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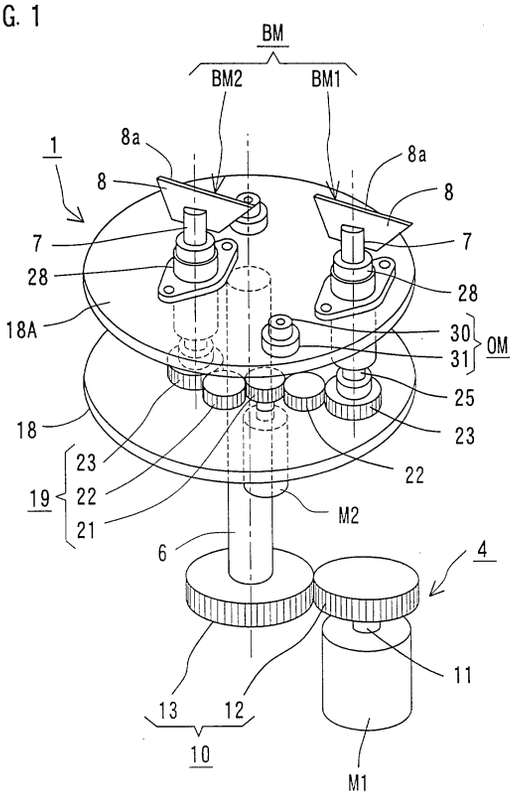
(54) Cleaning device for the metal frame surface of the spinning nozzle

(57) The object of the present invention is to improve the cleaning workability by sucking the spinning yarn when cleaning the metal frame surface of the spinning nozzle by applying oil to the metal frame surface of the nozzle without stopping the spinning.

The spinning nozzle cleaning device including a revolving means, wherein a metal blade is revolved along the revolving orbit by said revolving means, the metal blade is rotated or vibrated, and said metal blade cleans the metal frame surface of the spinning nozzle; comprises a spinning yarn suction means SM for sucking the spinning yarn during the cleaning of the spinning nozzle by the metal blade 8 is being carried out, located in the downstream side of the metal frame surface of the spinning nozzle 3a.

FIG. 1



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Description

[Technical Field]

[0001] The present invention relates to a cleaning device for cleaning a metal frame surface of a spinning nozzle of a spinning machine.

[Backgroud Art]

[0002] In a conventional cleaning device for cleaning the metal frame surface of the spinning nozzle of a spinning machine mentioned above, for example, a revolving shaft, a rotating shaft revolving around the revolving shaft, and a blade for cleaning the metal frame surface of the spinning nozzle by contacting against the metal frame surface of the spinning nozzle to the output side of the rotating shaft, are provided. Moreover, there is a conventional cleaning device for the metal frame surface of the spinning nozzle by a rotating-revolving typed blade arranged to clean the metal frame surface of the spinning nozzle by rotating and revolving the blade.

[0003] The cleaning device for cleaning the metal frame surface of the spinning nozzle of the spinning machine by the rotating-revolving typed blade, is constructed to clean the metal frame surface of the spinning nozzle by revolving and rotating the blade. Therefore, when cleaning the metal frame surface of the spinning nozzle without stopping the spinning, there was a problem in that an effective cleaning cannot be carried out since the yarn gets entangled to the blade instantly when rotating the blade.

[0004] Furthermore, according to the cleaning device for cleaning the metal frame surface of the spinning nozzle of the spinning machine by the rotating-revolving typed blade, since the metal blade which cleans the metal frame surface of the spinning nozzle is a hard metal, there was a problem in that when the oil film runs out on the metal frame surface of the spinning nozzle, the metal frame surface is scraped off and was damaged.

[Disclosure of the Invention]

[0005] The object of the present invention of the device for cleaning the metal frame surface of the spinning nozzle of the spinning machine by the metal blade, is to provide a cleaning device for the metal frame surface of the spinning nozzle constructed to prevent the entangling of the yarn to the metal blade by vibrating the metal blade without rotating, when carrying out the cleaning operation without stopping the spinning and with the spinning state continued.

