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(54) Apparatus for cleaning inking and printing sleeves

(57) An apparatus (2) for cleaning inking or printing rolls (4), in particular Anilox rolls or gravure cylinders (printing sleeves), and which include an elongate cleaning chamber (6) with bearing arrangements (8) for one or more inking or printing rolls (4) such that the rolls can be brought to rotate during the cleaning process, as active cleaning means (10) are arranged in the cleaning chamber (6) and adapted for being displaced along the rotating inking or printing rolls (4), the cleaning means (10) including one or more nozzles (12) for supplying cleaning liquid which is recirculated after passage of a filter, and optionally a brush, wherein the bearing arrangements (8) at a first end of the cleaning chamber (6) is constituted by a projecting, cantilevered mandrel (13) with engagement means (14) adapted to engage and support an inking or printing roll (4) and to fix an end part

(16) of the inking or printing roll (4), the mandrel (13) and engagement means (14) being connected with a drive motor (18), the apparatus (2) further including a separate wheel-supported transport device (24) for transporting inking or printing rolls (4) between the cleaning apparatus (2) and a printing unit in a substantially horizontal, cantilevered position, in that the cleaning chamber (6) at a second end is provided with an opening (26) through which insertion and extraction of inking and printing rolls (4) occur. By simple technical means it hereby becomes possible to alleviate the work environment problems associated with transport of relatively large and heavy inking and printing rolls between the cleaning apparatus and a printing unit, and not the least handling in connection with inserting and extracting such inking and printing rolls.

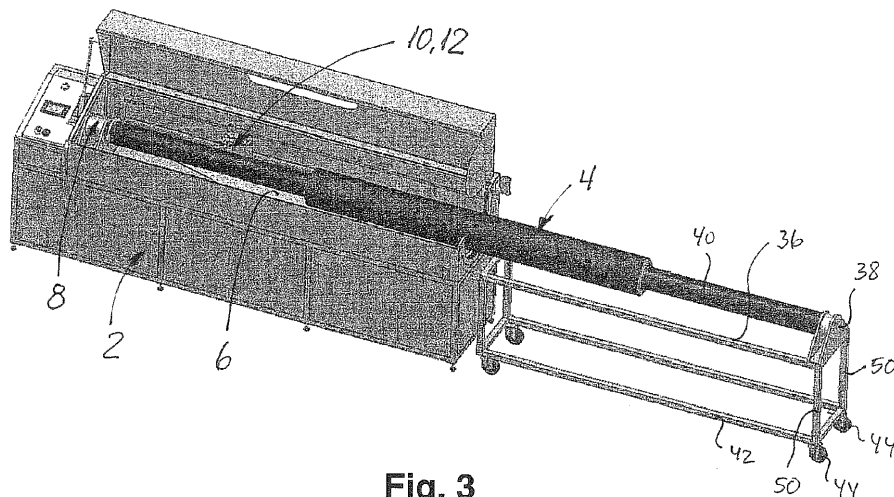


Fig. 3

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Description

Field of the Invention

[0001] The present invention relates to an apparatus for cleaning inking and printing rolls and of the type specified in the introduction of claim 1.

Background of the Invention

[0002] DE 9106454U1 describes an apparatus for cleaning items such as inking rolls and other printing unit parts for printing machines by using a water-based cleaning liquid, the apparatus including a cabinet configured as a liquid tight vat with a cover and a mesh-formed support face for items to be cleaned, a number of nozzles adapted to spray the items and a pump arranged to supply the nozzles with a cleaning liquid which is recirculated by sucking from the bottom of the vat-shaped cabinet at which a filter unit with one disposable filter is inserted between a suction branch from the vat and the nozzles.

[0003] There is described an efficient cleaning apparatus which can operate with a relatively small amount of cheap water-based cleaning liquid. This is possible because the cleaning liquid is recirculated, i.e. pumped up from the vat and cleaned efficiently by passing the disposable filter which can be discarded relatively cheaply according to current environmental requirements.

[0004] In addition to this prior art cleaning apparatus which is particularly suited for cleaning small inking rolls and other relatively small printing unit parts, larger special cleaning apparatuses are known which are adapted for cleaning larger inking rolls where the latter are arranged rotating and vertically upright during the cleaning process.

