Nov. 22, 1966 J. W. FALKINGER ETAL 3,286,304

DEVICE IN MULTILAYER PRESSES

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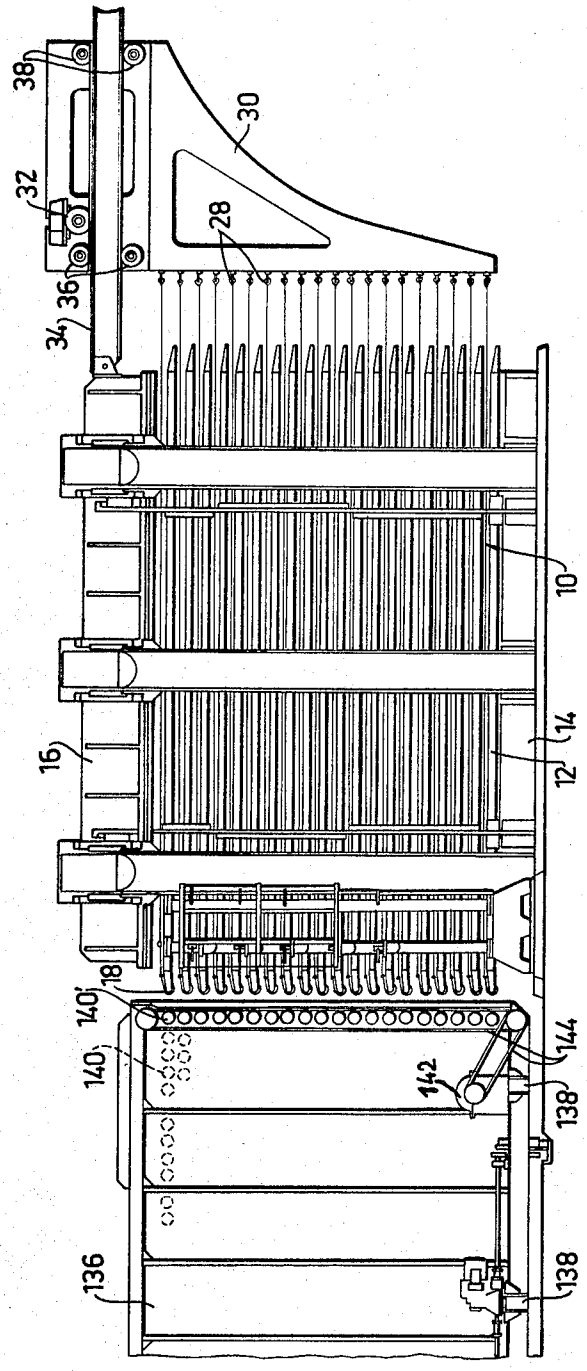
Fig. 1



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DEVICE IN MULTILAYER PRESSES

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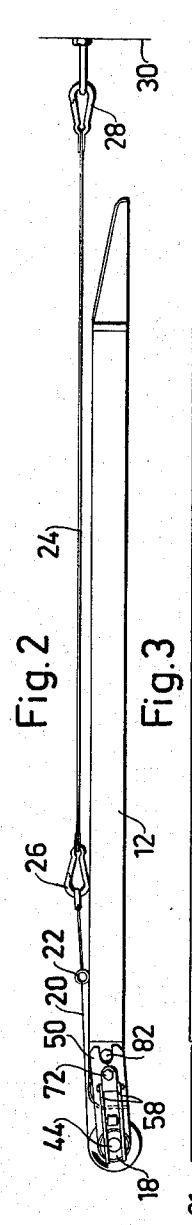