[0006] Furthermore, the object of the present invention of the device for cleaning the metal frame surface of the spinning nozzle of the spinning machine by the metal blade, is to provide a cleaning device for the metal frame surface of the spinning nozzle constructed to prevent the damage to be made to the metal frame surface of the spinning nozzle due to the running out of the oil film.

[0007] To be more specific, for achieving the above-described object, the present invention provides the cleaning device for the metal frame surface of the spinning nozzle including the revolving means, for cleaning the metal frame surface of the spinning nozzle by revolving the metal blade along the revolving orbit by the revolving means, wherein the metal blade includes a blade acting edge extending along the direction intersecting with the revolving orbit, and a vibration means for vibrating the blade acting edge of the metal blade along the direction of the revolving orbit is provided.

[0008] Moreover, according to the present invention, the revolving orbit is divided into at least two in the diameter direction, the metal blade is provided in each revolving orbit, and the cleaning device for the metal frame surface of the spinning nozzle is constructed to clean the metal frame surface of the spinning nozzle by vibrating the blade acting edge of each metal blade along each revolving orbit.

[0009] Furthermore, according to the present invention, the cleaning device for the metal frame surface of the spinning nozzle is constructed by providing on the revolving orbit of the metal blade, the lubricant injecting means for injecting lubricant to the metal frame surface of the spinning nozzle in beforehand to the metal blade.

[0010] On the other hand, according to the cleaning device for cleaning the metal frame surface of the spinning nozzle of the spinning machine by the metal blade described above, for achieving a stable yarn characteristic right after the cleaning, the cleaning operation is carried out with the spinning yarn released, without stopping the spinning yarn. When the cleaning operation is carried out without stopping the spinning likewise, there is a problem in that an effective cleaning cannot be carried out as a result of the yarn getting entangled instantly to the rotating-revolving typed metal blade or revolving-vibrating typed metal blade.

[0011] Therefore, the object of the present invention is to provide a cleaning device for the spinning nozzle constructed to prevent the damage to be applied to the metal frame surface of the spinning nozzle due to the running out of the oil film when cleaning the metal frame surface of the spinning nozzle of the spinning machine by the metal blade, and to suck and discharge the filament yarn effectively while the cleaning operation is being carried out, to prevent the entangling of the yarn to the metal blade of rotating-revolving typed or revolving-vibrating typed when cleaning the metal frame surface without stopping the spinning.

[0012] To be more specific, for achieving the above-described object, the present invention provides the cleaning device for the spinning nozzle including the revolving means, for cleaning the metal frame surface of the spinning nozzle by the metal blade while revolving the metal blade along the revolving orbit by the revolving means and rotating or vibrating the metal blade. The

spinning yarn suction means for sucking in the spinning yarn while the metal blade is cleaning the spinning nozzle, is to be located in the downstream side of the metal frame surface of the spinning nozzle, to compose the cleaning device for the spinning nozzle.

[0013] Furthermore, according to the present invention, the spinning yarn suction means includes a suction pipe member forming the spinning yarn suction path, and composes the cleaning device for the spinning nozzle wherein the inner surface of the suction pipe member is made into a rough internal surface.

[0014] Moreover, according to the present invention, the cleaning device for the spinning nozzle is constructed by the surface of the rough internal surface of the suction pipe member coated with heat resisting resin.

[Brief Description of the Drawings]

[0015]

Fig. 1 shows a basic composition of the cleaning device for the metal frame surface of the spinning nozzle which is to be the present invention, and is a schematic perspective view showing the composition of the cleaning device providing in two diameter positions differing from the revolving shaft, two revolving-vibrating typed blade means including a vibration means via each vibration supporting shaft, and for example, a pair of lubricant injecting means.

Fig. 2 shows a basic composition of the cleaning device for the metal frame surface of the spinning nozzle which is to be the present invention, and is a schematic perspective view showing the relationship of the employment between the revolving-vibrating typed blade means and the lubricant injecting means to the metal frame surface of the spinning nozzle.

