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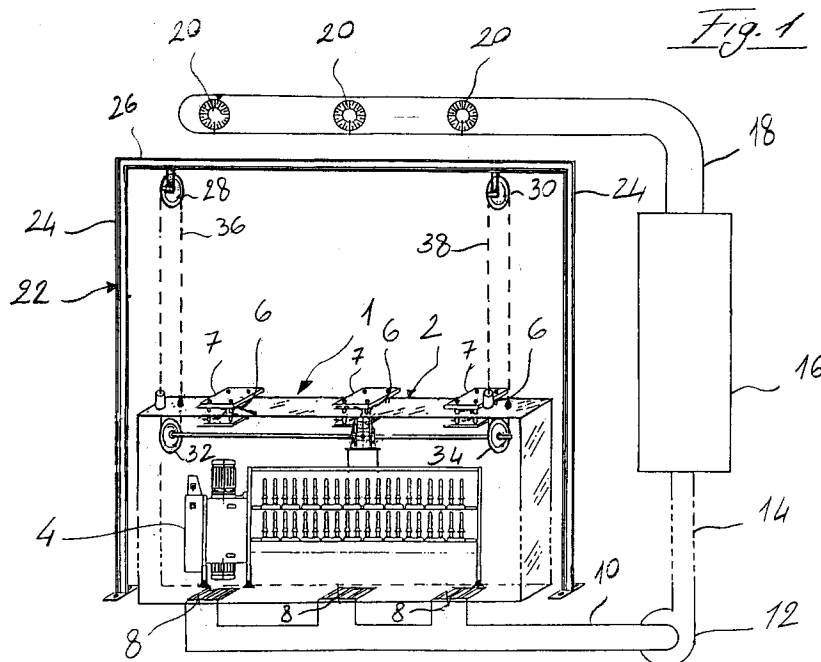
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I-20129 Milano (IT)(54) **Mobile anti-noise anti-pollution and anti-accident comprehensive protection device for textile machines.**

(57) Mobile anti-noise, anti-pollution and anti-accident comprehensive protection device for textile machines constituted by a case (2) made of a sound-

absorbent material open at its lower base and shaped in order to completely isolate a textile machine (4) from the external environment.

**EP 0 608 574 A1**

This invention refers to a mobile anti-noise, anti-pollution and anti-accident comprehensive protection device for textile machines.

As known, textile machines are usually pieces of equipment of large dimensions constituted by numerous mechanical parts in continuous alternating and rotational movement. Owing to this fact, textile machines have a high noise level which often exceeds the tolerance threshold of the human ear, thus making the working environment particularly uncomfortable for the workers.

Another problem arises during the operation of these machines: the yarns which are treated by the textile machines move at a very high speed, for example the rotating spindles turn at a speed of between 6,000 and 25,000 rpm (revolutions per minute). The high speed of rotations imparts a strong centrifugal force on the yarn which causes the detachment of particles from the yarn. These particles, as they are very light, disperse easily in the external environment and contribute to pollute the air inside the factory.

Another problem is due to the fact that the environment in which the textile machines are found is maintained at a considerable level of humidity to assist the textile handling of the yarns. These humidity levels which can arrive as high as 80% contribute to making the work environment even more uncomfortable.

Finally, since the mechanical parts of the textile machines are not protected these can cause accidents or injury to the person operating it. These accidents may become even more serious due to the high speed at which these mechanical parts move.

The object of this invention is to provide a device which is able to reduce considerably the noise generated by these machines, eliminate the dust which pollutes the air, eliminate the high level of humidity in the working environment and eliminate the danger of accidents.

These and other objectives are achieved by a mobile anti-noise, anti-pollution and anti-accident comprehensive protection device for textile machines characterized in that it is constituted by a case made of sound-absorbent material open at its lower base and shaped in order to completely isolate a textile machine from the external environment.