[0005] The development within the printing industry has gone in the direction that the present inking and printing rolls with time have become relatively large and heavy, causing a serious work environmental problem in connection with transport of large and heavy inking and printing rolls between cleaning apparatuses and printing machines.

Object of the Invention

[0006] On this background, it is the object of the invention to indicate an improved cleaning apparatus which by simple technical means may counteract the work environment problems associated with transport of relatively large and heavy inking and printing rolls between the cleaning apparatus and a printing unit, and not the least handling in connection with insertion and extraction of such inking and printing rolls.

Description of the Invention

[0007] The cleaning apparatus according to the invention is peculiar in that the bearing arrangements at a first

end of the cleaning chamber are constituted by a projecting, cantilevered mandrel with engagement means which are adapted to engage and support an inking or printing roll and to fix an end part of the inking or printing roll, the mandrel and the engagement means being connected with a drive motor, the apparatus further including a separate wheel-supported transport device for transporting inking or printing rolls between the cleaning apparatus and a printing unit in a substantially horizontal, cantilevered position, in that the cleaning chamber is provided at a second end with an opening through which insertion and extraction of inking and printing rolls occur. By simple technical means it hereby becomes possible to solve the work environment problems associated with transport of relatively large and relatively heavy inking and printing rolls between the cleaning apparatus and a printing unit, and not the least handling in connection with inserting and extracting such inking and printing rolls.

[0008] For use in connection with very long and heavy inking or printing rolls, the cleaning apparatus according to the invention may advantageously be designed such that a laterally projecting support with bearing is provided at the second end of the cleaning chamber, the bearing adapted to support an opposing end part of the inking or printing roll.

[0009] The cleaning apparatus according to the invention is preferably designed such that the projecting, cantilevered mandrel is provided with preferably longitudinal lamellae in that the mandrel is adapted to bear on the internal face of the substantially tubular inking or printing rolls, and that at the first end of the cleaning chamber, the engagement means are constituted by a number of lamellae which together with the lamellae on the mandrel form a ring with a diameter corresponding to the inner diameter of the inking or printing roll.

[0010] At the second end of the cleaning apparatus according to the invention, the support bearing is constituted by a central projecting journal of a short cylindrical body with axial lamellae arranged to engage between the lamellae of the mandrel.

[0011] With the object of allowing for possible differences in height of the inking or printing rolls in a printing machine and the cleaning apparatus according to the invention, respectively, it may advantageously be designed such that the separate transport device has an upper support frame part with an upwardly projecting end part from which a cantilevered, horizontal support for an inking or printing roll extends to an opposing end part of the upper support frame part which is arranged vertically adjustable relative to a wheel-supported lower support frame part.

[0012] With the object of increasing the capacity of the cleaning apparatus according to the invention, it may be advantageously designed such that the cleaning chamber is adapted for simultaneous cleaning of two or more inking or printing rolls arranged in parallel, and that the separate transport device is correspondingly adapted for simultaneous transport of two or more inking or printing

rolls arranged in parallel.

Description of the Drawing

[0013] The invention is explained more closely in the following with reference to the drawing, on which:

Fig. 1 shows a perspective view of an embodiment of a cleaning apparatus according to the invention, shown with an associated transport part for an inking or printing roll during transport to the cleaning apparatus;

Fig. 2 shows a perspective view of the cleaning apparatus shown in Fig. 1 where the transport part is disposed opposite the cleaning apparatus which is ready for receiving the inking or cleaning roll;

Fig. 3 shows a perspective view of the cleaning apparatus shown in Fig. 1 where the transport part is disposed opposite the cleaning apparatus during transfer of the inking or cleaning roll to the cleaning apparatus;

Fig. 4 shows a detail in perspective view of an embodiment of a projecting, cantilevered rotor for insertion into and fixation of an end part of an inking or cleaning roll when located in the cleaning apparatus;

Fig. 5 shows a detail in perspective view of an embodiment of a special end part for insertion into and supporting an opposing end part of an inking or cleaning roll when located in the cleaning apparatus;

Fig. 6 shows a detail in perspective view of the end part, cf. Fig. 5, during insertion into the opposing end part of the inking or printing roll;

Fig. 7 shows a detail in perspective view of the end part, cf. Fig. 5 and 6, where it is rotatably supported on a projecting support bearing;