Fig. 3 is a schematic plan view of the cleaning device for the metal frame surface of the spinning nozzle which is to be the present invention, showing the revolving-vibrating locus and two lubricant injecting means of the cleaning area of the first blade wherein the vibration supporting shaft interlocked to the vibration means is located on the first revolving locus diameter (R1), and the second blade wherein the vibration supporting shaft interlocked to the vibration means is located on the second revolving locus diameter (R2).

Fig. 4 is a schematic perspective view of the cleaning device for the metal frame of the spinning nozzle which is to be the present invention, showing a specific composition of the metal blade unit including a vibration means.

Fig. 5 is a schematic sectional view showing the inner structure of a specific composition of the metal blade unit including the vibration means.

Fig. 6 is a schematic sectional view of the cleaning device for the metal frame of the spinning nozzle which is to be the present invention, showing a composition wherein the cleaning device is combined capable of transferring on the guide rail extending along the spinning machine.

Fig. 7 is a schematic plan view showing the composition shown in Fig. 6 from above.

Fig. 8 shows a basic composition of the cleaning device for the metal frame surface of the spinning nozzle which is to be the present invention, and is a schematic sectional view showing the composition of the cleaning device comprising in two diameter positions differing from the revolving shaft, two revolving-vibrating typed blade means including vibration supporting shaft respectively, and for example, a lubricant injecting means for injecting lubricant such as silicon oil, and a spinning yarn suction means which is opening facing the spinning nozzle provided in the downstream side of the spinning nozzle.

[Best Mode for Embodying the Invention]

[0016] The cleaning device for the metal frame surface of the spinning nozzle according to the present invention will now be described in detail in reference to the specific embodiment shown in the drawings. Fig. 1 shows a basic composition of the cleaning device for the metal frame surface of the spinning nozzle which is to be the present invention, and is a schematic perspective view showing especially the composition of the cleaning device providing in two diameter positions differing from the revolving shaft, two revolving-vibrating typed blade means including a vibration means via each vibration supporting shaft, and for example, a pair of lubricant injecting means.

[0017] Fig. 2 shows a basic composition of the cleaning device for the metal frame surface of the spinning nozzle which is to be the present invention, and is a schematic perspective view showing the relationship of the employment between the revolving-vibrating typed blade means and the lubricant injecting means to the metal frame surface of the spinning nozzle. Fig. 3 is a schematic plan view of the cleaning device for the metal frame surface of the spinning nozzle which is to be the present invention, showing the revolving-vibrating locus and two lubricant injecting means of the cleaning area of the first blade wherein the vibration supporting shaft interlocked to the vibration means is located on the first revolving locus diameter (R1), and the second blade wherein the vibration supporting shaft interlocked to the vibration means is located on the second revolving locus diameter (R2).

[0018] Fig. 4 is a schematic perspective view of the cleaning device for the metal frame of the spinning nozzle which is to be the present invention, showing a specific composition of the metal blade unit including a vibration means. Fig. 5 is a schematic sectional view showing the inner structure of a specific composition of

the metal blade unit including the vibration means.

[0019] On the other hand, Fig. 6 is a schematic sectional view of the cleaning device for the metal frame of the spinning nozzle which is to be the present invention, showing a composition wherein the cleaning device is combined capable of transferring on the guide rail extending along the spinning machine. Fig. 7 is a schematic plan view showing the composition shown in Fig. 6 from above.

[0020] Referring to Fig. 1 through Fig. 5, the basic composition of the cleaning device for the metal frame surface of the spinning nozzle which is to the present invention, will now be described in a detail. The cleaning device for the metal frame surface of the spinning nozzle 1 according to the present invention is a device for cleaning the metal frame surface of the nozzle 3a of the metal frame of the spinning nozzle 3 providing the spinning nozzle hole 2, and comprises a revolving-vibrating typed blade means BM for dropping off the attached article attached to the metal frame surface of the nozzle 3a in contact with the metal frame surface of the nozzle 3a, and a lubricant injecting means OM for injecting lubricant of the silicon oil or the like to the metal frame surface of the nozzle 3a during the cleaning by the revolving-vibrating typed blade means BM.