These and other advantages will be clearer from the following description and from the attached drawings in which:

Figure 1 is a perspective view of the device of the present invention; and

Figure 2 is a perspective view of another form of embodiment of the invention.

With reference to figure 1, number 1 indicates the device which is the object of this invention, and

it is constituted substantially by a case 2 made of sound-absorbent material. Case 2 is open at its lower base so that by making it descend from above, as described hereinafter, it can completely cover a textile machine 4. In the drawing, the case has the form of a parallelepiped, but it is evident that it may be realised in any other form in order to be better suited to the textile machine which must be isolated from the external environment.

Preferably case 2 is made of a transparent material which allows the operators to control the textile machines while they are functioning. In this way they can intervene quickly as soon as there is a problem, for example when the bobbins of yarn are running out. A transparent material suitable for this purpose is polycarbonate inasmuch as it maintains its transparent characteristics for a long time.

Case 2 is also equipped with entrance openings 6 and exit openings 8 to cause the air to circulate on the inside of the said case. Air entrance openings 6 are equipped with silencers 7. Air exit openings 8 instead of being realised on one of the walls of the case, may also be realised in the cement base on which the textile machine is mounted, as shown in figure 1.

The exit openings 8 are connected by means of a system of tubes 10 and a suction pump 12 which serves to take up the air on the inside of the case. In turn the suction pump is connected beyond, by tube 14, to a filter 16 which eliminates the impurities present in the air arriving from the case 2. The air purified by the filter 16 passing through a second tube 18 is expelled to the external environment by means of air exit holes 20 realised in said second tube.

The device 1 is furthermore equipped with means for lifting case 2 with respect to textile machine 4 in order to allow said operators to carry out maintenance operations and substitution of the yarn bobbins. The lifting means are constituted by a frame 22 which is formed by two vertical rods 24 united at the top by a horizontal transverse 26. A couple of pulleys 28, 30 are fixed rotatably to the transverse 26. At the inside of the case a second pair of pulleys 28 and 32 are fixed rotatably. Around the pulleys 28 and 32 and around pulleys 30 and 34 means 36 and 38 are arranged respectively for the transmission of the movement between the pulleys. These transmission means may be constituted by transmission belts or chains which are indicated in the drawing simply by a broken line. If transmission chains are used, the pulleys 28, 30, 32 and 34 will be toothed wheels.

The case 2 is fixed to the forward or return run of transmission means 36, 38 in order to be raised or lowered with respect to machine 4. In turn the pulleys 28, 30 are driven by motor means which are not illustrated and can be constituted for exam-

ple by an electric motor. The lifting means may also be constituted by hydropneumatic pistons.

Figure 2 represents a second form of embodiment of the invention similar to the first one, so that identical numbers represent the same parts to those represented in the form of embodiment of figure 1.

The device of figure 2 differs from the one described hereinbefore in that the air exit holes are connected to the air entrance opening 6 on case 2 by means of flexible tubes 40. Furthermore, the filter 16 may be equipped with an air humidifier which is not illustrated.

With reference to figure 1, the operation of the device is as follows: case 2 is lowered by means of the lifting means in order to completely isolate the textile machine 4 from the external environment. At this point, textile machine 4 may be started together with air suction pump 12. At the inside of case 2, the polluted air full of particles which have become detached from the yarns during working is taken up by means of pump 12 which then sends the air towards filter 16 which eliminates the dust from the air, finally the cleaned air is returned to the external environment passing subsequently along tube 18 and exit holes 20.

The case 2, as already stated, is equipped with silencers 7 in order to prevent noise from passing to the inside of the machine room by passing through the entrance openings 6.

In this first form of embodiment the air is humidified by means of a humidifier present on the inside of the machine room where the textile machine is contained.