Fig. 8 shows a perspective view of the cleaning apparatus with correctly disposed and rotatably fixed inking or printing roll;

Fig. 9 shows a plan view of the cleaning apparatus, cf. Fig. 8, as seen from the end and with an open lid;

Fig. 10 shows a plan view of the cleaning apparatus, cf. Fig. 8, as seen from the end and with closed lid;

Fig. 11 shows a perspective view of the cleaning ap-

paratus, cf. Fig. 8, where a structural cover at the left end of the apparatus is removed such that the bearing for the support bearing, cf. Figs. 5 - 7, and associated gear motor can be seen;

Fig. 12 shows a detail in perspective view of bearing and gear motor, cf. Fig. 11;

Fig. 13 shows a plan view of the bearing part, cf. Fig. 5 - 7, with associated gear motor;

Fig. 14 shows a perspective view of a preferred embodiment of an apparatus according to the invention with a projecting, cantilevered mandrels for receiving an inking or printing roll during cleaning of the latter;

Fig. 15 shows a detail in perspective view of the mandrel, cf. Fig. 14;

Fig. 16 shows a detail in perspective view of an outer end part of the mandrel, cf. Fig. 14;

Fig. 17 shows a detail in perspective view of a supported end part of an extra long mandrel, cf. Fig. 14;

Fig. 18 shows a perspective view of the mandrel, cf. Figs. 14 and 17, respectively; and

Fig. 19 shows a detail in perspective view of an end part with journal for mounting by a free end of an extra long mandrel, cf. Fig. 14.

Detailed Description of the Invention

[0014] Figs. 1-3 show an embodiment of a cleaning apparatus 2 according to the invention, the apparatus 2 with associated transport device 24 shown and described as adapted for cleaning one inking or printing roll 4 at a time, but which, cf. claim 6, can be adapted to clean and transport, respectively, two or more inking or printing rolls 4 at the same time, as the cleaning chamber 6 and the transport device 24, respectively, relatively simply can be extended to handle the desired number of inking or printing rolls 4 simultaneously.

[0015] In Fig. 1 appears how an inking or printing roll 4 by means of a transport device 24 arrives at the cleaning apparatus 2, supported on a projecting support 40 that project horizontally from an upwardly projecting end part 38 of an upper support frame part 36 of the transport device 24, which also includes lower support frame part 42 with swivelling wheels 44.

[0016] The upper support frame part 36 of the transport device 24 may suitably be vertically adjustable relative to the lower support frame part 42, as the corner connections between the upper support frame part 36 and the

lower support frame part 42 may be constituted by telescoping leg supports 50 such that the vertical adaptation between the transport device 24 and the insertion opening 26 to the cleaning chamber 6 may occur completely trouble-free.

[0017] In Fig. 2, the transport device 24 is provided with its horizontal support 40 with the inking or printing roll 4 opposite the opening 26 and aligned with a horizontally projecting support in the cleaning chamber 6. In Fig. 3, it is then seen how the inking or printing roll 4 is on its way into the cleaning chamber 6.

[0018] Fig. 4 shows how and end part 16 of the inking or printing roll 4 can be inserted over engagement means 14 in the form of flexible lamellae 30 which together form a ring and which are adapted to expand radially by axial displacement of an internal cone.

[0019] Figs. 5-7 show how an opposing end part 22 of the inking or printing roll 4 is provided with a journal 32 on a cylindrical end part with axial lamellae 34 intended for insertion into an open end part 22 and between the horizontal lamella supports 28 internally of the inking or printing roll 4 such that the journal 32 can be supported on a laterally projecting support bearing 20.

[0020] Figs. 8 and 9 show the cleaning apparatus 2 with inking or printing roll 4 inserted, i.e. ready for starting the cleaning procedure itself if only the lid 46 with the semi-circular lid 48 for the cleaning chamber 6 has been pivoted down to closed position, cf. Fig. 10.

[0021] It appears more clearly in Fig. 11 that the longitudinal, horizontal bearings for the inking or printing roll 4 extending between the engagement means 14, 30 and the opposing end part 22 of the inking or printing roll 4 are constituted by horizontal lamella supports 28.

[0022] Figs. 12 and 13 serve to illustrate how the engagement means 14, 30 are drivingly connected with an electric gear motor 18 via a gearing.

