(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 020 524**
B2

(12) # NEW EUROPEAN PATENT SPECIFICATION

(45) Date of publication of the new patent specification : **21.10.87**

(51) Int. Cl.⁴ : **D 01 G 15/82**

(21) Application number : **79901391.7**

(22) Date of filing : **02.11.79**

(86) International application number : **PCT/GB 79/00175**

(87) International publication number : **WO/8000981 (15.05.80 Gazette 80/11)**

(54) **TEXTILE CARDING APPARATUS.**

(30) Priority : **03.11.78 GB 4320978**

(43) Date of publication of application : **07.01.81 Bulletin 81/01**

(45) Publication of the grant of the patent : **08.08.84 Bulletin 84/32**

(45) Mention of the opposition decision : **21.10.87 Bulletin 87/43**

(84) Designated contracting states : **CH DE FR GB**

(56) References cited :
DE-A- 2 711 175
FR-A- 1 297 857
GB-A- 1 070 792
US-A- 2 719 338
US-A- 3 377 665
US-A- 3 486 309
US-A- 3 736 625

(73) Proprietor : **HOLLINGSWORTH (U.K.) LIMITED**
Scaitcliffe Street P.O. Box 55
Accrington Lancashire BB5 0RN (GB)

(72) Inventor : **WHITELEY, John**
11 Chatburn Park Drive Clitheroe BB7 2AY
Lancashire (GB)
Inventor : **LANE, Robert**
94 Bellfield Road Accrington
Lancashire (GB)
Inventor : **WILD, Gerald**
Farheight Nook Pickup Bank
Near Darwan Lancashire (GB)

(74) Representative : **Barlow, Roy James et al**
J.A.KEMP & CO. 14, South Square Gray's Inn
London WC1R 5EU (GB)

EP 0 020 524 B2

Description

The present invention relates to a textile carding apparatus for processing textile fibres, having a sliver coiler provided with suction means for removing dust and fly from a region within a hood thereof.

In conventional textile carding apparatus for example, the carding machine comprises a main framework supporting a material feeding arrangement, a taker-in cylinder, a main cylinder with adjacent revolving or stationary flats, a doffing system and a sliver deposition apparatus in the form of a sliver coiling mechanism. The function of the coiler is to receive the condensed web from the doffing arrangement and deposit it in sliver form into a sliver can or similar receptacle. During this coiling operation material fed to the coiler releases dust and fly into the atmosphere, particularly in the region where the material is made to change direction on its path to the coiler as for example, around a sliver guide roller and as it enters the aperture in the rotating coiler plate. This release or liberation of dust and fly can be a hazard to the health of any carding operative in the vicinity of the carding machine or even an operative working within the room containing the carding machine. It is therefore of the greatest importance that the egress of dust and other injurious elements be prevented from polluting the air surrounding the carding machine. Additionally and importantly by removing dust and fly from the sliver a cleaner material results and in this respect a material more suitable for feeding to the rotor of an open-end spinning machine is provided. In the open-end spinning process dust and trash are undesirable elements in spinning. Collection of dust within the spinning rotor can cause repeated end breaks and also contamination of the resultant yarn.

An apparatus for removing dust and fly by suction from the regions adjacent to a textile carding machine is disclosed in British Patents Nos. 1,138,220 and 1,070,792. In the former, a duct branch is extended from a main duct so that its open end overlies the sliver coiling mechanism to suck dust-laden air from this region. However it is believed that this proposal would not remove dust and fly from this region to a required degree of efficiency. Likewise, in the latter, suction is applied in the region where the sliver enters the coiler region.

The way in which the present invention is characterised will be evident from the characterising portion of claim 1.

Preferably the sliver within the hood may pass over at least one rotatable sliver guide roller above the sliver coiling apparatus and around which the sliver is caused to divert in its passage to the sliver coiling apparatus.

The sliver coiler hood may be a double hood which includes an inner hood which is localised within the outer hood and is in the region of a coiler plate of the sliver coiler, the spaced support points defining the unsupported length of the sliver between the inner and outer hoods, and the suction being applied to a second suction means connected to the interior of the inner hood to remove dust and fly therefrom as well as to the first-mentioned suction means to the interior of the outer hood.