Fig. 2

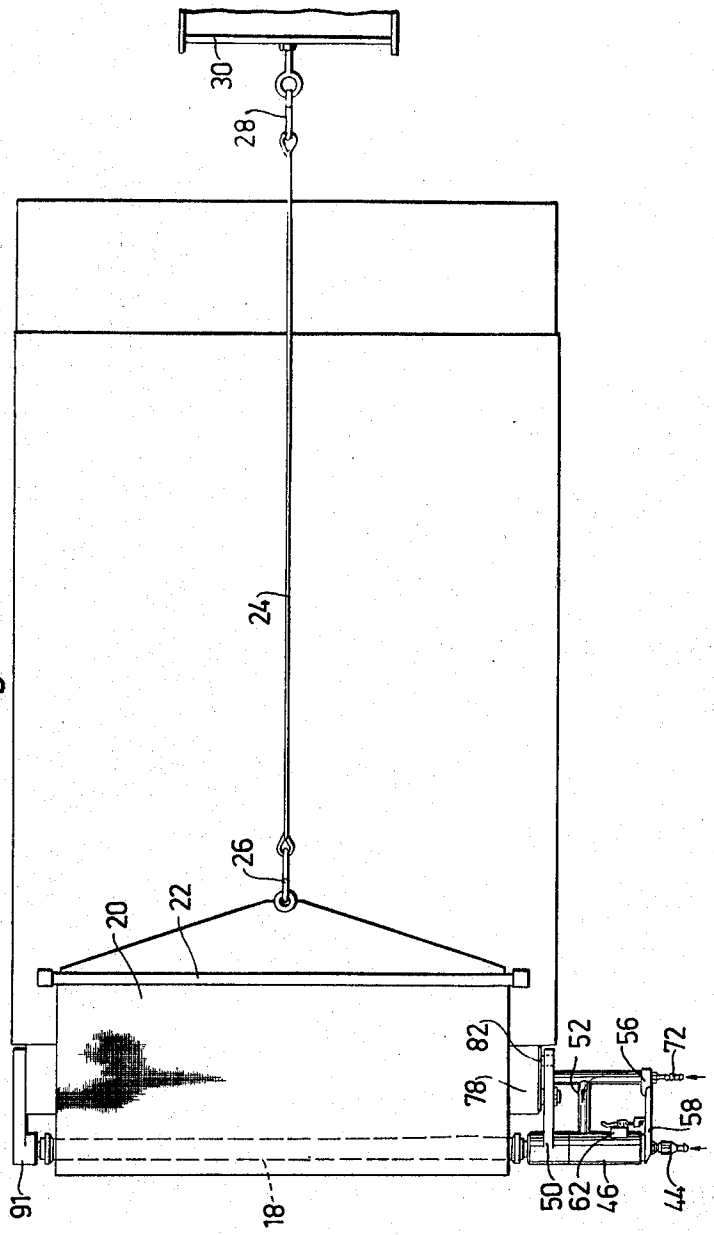

Fig. 3

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Fig.5

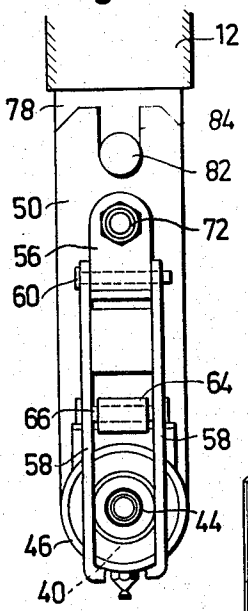
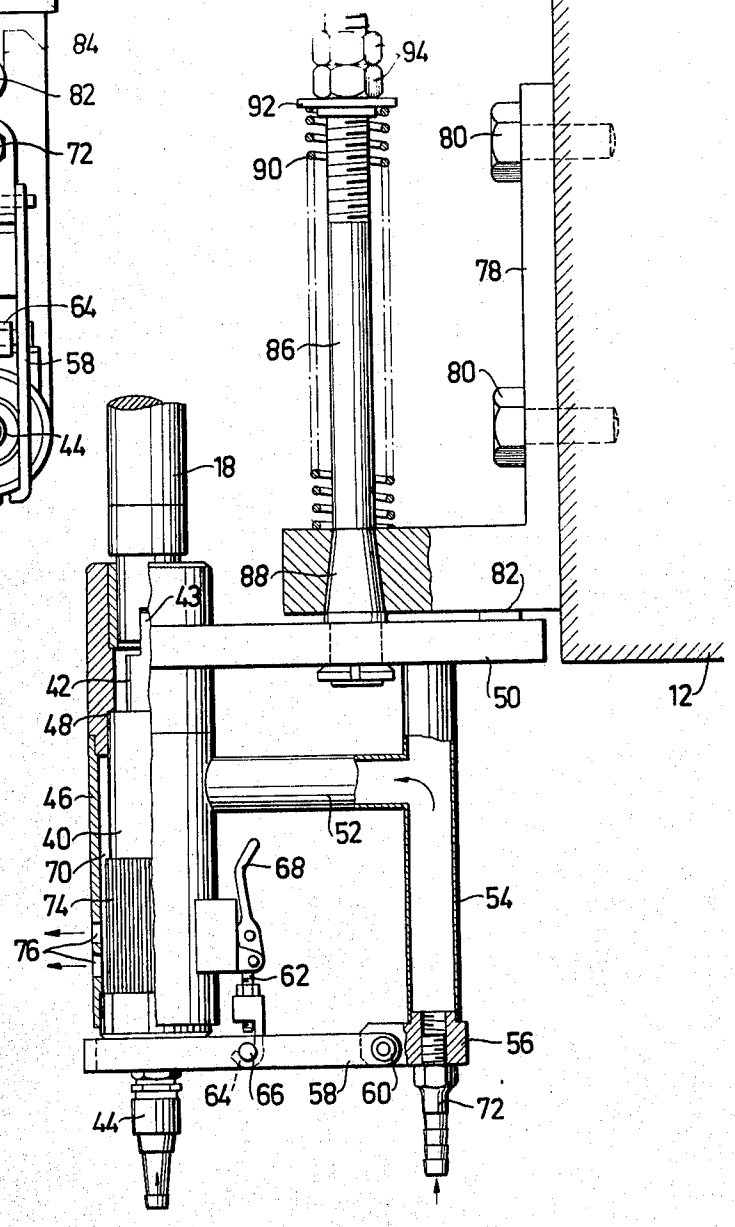