[0023] Fig. 14 shows a projecting, cantilevered mandrel 13 which is rotatably seated at the first end of the cleaning chamber 6, and which is drivingly connected with the electric drive motor 18.

[0024] On Fig. 15 appears an inner end part of the mandrel 13 which between the longitudinal lamellae 30, 34 consisting of an anti-friction material is provided with short lamellae 14 that act as the indicated engagement means as they ensure a firm and rotationally rigid connection between the mandrel 13 and the inner side of the tubular inking or printing rolls 4. In the art these are often termed "printing sleeves".

[0025] The length of the cantilevered mandrel 13 will in practice be adapted to the current length of the inking or printing rolls 4 in the actual printing facility; however, in practice it is to be noted that the cleaning apparatus 2 and the transport device 24, respectively, according to the invention in principle can be operated with tubular inking or printing rolls 4 with a length of 800 - 4000 mm.

[0026] By long inking or printing rolls 4 with a length of more than 2000 mm, it is intended to use an external support or support bearing 20 for the free end 22 of the

inking or printing roll 4, as e.g. shown in Figs. 16-19.

[0027] Finally, it is to be mentioned that the indicated and described cleaning apparatus with associated transport device can be modified within the scope of the invention, as the cleaning apparatus may be adapted with a cleaning chamber with several storeys, i.e. with several superposed rotatable cantilevered mandrels for receiving inking or printing rolls.

[0028] In that case, the associated transport device may either be adapted with several horizontal support bearings with the desired number of inking or printing rolls arranged upon one another, or be arranged with additional vertically adjustable horizontal support bearings.

Reference numbers of the drawing

[0029]

20	2	cleaning apparatus
	4	inking or printing roll
	6	cleaning chamber
25	8	bearing arrangement
	10	cleaning means
30	12	nozzles
	13	projecting, cantilevered mandrel
	14	engagement means (lamellae of elastic material)
35	16	end part of inking or printing roll
	18	drive motor
40	20	support bearing
	21	end support part
	22	opposing end part of the inking or printing roll
45	24	transport device
	26	opening for cleaning chamber
50	28	horizontal lamella supports
	30	lamellae of elastic material
	32	journal
55	34	axial lamellae
	36	upper support frame part

- 38 upwardly projecting end part
- 40 horizontal support
- 42 lower support frame part
- 44 swivelling wheel
- 46 lid for cleaning chamber
- 48 semi-circular lid
- 50 telescoping leg supports

Claims

1. An apparatus (2) for cleaning inking or printing rolls (4), in particular Anilox rolls or gravure cylinders (printing sleeves), and which includes an elongate cleaning chamber (6) with bearing arrangements (8) for one or more inking or printing rolls (4) such that the rolls can be brought to rotate during the cleaning process, as active cleaning means (10) are arranged in the cleaning chamber (6) and adapted for being displaced along the rotating inking or printing rolls (4), the cleaning means (10) including one or more nozzles (12) for supplying cleaning liquid which is recirculated after passage of a filter, and optionally a brush, **characterised in that** the bearing arrangements (8) at a first end of the cleaning chamber (6) are constituted by a projecting, cantilevered mandrel (13) with engagement means (14) which are adapted to engage and support an inking or printing roll (4) and to fix an end part (16) of the inking or printing roll (4), the mandrel (13) and the engagement means (14) being connected with a drive motor (18), the apparatus (2) further including a separate wheel-supported transport device (24) for transporting inking or printing rolls (4) between the cleaning apparatus (2) and a printing unit in a substantially horizontal, cantilevered position, **in that** the cleaning chamber (6) is provided at a second end with an opening (26) through which insertion and extraction of inking and printing rolls (4) occur.
2. A cleaning apparatus (2) according to claim 1, **characterised in that** a laterally projecting support with bearing (20) is provided at the second end of the cleaning chamber (6), the bearing (20) adapted to support an opposing end part (22) of the inking or printing roll (4).
3. A cleaning apparatus (2) according to claim 1 or 2, **characterised in that** the projecting, cantilevered mandrel (13) is provided with preferably longitudinal lamellae, **in that** the mandrel is adapted to bear on the internal face of the substantially tubular inking or

printing rolls, and at the first end of the cleaning chamber (6), that the engagement means (14) is constituted by a number of lamellae (30) which together with the longitudinal lamellae on the mandrel (13) form a ring with a diameter corresponding to the inner diameter of the inking or printing roll (4).