The following is a more detailed description of one embodiment of the invention by way of example, reference being made to the accompanying drawings in which :

Figure 1 is a schematic view of the doffing and coiling apparatus of a carding machine which also illustrates the sliver path from doffer to coiler ;

Figure 2 is a sectional plan view of the coiler dust hood along the line II-II of Figure 3 showing its positioning over the coiler, and

Figure 3 is a sectional side elevation of the coiler dust hood along the line III-III of Figure 2.

With reference to the drawings a carding machine doffing and coiling arrangement receives a web of fibres carded on a main cylinder 1. This carded web 2 is taken from the main cylinder 1 by the doffer 3. A roller doffing arrangement is then used to strip the carded web from the doffer 3. This roller doffing arrangement comprises a doffing roll 4 with a blade 5 followed by a redirecting roller 6 and a pair of crush rolls 7 and 8. The carded web is then removed by a belt doffing device 9 which compresses the carded web into a sliver 11 which is then further compressed by passing it through the trumpet guide 10. This trumpet guide 10 leads the sliver 11 into the drawbox 12 which is indicated by dotted line in Figure 1.

The sliver 11 then passes through tongue and groove rollers 13 and 14 around the guide 15 and upwardly to a first grooved sliver guide roller 16 on to a second grooved sliver guide roller 17 and downwardly into a coiler 18. The sliver is then coiled in conventional fashion and deposited into a sliver can 19 which is held stationary by retaining arms 20. The sliver can illustrated is supported on castors 21.

Over the coiler 18 an outer dust hood 22 is provided to inhibit dispersion of the dust and fly liberated from the sliver as it changes direction over the grooved rollers 16 and 17.

The outer dust hood 22 comprises a hollow casing of sheet material, which may, for example, by polycarbonate. This material is suitable since its antistatic properties deter the adherence of dust and fly to the surfaces of the hood and also because its transparency permits observance of conditions existing within the hood during operation. Alternatively the hood may be formed from sheet metal. A rim 23 of strip metal extends around the base of the hood 22 so as to give rigidity to the hood. The hood 22 is attached to a casing 24 of the coiler 18 by a hinge 25 which permits the hood to be raised from the closed

position as shown in the drawings to an open position so as to allow threading up of the sliver to the coiler. A counterbalance device may be used to allow the hood 22 to be placed in an open, intermediate or closed position. In the closed position the rim 23 engages a raised stop 26 on an upper surface of the coiler casing 24 so as to provide an air inlet clearance 27 between the hood 22 and the casing 24 for a purpose hereinafter described.

The grooved roller 16 is mounted for free rotation on a bracket 28 and the grooved roller 17 is similarly mounted for free rotation on a bracket 29. The brackets 28 and 29 are interconnected by a metal strip 30 and supported from the casing of the coiler 18.

In operation the inside of the hood is subjected to suction. This suction is applied through an outlet hole 31 formed in the coiler casing 24 which communicates with a duct 32 provided in a block 33 attached to the underside of the coiler casing 24. The duct 32 is connected to a suction pipe 34 through the side of the coiler casing 24 which leads to a source of suction 35 shown schematically in Figure 1.

When the carding machine is in operation, dust and fly are liberated from the sliver particularly as it passes around the grooved rollers 16 and 17. The suction source 35 draws air through the clearance 27 between the hood 22 and the coiler casing 24 and from the interior of the hood through the hole 31 and then through the duct 32 and the pipe 34 to a waste collection point. The dust and fly liberated from the sliver 11 within the hood 22 are entrained by the airstream passing through the hood 22 and are conveyed thereby to the waste collection point.

Additionally, it has been found that dust and fly tend to be liberated from the sliver 11 as it enters an aperture 36 provided in a rotating coiler plate 37 which is offset from the axis of rotation of the coiler plate. To remove dust and fly from this region the coiler plate 37 is enclosed by a localised inner hood 38 the interior of which communicates with the suction source 35. The inner hood 38 comprises an upright side wall 39 which encircles the coiler plate 37 and is concentric therewith. The side wall 39 is secured to the coiler casing 24 by a plurality of brackets 40 and is provided around its top edge with a seal 41 which may consist of felt or similar material. A circular cover 42 extends over the coiler plate 37 and has a sliver inlet hole 43 at a position above the aperture 36 in the coiler plate 37. The cover 42 is located with respect to the coiler plate 37 by a locating pin 44 fixed to the coiler plate 37 and projecting through a locating hole 45 in the cover 42. Driving of the cover 42 in synchronism with the coiler plate 37 is effected by a setscrew 46 which passes through the cover 42 and screws into a stud 47 located in the coiler plate 37. Between the head of the setscrew 46 and the cover 42 is a spring 48 which lightly presses the cover 42 into contact with the seal 41.