Fig.4



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DEVICE IN MULTILAYER PRESSES

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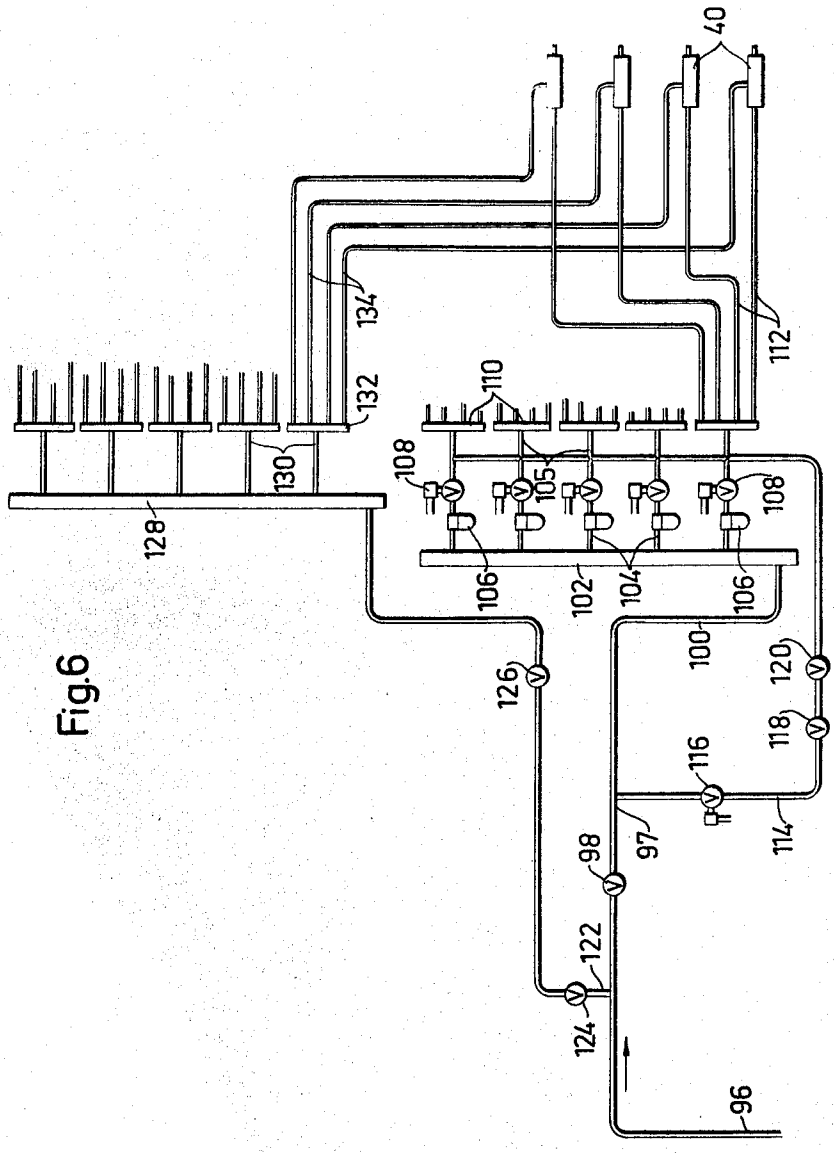

Fig.6

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DEVICE IN MULTILAYER PRESSES

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Claims priority, application Sweden, Mar. 19, 1963, 2,982/63
11 Claims. (Cl. 18—17)

This invention relates to multilayer presses.