4. A cleaning apparatus (2) according to claim 1 or 2, **characterised in that** the bearing (20) is constituted by a central projecting journal (32) of a short cylindrical body with axial lamellae (34) arranged to engage between the lamellae of the mandrel (13).
5. A cleaning apparatus (2) according to claim 1, **characterised in that** the separate transport device (24) has an upper support frame part (36) with an upwardly projecting end part (38) from which a cantilevered, horizontal support (40) for an inking or printing roll (4) extends to an opposing end part of the upper support frame part (36), which is arranged vertically adjustable relative to a wheel-supported lower support frame part (42).
6. A cleaning apparatus (2) according to claim 1, **characterised in that** the cleaning chamber is adapted for simultaneous cleaning of two or more inking or printing rolls arranged in parallel, and the separate transport device is correspondingly adapted for simultaneous transport of two or more inking or printing rolls arranged in parallel.

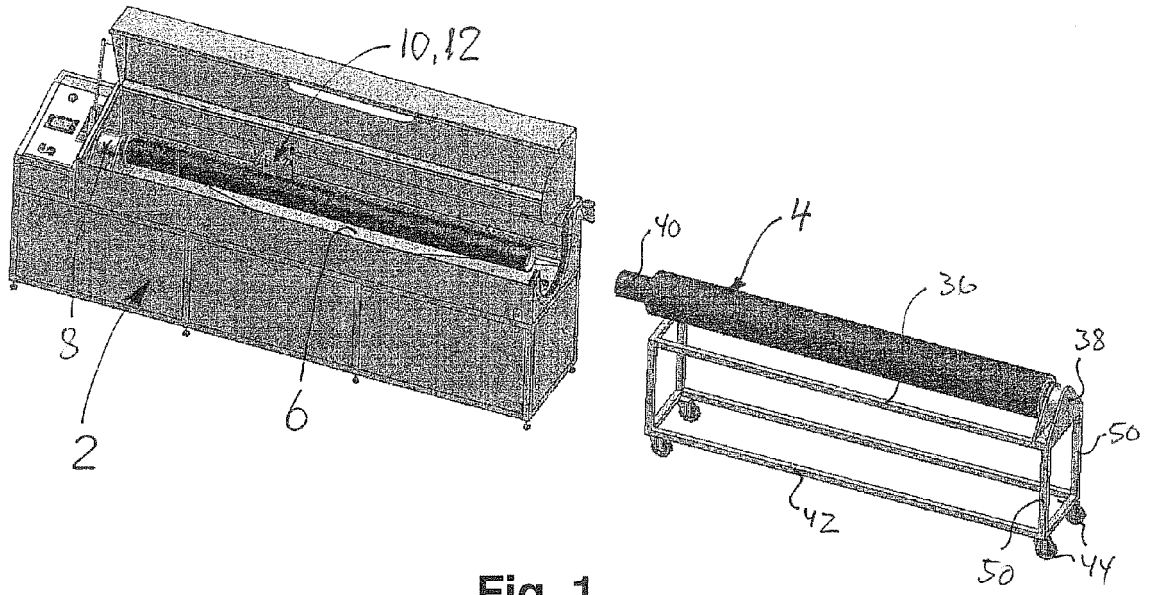


Fig. 1

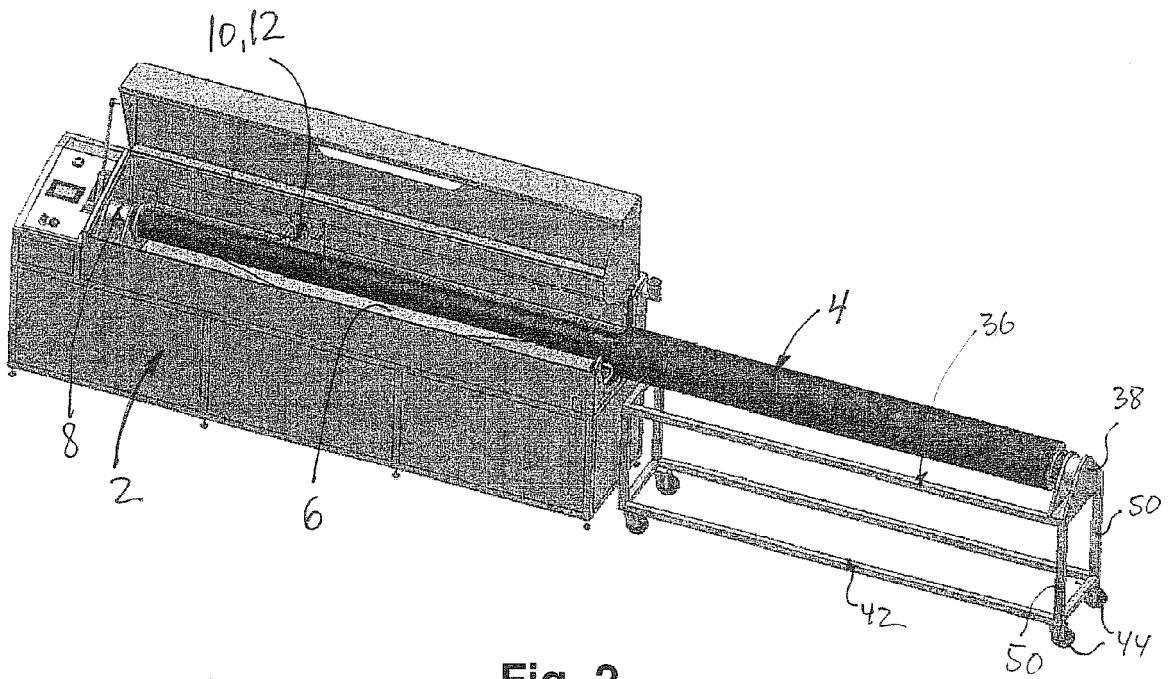
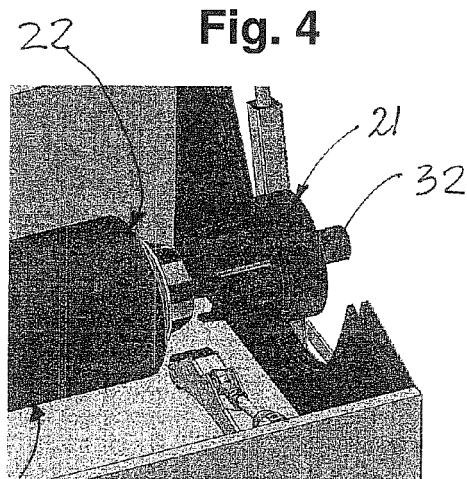
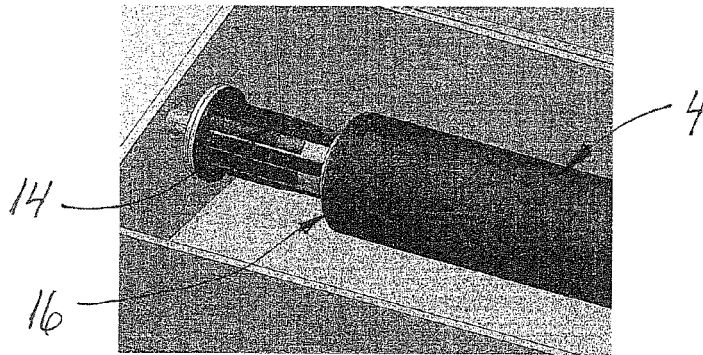
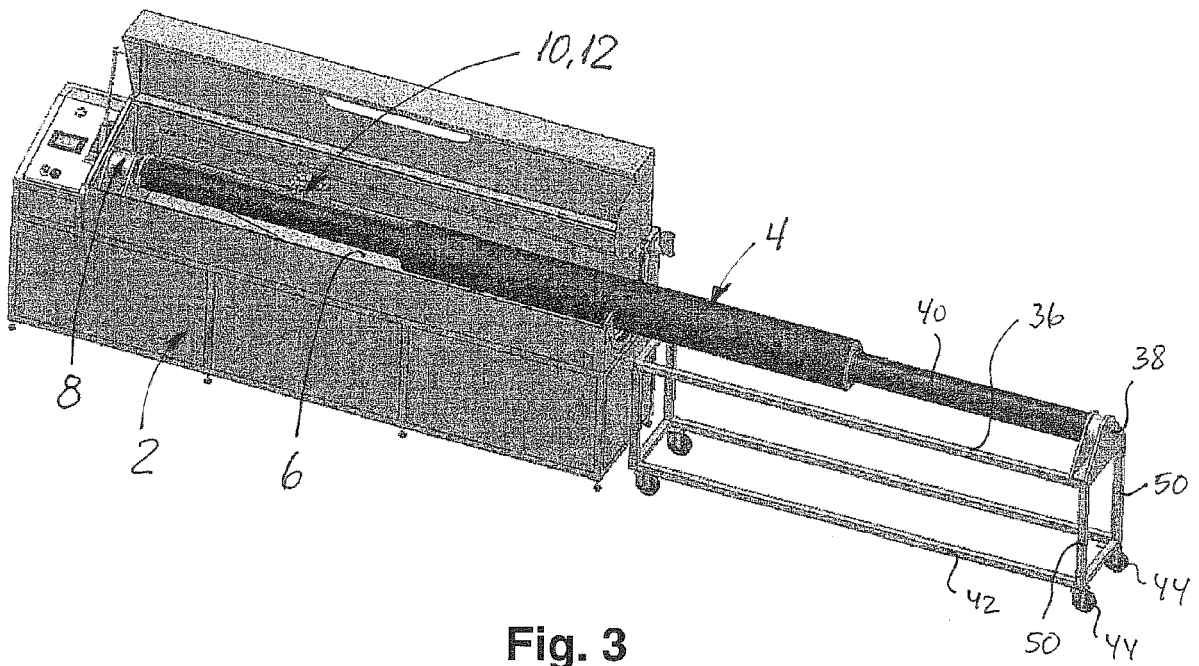