The interior of the inner hood 38 is connected to the suction source 35 by an outlet pipe 49 which is formed so as to communicate through the coiler casing 24 with the duct 32.

In operation, a portion of the air drawn into the interior of the hood 22 enters the interior of the inner hood 38 along with the sliver 11 as it passes through the sliver inlet hole 43 in the cover 42. The fibres of the sliver 11 are disturbed as they enter the aperture 36 resulting in the liberation of dust and fly from the sliver 11 in this region. The liberated dust and fly is entrained in the airstream exiting from the inner hood 38 through the outlet pipe 49 to join in the duct 32 with the dust and fly removed from within the hood 22 so as to be conveyed to a suitable waste collection point.

If desired, an additional air inlet 50 may be provided in the hood 22 at a position on a side of the grooved roller 17 and the coiler plate 37 remote with respect to the outlet position of the hole 31. Thus, in operation, airflow is created which flows from the air inlet 50 across the case of the cover 42 and out through the outlet hole 31 carrying with it dust and fly liberated from the sliver as it passes around the grooved rollers 16 and 17.

If desired the raised stop 26 may be omitted so that the rim 23 rests on the coiler casing 24 whereby air is admitted to the hood 22 mainly through the air inlet 50.

In certain processing conditions the inner hood 38 may be used without the use of the outer hood 22, or, alternatively, the outer hood 22 may be used without an inner hood 38. However, particularly when processing heavily contaminated material, it is preferable to employ both the inner and outer hoods to achieve maximum cleaning efficiency.

Claims

1. Textile carding apparatus for processing textile fibres, having a sliver coiler provided with suction means for removing dust and fly from a region within a hood thereof, characterised in that the free sliver passes as an unsupported length between spaced support points (16, 17, 36) which are contained under the hood (22) of the coiler ; and in that air inlet means (27, 50) and suction means (31, 32, 34, 35) are connected to the interior of the coiler hood so as to generate an air flow through the region within the hood, thereby extracting dust and fly from the free sliver.

2. Textile carding apparatus according to claim 1, characterised in that the spaced support points contained under the hood (22) comprise at least one rotatable sliver guide roller (16, 17) above the sliver coiling apparatus (18) and around which the sliver is caused to divert in its passage to the sliver coiling apparatus.

3. Textile carding apparatus according to claim 2, characterised in that a stop (26) protrudes from an upper surface of the sliver coiling apparatus (18) and is engaged by a rim (23) of the hood (22)

so as to form a clearance (27) between the rim (23) and the upper surface of the sliver coiling apparatus constituting said air inlet means.

4. Textile carding apparatus according to claim 2 or 3, characterised in that the air inlet means comprise an air inlet port (50) formed in the hood (22).

5. Textile carding apparatus according to claim 4, characterised in that the air inlet port (50) is formed in the hood (22) at a side of the guide roller (17) opposite to the position of a suction outlet (31) for the hood.

6. Textile carding apparatus according to any one of claims 1 to 5, characterised in that the hood (22) is formed of polycarbonate.

7. Textile carding apparatus according to claim 1, in which the sliver coiler is a double hood, characterised by the fact that the double hood includes an inner hood (38) which is within the outer hood (22) and is localised in the region of a coiler plate (37) of the sliver coiler ; in that the spaced support points (16, 17) define the unsupported length of the sliver between the inner and outer hoods (38 and 22) ; and in that the suction is applied to a second suction means (49) connected to the interior of the inner hood (38) to remove dust and fly therefrom as well as to the first-mentioned suction means (31) to the interior of the outer hood (22).

