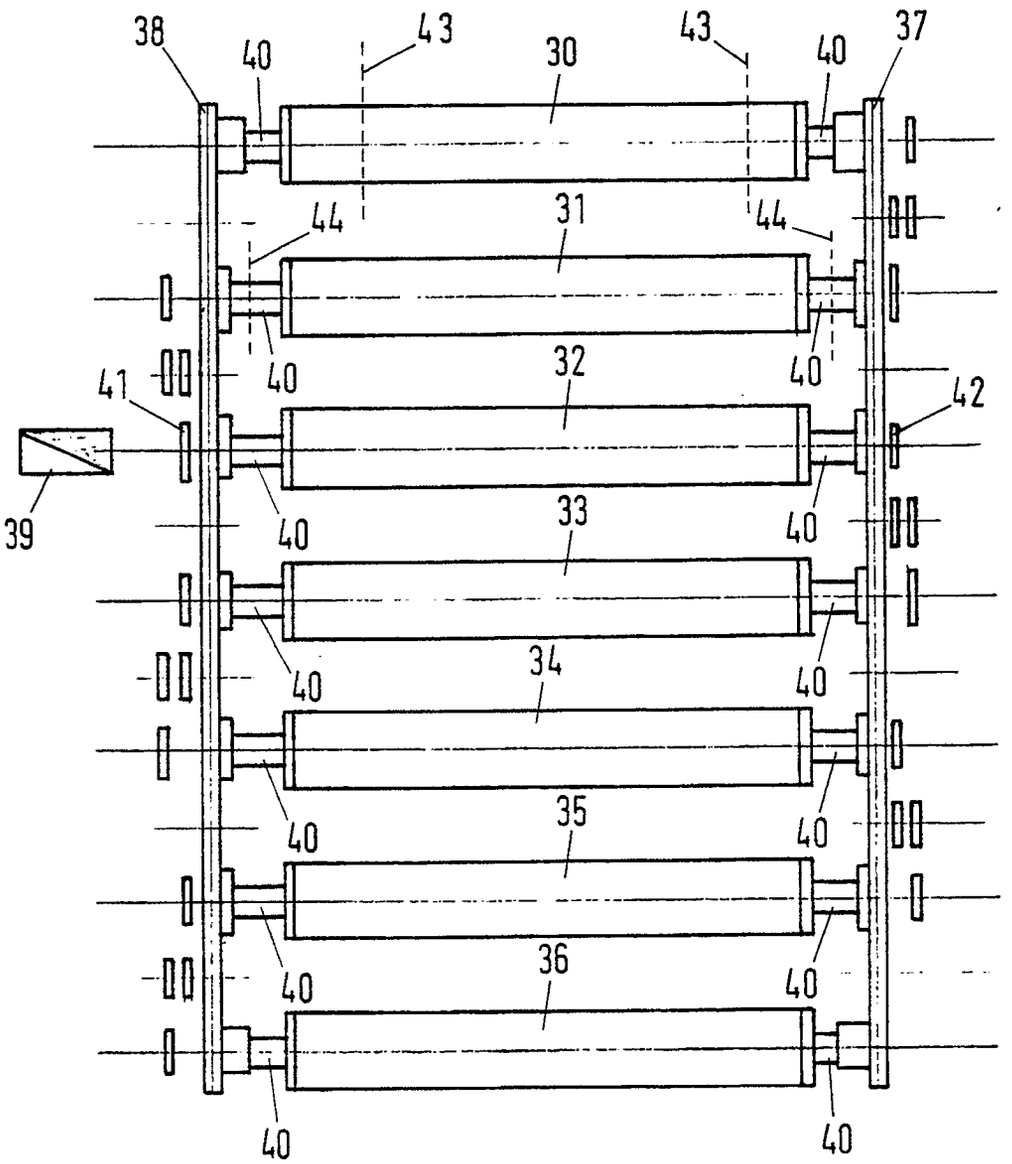
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FIG.3