More particularly this invention relates to improvements relating to multilayer presses intended for production of sheets or boards of fibrous materials, such as wood fibers, for example.

Multilayer presses of the type in consideration comprise a plurality of superimposed heated press plates between which the sheet or board blanks to be pressed are fed on wire sieves which are disposed to be unrolled from rollers or the like members to be subjected subsequently to pressure and/or heat between said press plates. The sheets or boards upon their treatment between the press plates are removed from the press and at the same time the wire sieves are to be wound up again on their roller members.

With constructions in use hitherto, it has proved to be impossible to conduct said winding up step so that the wire sieves are deposited at least approximately in uniformly and tightly superimposed turns about the roller members. Instead, irregular interspaces are formed between the layer turns on the roller members causing the wire sieve to constitute an obstacle when a subsequent set of blanks is to be fed between the press plates. It has therefore proved to be necessary every time to adjust by hand the winding up of all sieves onto their roller members which adjustment is a tiresome and time-wasting work impairing the capacity of the press.

One main object of the invention is to eliminate said drawback by providing means for use in connection with multilayer presses of the type in consideration and provided with wire sieves adapted to be unrolled and wound onto roller members, which cause the wire sieves when being wound up automatically to be deposited on the roller members in uniform and interspace-free, tight layer turns.

A further object of the invention is to provide means for use in connection with and multilayer presses of the type in consideration which act on the wire sieves so as to keep them stretched, in particular when being wound upon the roller members. Preferably these means are adapted to act on the wire sieves also after the winding up thereof onto the roller members.

Further objects and advantages of the invention will become apparent from the following description, considered in connection with the accompanying drawings, which form part of this specification and of which:

FIG. 1 is a lateral elevation of a multilayer press embodying the invention.

FIG. 2 is a lateral elevation of a press plate with a wire sieve belonging thereto and actuating members constructed and disposed according to the invention and presented in a larger scale.

FIG. 3 is a top view of the same parts.

FIG. 4 is a partial sectional view of an air motor with cooperating elements presented in the same view as in FIG. 3 but in a still larger scale.

FIG. 5 is an end view of FIG. 4.

FIG. 6 is flow sheet.

Referring to the drawings, reference numeral **10** generally denotes a multilayer press having a series of superimposed press plates **12** located between a base stand **14** and a top press **16** and in known manner supplied with a heating fluid, such as high-pressure steam. The press plates are movable up and down between a position in which they are mutually spaced so as to allow introduction of sheet or board blanks therebetween and a position in which the blanks are compressed therebetween, usually by means of a pressure produced hydraulically. These devices are known per se and as they do not belong to the invention they shall not be described here more detailed.

In front of each press plate **12** there is disposed a roller member **18** onto which a wire sieve **20** can be wound up. The free end of the wire sieve is to be kept stretched in the transversal direction by means of a rod **22** and is fixed to a drawing or traction wire **24** via a hook **26**. This traction wire has a length exceeding that of the press plate and is at its opposite end through a hook **28** fixed to a traction member **30**. This traction member is in the embodiment shown common for all wire sieves **20** and thus has a height dimension substantially equal to the height space occupied by the press plates **12** within the press. The traction member is driven by an electric motor **32** and guided by a beam **34** and rolls **36, 38** engaging said beam.

According to the invention, the roller members **18** are individually driven by means of motors **40**, see in particular FIG. 4. The driving fluid for the motors may be a liquid, but is preferably constituted by compressed air driving the motors with a number of revolutions variable in response to the load. The outgoing shaft **42** of the motor is by means of a claw or clutch coupling **43** or a similar coupling device joined with the roller member **18** so as to be brought into and out of the coupling position by means of an axial displacement. The motor is of a type known per se with a rotor which may have an idling speed in excess of 10,000 revolutions per minute. The dimension of the motor in the transverse direction is smaller than the space occupied by a press plate **12** and a wire sieve **20** when being wound upon the roller member **18**. The driving fluid is supplied through a nipple **44** formed for connection of a hose (not shown) leading to a pressure source.