8. Textile carding apparatus according to claim 7, and including a rotatable coiler plate (37) having a hole (36) for passing the sliver therethrough characterised by air inlet means to the inner hood (38) in the form of a clearance around the periphery of the coiler plate (37) ; and in that the inner hood (38) comprises a side wall (39) surrounding the coiler plate (37) and a cover (42) having a sliver inlet hole (43) at a position offset from the axis of rotation and above the sliver hole (36) of the coiler plate ; and in that drive means (46, 47) interconnect the coiler plate (37) and the cover (42) for synchronous rotation.

9. Textile carding apparatus according to claim 8, characterised in that the side wall (39) is circular and concentric with the coiler plate (37).

Patentansprüche

1. Textilkardiervorrichtung zur Verarbeitung von Textilfasern, mit einem Bandleger, der Saugmittel zum Entfernen von Staub und Flug aus einem Bereich innerhalb einer ihm zugeordneten Haube aufweist, dadurch gekennzeichnet, daß das freie Faserband als nicht abgestützte Bahn zwischen im Abstand angeordneten, unter der Haube (22) des Bandlegers befindlichen Auflagestellen (16, 17, 36) durchläuft und daß mit dem Innenraum der Haube des Bandlegers Lufteinlaßmittel (27, 50) und Saugmittel (31, 32, 34, 35) derart verbunden sind, daß ein Luftstrom durch den Bereich innerhalb der Haube erzeugt und dadurch aus diesem Staub und Flug abgezogen werden.

2. Textilkardiervorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die unter der Haube (22) befindlichen, im Abstand angeordneten Auflagestellen wenigstens eine oberhalb der Faserbandeinlegevorrichtung (18) angeordnete drehbare Faserbandführungsrolle (16, 17) aufweisen, um die das Faserband auf seinem Weg zu der Faserbandeinlegevorrichtung umgelenkt ist.

3. Textilkardiervorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß von einer Oberseite der Faserbandeinlegevorrichtung (18) ein Anschlag (26) vorsteht, der mit einer Berandung (23) der Haube (22) derart in Eingriff steht, daß zwischen der Berandung (23) und der Oberseite der Faserbandeinlegevorrichtung ein die Lufteinlaßmittel bildender Spalt (27) ausgebildet ist.

4. Textilkardiervorrichtung nach Anspruch 2 oder 3, dadurch gekennzeichnet, daß die Lufteinlaßmittel einen in der Haube (22) ausgebildeten Lufteinlaß (50) aufweisen.

5. Textilkardiervorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß der Lufteinlaß (50) in der Haube (22) auf einer Seite der Führungsrolle (17) der Stelle eines der Haube zugeordneten Saugzugauslasses (31) gegenüberliegend angeordnet ist.

6. Textilkardiervorrichtung nach einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß die Haube (22) aus Polycarbonat besteht.

7. Textilkardiervorrichtung nach Anspruch 1, bei der der Bandleger eine Doppelhaube aufweist, dadurch gekennzeichnet, daß die Doppelhaube eine innere Haube (38) aufweist, die innerhalb der äußeren Haube (22) und in dem Bereich eines Kopftellers (37) des Bandlegers angeordnet ist ; daß die im Abstand angeordneten Auflagestellen (16, 17) die nicht abgestützte Bahn des Faserbandes zwischen der inneren und der äußeren Haube (38, 22) ausbilden und daß der Saugzug zweite Saugmittel (49) beaufschlagt, die mit dem Innenraum der inneren Haube (38) zum Abzug von Staub und Flug daraus und mit den erstgenannten zum Innenraum der äußeren Haube (22) führenden Saugmitteln (31) verbunden sind.

8. Textilkardiervorrichtung nach Anspruch 7, mit einem drehbaren Kopfteller (37), der eine Öffnung (36) zum Durchlaß des Faserbandes aufweist, gekennzeichnet durch zu der inneren Haube (38) führende Lufteinlaßmittel in Gestalt eines sich um den Umfang des Kopftellers (37) erstreckenden Spaltes ; und dadurch, daß die innere Haube (38) eine den Kopfteller (37) umgebende Seitenwand (29) und eine Abdeckung (42) mit einem Faserbandeinlaßloc (43) an einer bezüglich der Drehachse versetzten und oberhalb der Faserbandöffnung (36) des Kopftellers liegenden Stelle aufweist sowie dadurch, daß der Kopfteller (37) und die Abdeckung (42) durch eine synchrone Drehbewegung erzeugende Antriebsmittel (46, 47) miteinander verbunden sind.

9. Textilkardiervorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß die Seitenwand (39) kreisrund und konzentrisch bezüglich des Kopftellers (37) ist.

Revendications

1. Machine à carder les textiles qui permet de traiter des fibres textiles et comporte un enrouleur de ruban de fibres qui est muni de moyens d'aspiration destinés à retirer les poussières et le duvet d'une région située à l'intérieur d'un capot de celui-ci, caractérisée en ce que le ruban libre passe, sous forme d'un tronçon non supporté, entre des points de support espacés (16, 17, 36) qui sont abrités par le capot (22) de l'enrouleur, et en ce que des moyens d'arrivée d'air (27, 50) et des moyens d'aspiration (31, 32, 34, 35) sont raccordés à l'intérieur du capot d'enrouleur de manière à produire un écoulement d'air à travers la région située à l'intérieur de ce capot, extrayant ainsi du ruban libre les poussières et le duvet.

2. Machine à carder les textiles selon la revendication 1, caractérisée en ce que les points de support espacés abrités par le capot (22) comprennent au moins un galet de guidage de ruban rotatif (16, 17) situé au-dessus du dispositif d'enroulement de ruban (18) et autour duquel est dévié le ruban lors de son passage vers le dispositif d'enroulement de ruban.

3. Machine à carder les textiles selon la revendication 2, caractérisée en ce qu'une butée (26) fait saillie à partir d'une surface supérieure du dispositif d'enroulement de ruban (18) et reçoit un rebord (23) du capot (22) de manière à former un espace (27) entre le rebord (23) et la surface supérieure du dispositif d'enroulement de ruban, constituant lesdits moyens d'arrivée d'air.

4. Machine à carder les textiles selon l'une des revendications 2 et 3, caractérisée en ce que les moyens d'arrivée d'air comprennent un orifice d'arrivée d'air (50) ménagé dans le capot (22).

5. Machine à carder les textiles selon la revendication 4, caractérisée en ce que l'orifice d'arrivée d'air (50) est ménagé dans le capot (22) du côté du galet de guidage (17) opposé à l'emplacement d'une sortie d'aspiration (31) du capot.

6. Machine à carder les textiles selon l'une quelconque des revendications 1 à 5, caractérisée en ce que le capot (22) est formé d'un polycarbonate.

7. Machine à carder les textiles selon la revendication 1, dans laquelle l'enrouleur de ruban est à double capot, caractérisée en ce que le double capot comprend un capot intérieur (38) qui est situé à l'intérieur du capot extérieur (22) et est disposé dans la zone d'une plaque d'enroulement (37) de l'enrouleur de ruban, en ce que les points de support espacés (16, 17) définissent le tronçon non supporté du ruban qui est situé entre les capots intérieur et extérieur (38 et 22), et en ce que l'aspiration est appliquée sur un second moyen d'aspiration (49) raccordé à l'intérieur du capot intérieur (38) en vue de retirer de celui-ci les poussières et le duvet, ainsi que sur le premier moyen d'aspiration mentionné (31) raccordé à l'intérieur du capot extérieur (22).

8. Machine à carder les textiles selon la revendication 7 et comportant une plaque d'enroulement rotative (37) qui présente un trou (36) permettant de faire passer le ruban à travers elle, caractérisée par des moyens d'arrivée d'air au capot intérieur (38) se présentant sous la forme d'un espace s'étendant tout autour de la périphérie de la plaque d'enroulement (37), et en ce que le capot intérieur (38) comprend une paroi latérale (39) entourant la plaque d'enroulement (37) et un couvercle (42) présentant un trou (43) d'entrée du ruban en une position décalée de l'axe de rotation et située au-dessus du trou de ruban (36) de la plaque d'enroulement, et en ce que des moyens d'entraînement (46, 47) relient mutuellement la plaque d'enroulement (37) et le couvercle (42) pour les faire tourner en synchronisme.

9. Machine à carder les textiles selon la revendication 8, caractérisée en ce que la paroi latérale (39) est circulaire et concentrique avec la plaque d'enroulement (37).