With reference to figure 2 it is emphasized that the functioning of the second form of embodiment is identical to that of the form of embodiment 1 and is different only in that the air going out of holes 20 is conducted directly to the case by means of flexible tubes 40. In this way there is no need for the case to be equipped with silencers 7 in that the movement of the air occurs in a closed circulation system and therefore there is no noise dispersion to the outside of the case 2. Furthermore, this form of embodiment avoids the need to humidify the whole machine room environment with considerable energy saving. In fact, since a closed circulation system is concerned the humidifier may be positioned on the inside of said system. In the illustrated example it has been positioned on filter 16.

It is emphasized that the device has achieved the proposed objectives. In fact, it prevents the dispersion of noise and polluted air inside the working environment, and in the case of the second form of embodiment, it also allows the humidity of the working environment to be reduced.

The device described may then be further improved by equipping it with a seal made of elastomeric material or another material suitably arranged along the perimeter of the lower base of case 2. This seal when it is in the lowered position completely adheres to the base of the textile machine 4. Thus, the seal prevents vibrations transmitted to the ground by the machine from being in turn transmitted to the case which in turn causes it to vibrate and so create noise. Furthermore, the seal prevents noise created by the machine from going out of the cracks which form between the outside edge of the case and the irregularities of the base. The seal also prevents the polluted air contained in the inside of the case from passing to the outside environment.

It is also emphasized that the continuous suction of the air obtained by means of pump 12, prevents the particles contained on the inside of the case from falling back onto the moving parts of the machine 4, causing possible breakdowns. This fall is assisted by the high level of humidity in the air contained in case 2 as the humidity is absorbed by the particles causing them to become heavier.

Lastly, it is emphasized that case 2 of the device may be provided with openings equipped with doors which allow simple maintenance of the machine or substitution of the yarn bobbins this avoiding the need to completely lift the case 2 with respect to the textile machine 4.

Claims

1. Mobile anti-noise, anti-pollution and anti-accident comprehensive protection device for textile machines characterized in that it is constituted by a case (2) made of a sound-absorbent material open at its lower base and shaped in order to completely isolate a textile machine (4) from the external environment.
2. Device according to claim 1, characterized in that it is equipped with entrance openings (6) and exit openings (8) for the circulation of air inside the case (2).
3. Device according to claim 2, characterized in that the entrance openings (6) are equipped with silencers (7).
4. Device according claim 2, characterized in that the exit openings (8) are connected to a suction pump (12) to take up the air from the inside of the case (2).
5. Device according to claim 4, characterized in that the suction pump (12) is connected to a filter (16) for cleaning the air going out of the

case (2).

6. Device according to claim 5, characterized in that the filter (16) is connected to the air openings (6) for entrance of cleaned air to the inside of the case (2). 5
7. Device according to claim 4, characterized in that the filter is equipped with an air humidifier. 10
8. Device according to claim 1, characterized in that the case is equipped with means for raising and lowering the case (2) with respect to the textile machine (4). 15
9. Device according to claim 1, characterized in that the case (2) is made of transparent material.
10. Device according to claim 9, characterized in that the case (2) is made of polycarbonate. 20
11. Device according to claim 2, characterized in that the perimeter of the lower base of the case (2) is provided with a seal. 25
12. Device according to claim 11, characterized in that the seal is made of elastomeric material.