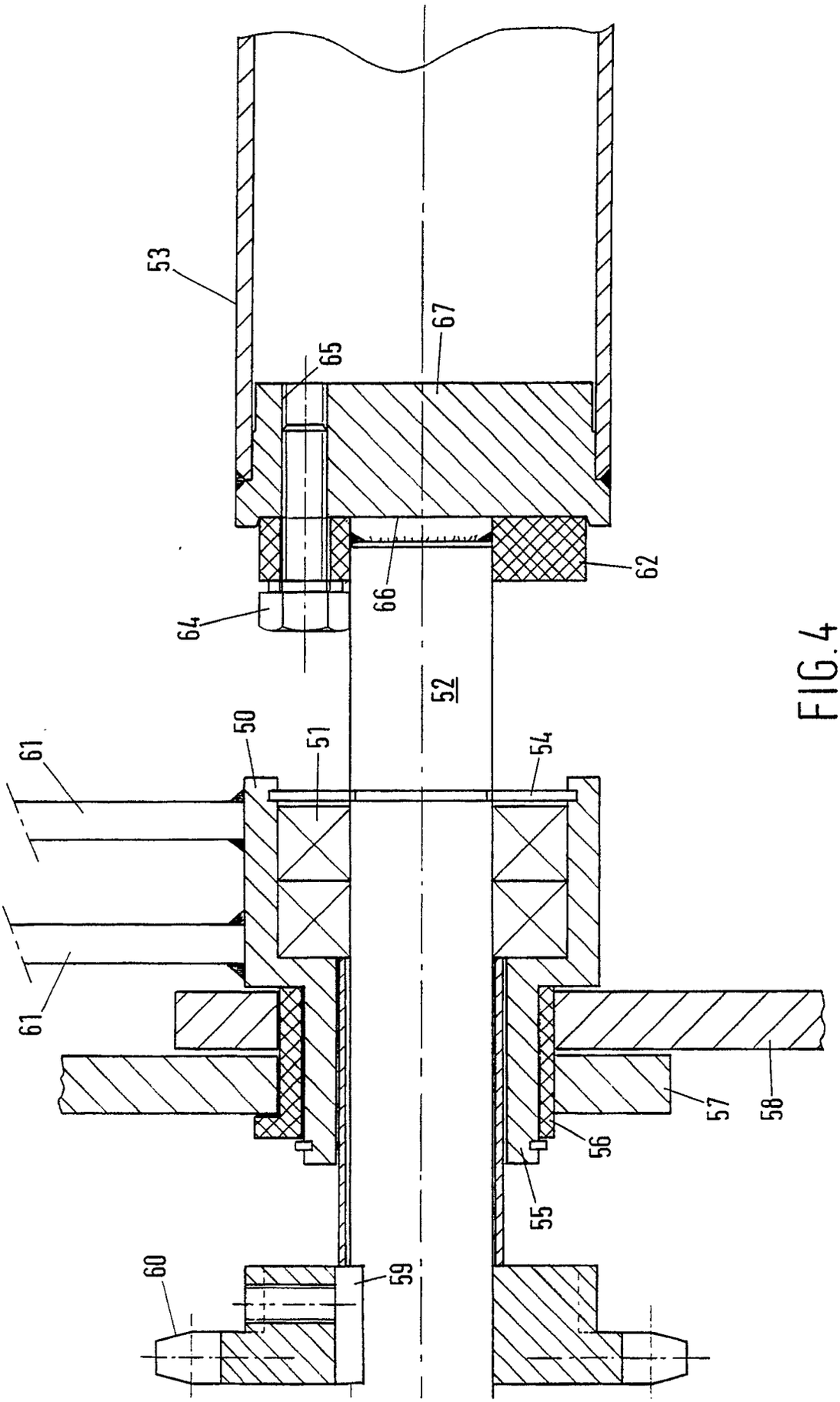

FIG.4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 20 2494

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X,A	US-A-4 311 242 (HNATKO) * column 1, lines 45 - 61 * * column 3, lines 1 - 31; figures 1-8 *	1,2,4,10	B 07 B 1/14
D,Y,A	EP-A-0 101 637 (ZIJLSTRA & BOLHUIS BV) * the whole document *	1-3,5,10, 8,9	
Y,A	US-A-4 034 837 (VINARCSIK ET AL) * column 1, lines 8 - 11 * * column 2, line 28 - column 3, line 28; figures *	1-3,5,10, 4	
A	US-A-1 651 622 (NORMAN) * page 1, lines 55 - 105 * * page 2, lines 72 - 116; figures *	1,2,4,10	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 07 B
A 01 D
B 65 G

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	07 December 90	VAN DER ZEE W.T.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
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A: technological background
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