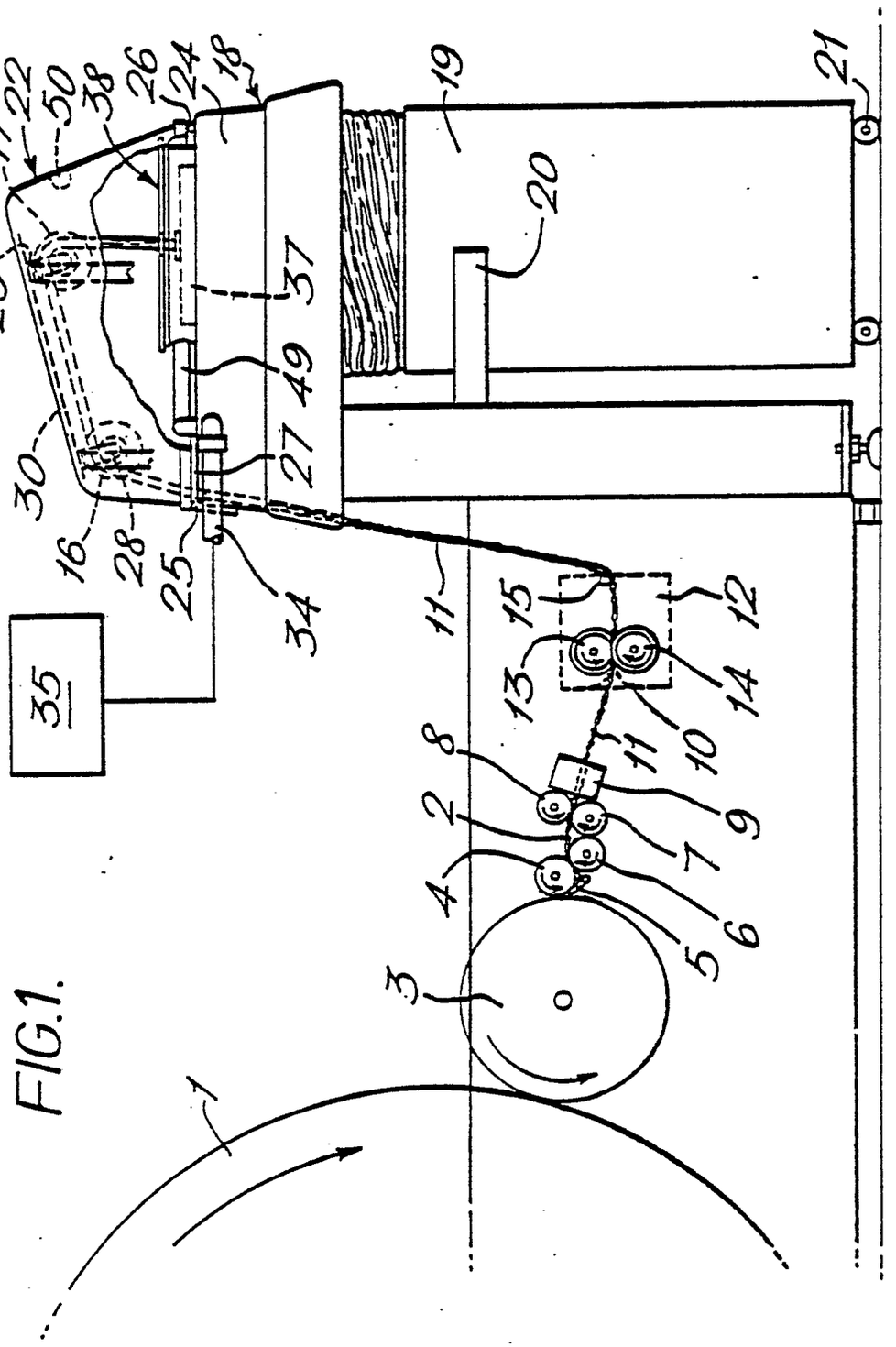

17
22
50
38
26
24
18
19
21
20
29
37
49
27
30
16
28
25
34
11
15
12
13
14
8
10
2
9
7
4
6
5
3
1
35

FIG.1.

FIG.2.