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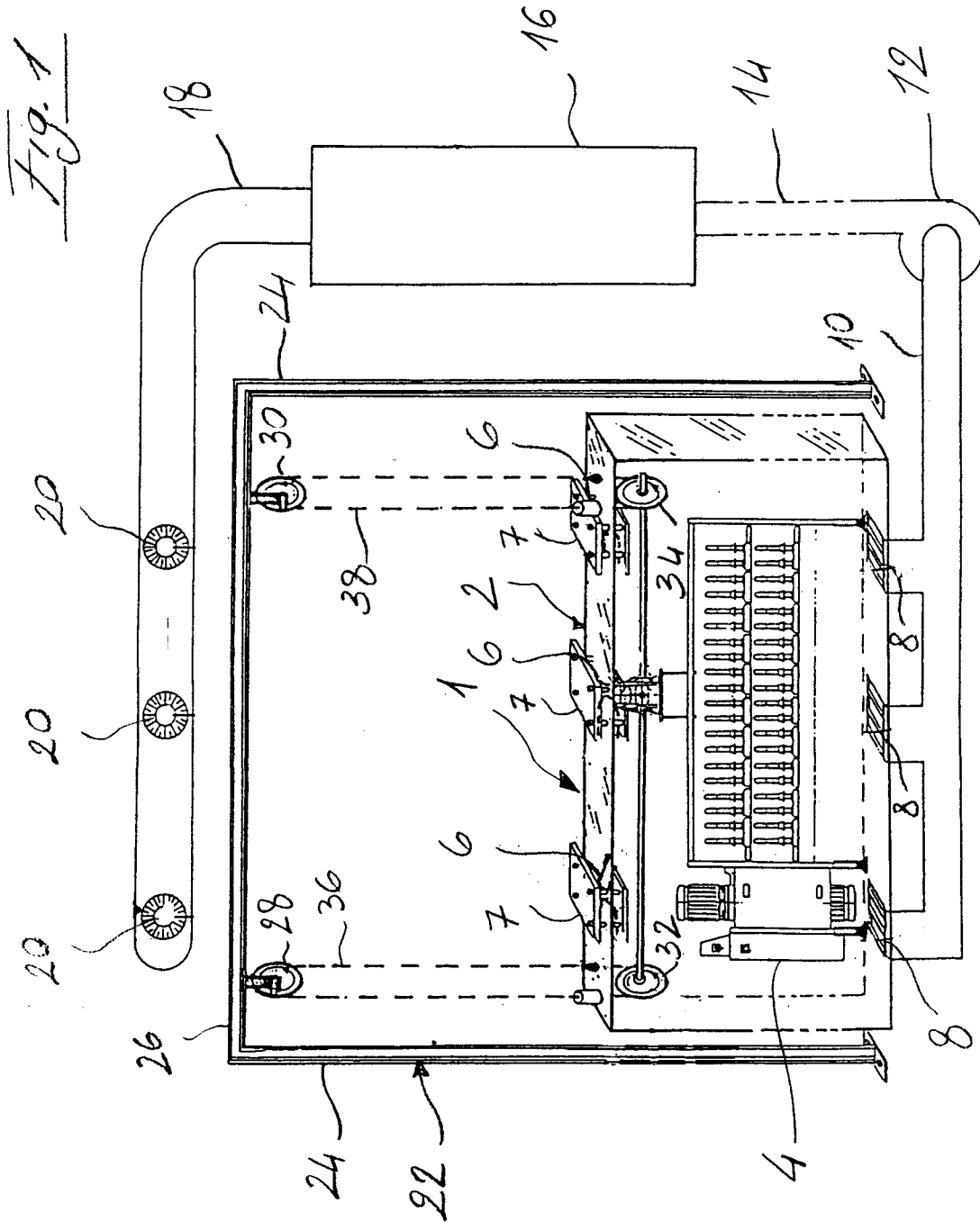
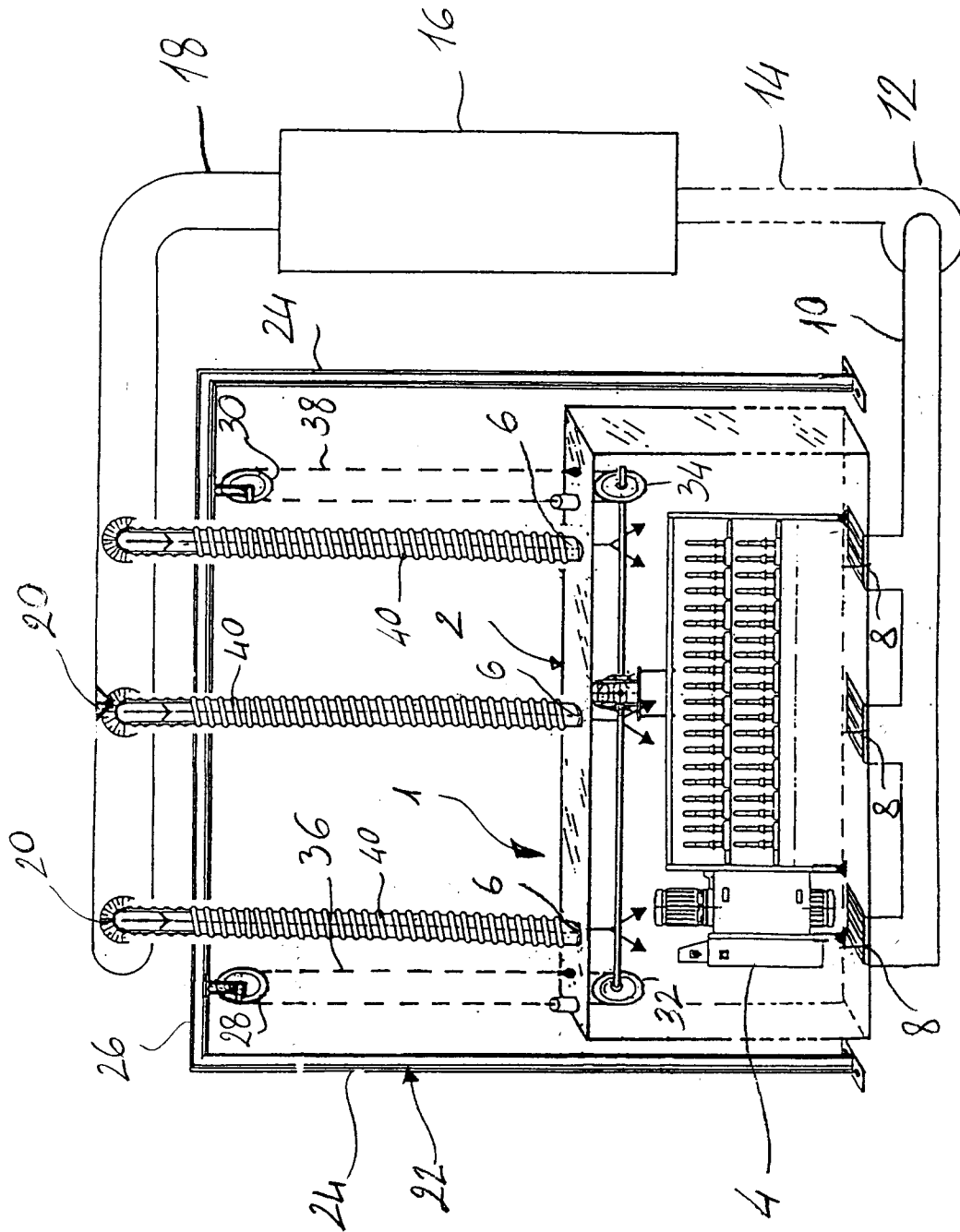


Fig. 2





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EUROPEAN SEARCH REPORT

Application Number

EP 93 20 0169

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	EP-A-0 442 282 (PALITEX PROJECT-COMPANY) * the whole document *	1,2	B65H54/72 B65H54/70 D01H11/00 D01H1/16
X	EP-A-0 141 936 (MASCHINENFABRIK RIETER) * the whole document *	1	
A	---	8	
A	GB-A-2 019 454 (F.ILI MARZOLI) * the whole document *	2	
A	---		
A	GB-A-2 161 505 (MAGNAVAC AIR SYSTEMS) * the whole document *	2	
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A	US-A-3 146 572 (KEYSER) * column 3, line 62 - line 65; figures *	1,8,9	
A	---		
A	DE-C-935 711 (HAMEL) * the whole document *	8	

			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B65H D01H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30 JUNE 1993	Examiner RAYBOULD B.D.J.
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	