The motor **40** is disposed in a casing **46** constituting part of a support for keeping the motor adjacent the press plate **12**. The casing has a projection **48** limiting the movement of the motor towards the roller member **18**.

The support comprises a bar **50** and a tube **52** extending in parallel to said bar. Both the bar and the tube are fixed in the casing **46** and a tube **54** extending in parallel to the longitudinal extension of said casing and at its end portion formed with a projection **56** on which two arms **58** are mounted rotatably about a pivot **60**. The arms **56** project over the end wall of the motor and are actuated by a locking member **62** having a hook **64** clutching a pin **66** connected with the arms **58**. The locking member has an arm **68** which is mounted in the casing **46** and which in its lowered position keeps the arms **58** pressed against the motor **40** and thereby locks this latter in its position.

An interspace **70** formed between the casing **46** and the motor **40** is supplied with cooling air from a nipple **72** communicating with the tubes **54** and **52**. The cooling air after having streamed past the flanges **74** and the engine escapes through openings **76** formed in the casing **46**.

A bracket **78** is secured to a lateral edge of the press plate **12** by means of screws **80**. Projecting from the bracket **78** is a pin **82** which fits in a cavity **84** formed in the end portion of the bar **50** (FIG. 5). A pin **86** passes through the bracket **78** with a conical portion **88** and is rigidly secured to the bar **50**. The pin **86** is sur-

rounded by a spring member 90 set between the bracket and a washer 92 locked relatively to the pin by means of nuts 94. The spring member 90 keeps the support immobilized against the bracket 78. At the same time the support is prevented from turning about the pin 86 by means of the pin 82. In this way it is made sure that the motor 40 is kept in continuous engagement with the roller member 18. If, however, the motor 40 must be removed for inspection or replacement, it is only necessary to bring the locking member 62 out of its locking position by lifting the arm 68 to permit to turn the arms 58 away whereby the motor is set free. If, on the other hand, a wire sieve must be replaced, this may be done by guiding the support outwards under compression of the spring member 90 until the clutch coupling 43 is put out of operation and the pin 82 comes out of engagement with the bar 50. Thereafter, the support with the motor may be turned by 90° whereafter the roller member 18 is accessible for removal.

The roller members 18 are at their one end supported by the support described hereinbefore through the motor 40 and at their opposite end by a support arm 91 fixed to the bracket 78 (FIG. 3).

According to FIG. 6 a pipe 96 leading from a pressure source (not shown) is forked into two branch pipes of which one provides the motors with driving fluid and the other with cooling fluid, the fluids in both cases preferably being air. Behind a locking valve 98 the driving fluid branch pipe 97 is forked again into two branches of which the one branch pipe 100 is connected to a header 102 from which in turn a plurality of pipes 104 extend of which each contains an air lubricator 106 and a valve 108 controlled in an electric way. The conduits 104 lead to a minor header 110 which in turn through pipes 112 is connected with a plurality of motors 40, such as four motors. In the illustrated embodiment the header 102 has five branch pipes 104, each of which feeds four motors 40. In the embodiment shown the number of press plates is thus 20.

A branch pipe 114 housing a valve 116 controlled in an electric way, a pressure reducing valve 118 and a back pressure valve 120, is connected to portions 105 of the branch pipes 104 located between the valves 108 and the headers 110. The pressure supplied to the motor 40 through the pipe 114 is substantially less than the pressure in the pipe 100. Thus the first mentioned pressure may amount to one atmosphere above atmospheric pressure, the working pressure in the pipe 100 being seven atmospheres above atmospheric pressure, for example.

The cooling air passes through the branch pipe 122 containing a sealing valve 124 and a regulating valve 126 to a header 128 which through branch pipes 130 communicates with a header 132 for a smaller number of pipes 134, such as four pipes, for example, each being connected to a nipple 72. The pressure of the cooling air is relatively low.