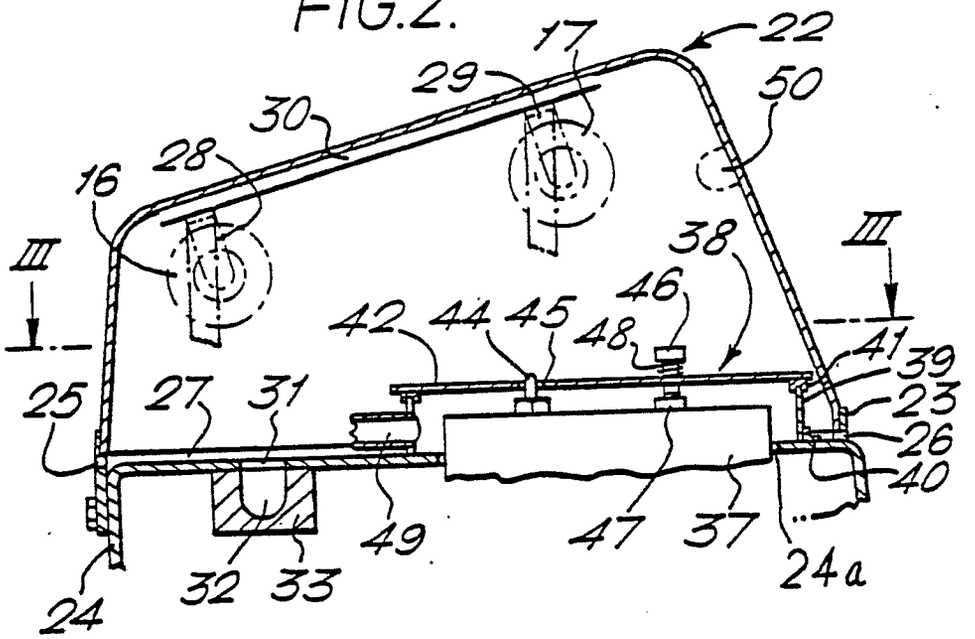
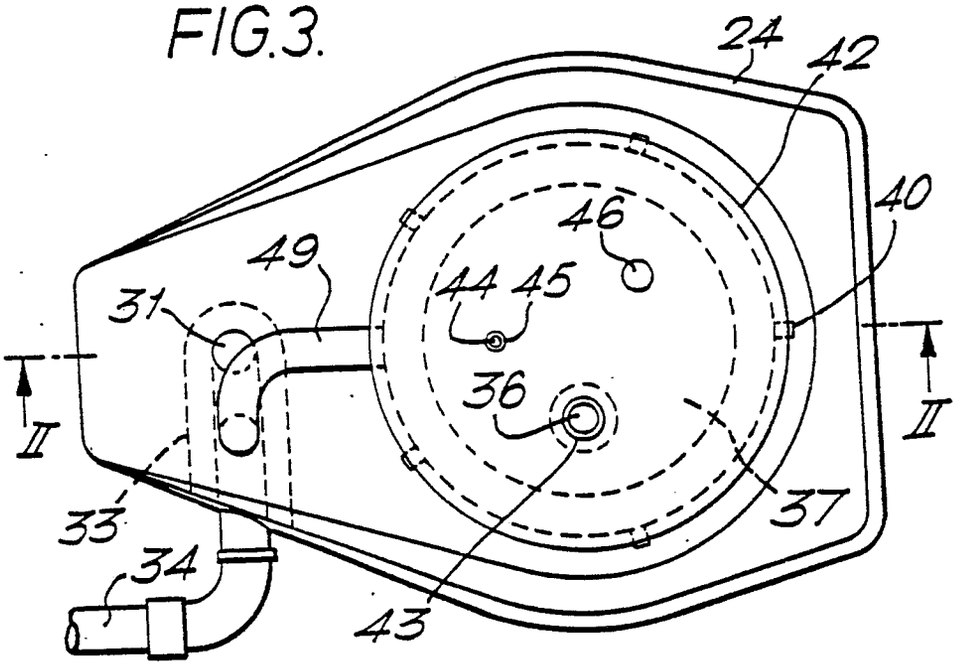

17
22
29
50
30
28
16
III
38
III
46
42
44
45
48
41
39
25
27
31
23
26
40
49
47
37
24a
24
32
33

FIG.3.


24
42
40
46
49
44
45
31
II
II
36
37
33
34
43