Fig. 2



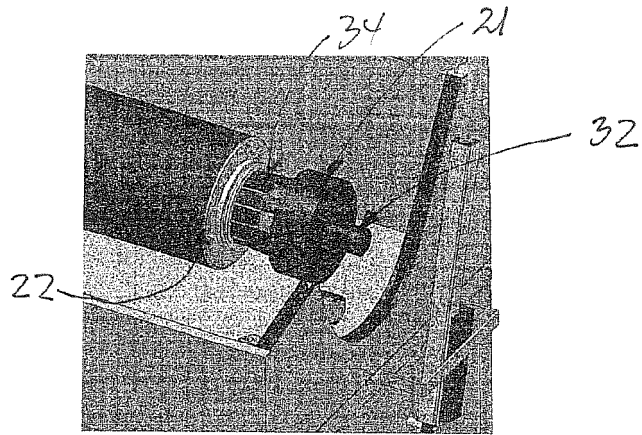


Fig. 6

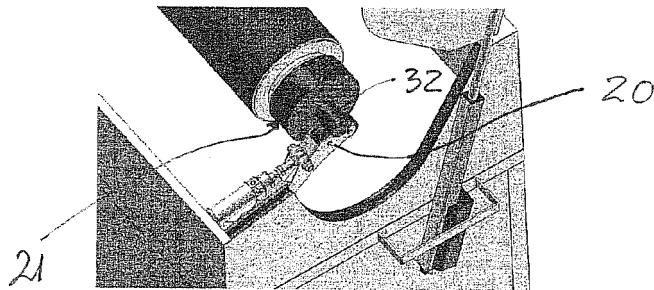


Fig. 7

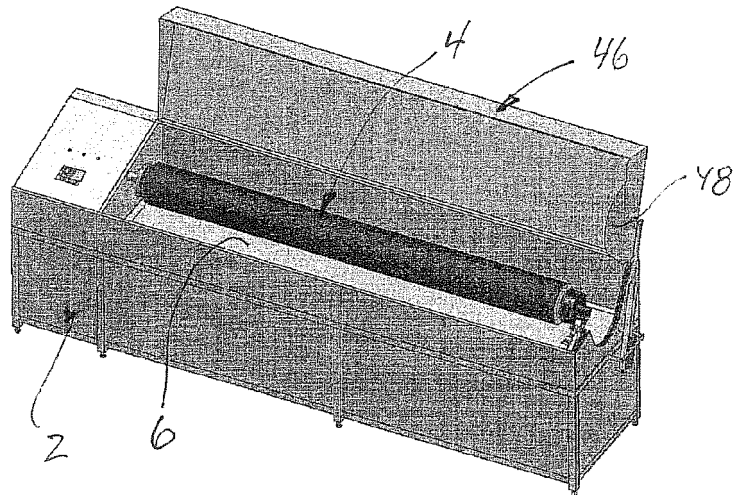


Fig. 8

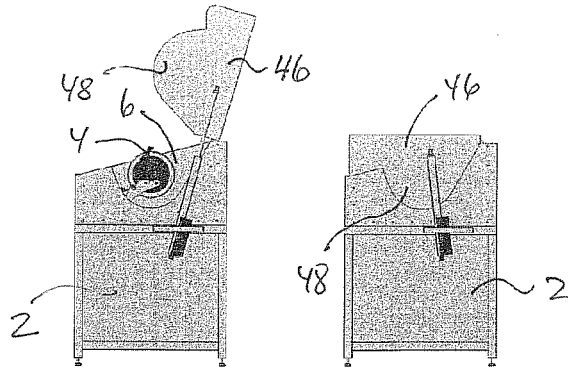


Fig. 9

Fig. 10

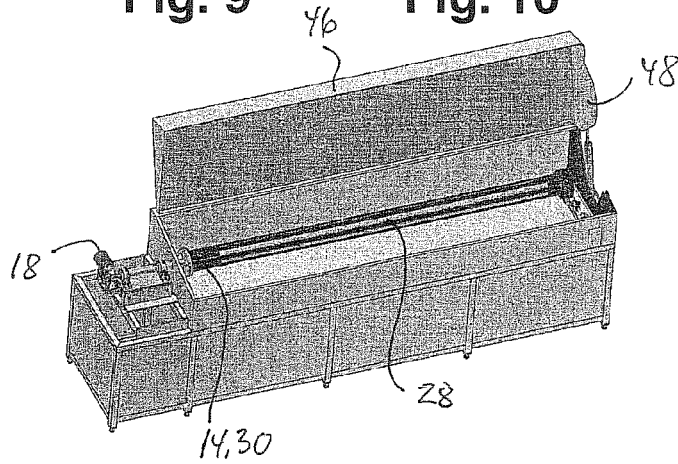


Fig. 11

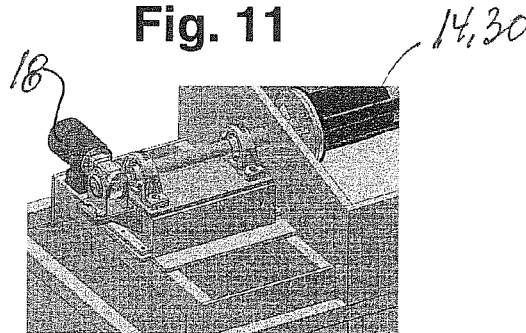


Fig. 12

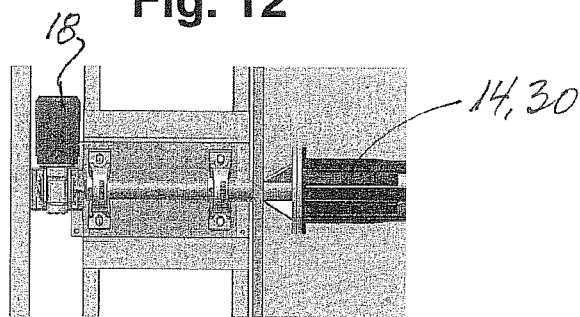


Fig. 13





EUROPEAN SEARCH REPORT

Application Number
EP 12 15 0730

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 852 257 A2 (BIEFFEBI SPA [IT]) 7 November 2007 (2007-11-07)	1-4	INV. B41F35/00 B41F35/02 B41F35/04
Y	* abstract * * claims 1, 3-4, 19 * * paragraphs [0007], [0011], [0014], [0019], [0022] - [0024], [0026], [0028], [0035], [0050] - [0053], [0058] * * figures 1-9 *	1-6	
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A	----- GB 15022 A A.D. 1913 (BECKER KARL [DE]) 13 November 1913 (1913-11-13) * page 1, lines 5-7 * * page 2, lines 8-12 *	3,4	----- TECHNICAL FIELDS SEARCHED (IPC) B41F B08B F16C F16D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 30 March 2012	Examiner Bellofiore, Vincenzo
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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30-03-2012

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REFERENCES CITED IN THE DESCRIPTION

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