A load-carrying car 136 on wheels 138 is subdivided into horizontal compartments, each being bounded by horizontal rows of rollers 140. On these rollers wet board blanks are deposited in correspondence to the number of press plates in the press. The car 136 is placed straight opposite to the intake front of the press 10, whereupon the board blanks are advanced so much as to come to contact with the corresponding wire sieves 20. This may be effected by means of an electric motor 142 driving over a transmission 144, a roll 140' in each roller. Thereupon, the traction member 30 is made operative which thus unrolls one wire sieve each over each press plate, each wire sieve carrying the blank with it. When the traction member 30 has reached its end position, the press is made operative, the blanks thereby being subjected to pressure and heat so as to cause the water present therein to be expelled and the blanks to be given their final shape. When the press plates have been withdrawn from one another the wire sieves 20 are again wound up on their roller members 18 and the finished fiber boards or sheets are removed from the press whereupon the process is repeated with a fresh set of blanks.

According to the invention, the wire sieve 20 is kept stretched during the whole operative cycle. During the introduction between the press plates 12 of the blanks located on the wire sieve the motors 40 may be out of operation because the wire sieves are exposed to the resistance exerted by the blanks. During the winding up of the wires 20 on the roller members 18 the motors 40 are fed with pressure fluid of the higher pressure through the pipes 96, 97, 100, 102, 104, 105, 110 and 112. Then the valves 108 are open whereas the valve 116 is closed. The total motor torque now exceeds the moment of the traction member 30 acting in the opposite direction. During this step of operation, a uniform winding up of the wire sieve onto the roller member is accomplished and the wire sieve is kept stretched during the whole time. In position of rest of the wire sieves, the motors operate with the lower working pressure so as to prevent the wire sieves from being wound up partially. The pressure fluid is then supplied through the pipes 96, 97, 114, 105, 110, 112, the valve 116 being open and the valves 108 closed. The motors 40 may also during the insertion of the wire sieves out from their roller members between the press plates be in operation under actuation of the lower working pressure.

It is easily understood that when the speed of movement of the wire sieves over the press plates is kept constant, the rotational speed of the roller members 18 must vary and will become higher in response to the reduction of the diameter of the wire sieve on the roller member 18 and vice versa. The motor 40 is of such kind as to be capable of working under the said conditions.

It is also possible to effect the unrolling and drawing out of the wire sieves from the rollers 18 over the press plates 12 by means of individual motors of a similar kind as those described hereinbefore. The material to be treated in the multilayer press may also entirely or partly consist of peat, inorganic fibers, granulates or powders of organic or inorganic kind.

While one more or less specific embodiment of the invention has been shown and described, it is to be understood that this is for purpose of illustration only, and that the invention is not to be limited thereby, but its scope is to be determined by the appended claims.

What we claim is:

1. A device in multilayer presses for production of sheets or boards of fibrous material, comprising a plurality of superimposed heated press plates, a roller member associated externally of each plate except the top plate, said plates adapted to have sheet or board blanks fed on wire sieves adapted to be unrolled from said roller members to be subjected subsequently to pressure and heat between said press plates and removal from the press after the pressing operation, characterized by at least one traction member disposed to act on said wire sieves at their free end and motors adapted to act on the shafts of each individual roller member and to exercise moments in a direction opposite to the direction of action of the traction members so as to keep the wire sieves stretched.

2. In the device of claim 1 the traction member and the motors being adapted to be operative during the operative step of winding up the wire sieves onto the roller members after the pressing operation and removal of the pressed objects.

3. In the device of claim 2, the motors being adapted to actuate the wire sieves even after the winding up thereof onto the roller members.

4. In the device of claim 1, the motors being adapted to be rotated by means of a liquid pressure fluid.

5. In the device of claim 1, the motors being adapted to be rotated by a gaseous pressure fluid.

6. In the device of claim 1, the motors being adapted to be rotated by compressed air.

7. In the device of claim 3, the motors being adapted to exert a greater torque on the roller members during the operation of winding up the wire sieves onto the roller members than after completed winding up operation.

8. In the device of claim 7, the motors being adapted to exert the lower torque on the roller members even during the unrolling operation.

9. In the device of claim 1, the traction members belonging to a plurality of wire sieves being coupled together, the motors each acting individually on its shaft.

10. In the device of claim 1 the traction members being constituted by a single member common to all wire sieves, the motors each acting individually on its shaft.

11. In the device of claim 1, the motors having a largest dimension in height less than the spacing between two adjacent press plates in their pressing position.

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