[0021] According to the specific embodiment shown in Fig. 1, the revolving-vibrating typed blade means BM comprises a first blade mechanism BM1 revolving-vibrating with the vibration supporting shaft connected to a vibration means positioned, concerning the first revolving locus diameter (R1), and a second blade mechanism BM2 revolving-vibrating with the vibration supporting shaft connected to a vibration means positioned, concerning the second revolving locus diameter (R2).

[0022] In the revolving-vibrating blade means BM, the first and the second blade mechanisms BM1 and BM2 have the same structure, and for the same component part, same code number is to be used and only one of the component parts will be described. The revolving-vibrating typed blade means BM comprises a revolving shaft driving system 4 provided with a revolving shaft 6, a vibration supporting shaft driving system 5 providing a vibration supporting shaft 7, and a blade 8 for cleaning the metal frame surface of the spinning nozzle 3a in elastic contact with the metal frame surface of the spinning nozzle 3a to the output side of the vibration supporting shaft 7 via the elastic means 9.

[0023] According to the specific embodiment shown in Fig. 1 and Fig. 2, the revolving shaft driving system 4 includes a driving motor for revolving M1, and the revolving shaft 6 is driven and interlocked to the driving motor for revolving M1 via the power transmission means 10. According to the embodiment shown in Fig. 1, the power transmission means 10 is formed by the revolution driving gear 12 attached to the rotating shaft 11 of the driving motor for revolving M1, and a revolution driven gear 13 engaging to the revolution driving gear 12.

[0024] The slip ring 14 is combined to the revolving shaft 6, and the power supply line 15 with DC 24V is connected to the slip ring 14. Furthermore, the rotary joint 16 is combined to the revolving shaft 6, and the silicon oil supplying line 17 for supplying lubricant to the lubricant injecting means OM to be mentioned later on, is connected to the rotary joint 16.

[0025] The rotating disk member 18 constructed in a unity with the revolving shaft 6 is provided in the power output edge 6a of the revolving shaft 6. The vibration supporting shaft driving system 5 and the composing member OM of the lubricant injecting means to be mentioned later on of the first and the second blade mechanisms BM1 and BM2 are combined in the rotating disk member 18.

[0026] According to the specific embodiment shown in Fig. 1 and Fig. 2, the vibration supporting shaft driving system 5 of the first and the second blade mechanisms BM1 and BM2 comprises such as one driving motor for vibration M2. Moreover, the vibration supporting shaft 7 is driven and interlocked to the driving motor for vibration M2 via the power transmission means 19. According to the embodiment shown in Fig. 1, Fig. 2, and Fig. 3, the power transmission means 19 comprises a driving gear 21 attached to the rotating shaft 20 of the driving motor for vibration M2, an intermediate gear 22, and a driven gear 23 engaged to the intermediate gear 22.

[0027] Each of the driving motors for vibration M2, M2 of the first and the second blade mechanisms BM1 and BM2 are connected to the power supply line 15 with DC 24V through the interior of the revolving shaft 6 from the center hole provided in the rotating disk member 18.

[0028] Next, referring to Fig. 4 and Fig. 5, the specific composition of the vibration means 24 of the cleaning device for the metal frame surface of the spinning nozzle 1 according to the present invention, will be described in a detail. According to the cleaning device for the metal frame surface of the spinning nozzle 1 which is to be the present invention, the metal blade 8 is set to be extending along the direction where the blade acting edge 8a intersects with the revolving orbit, and the vibration means 24 is capable of making the blade acting edge 8a of the metal blade 8 to carry out reciprocating minute vibration along the revolving orbit.

[0029] In the embodiment shown in Fig. 4 and Fig. 5, the vibration means 24 vibrates the metal blade 8 of the metal blade unit BU by the vibration supporting shaft driving system 5 of each of the blade mechanisms BM1 and BM2. According to the example shown in the drawing, one driving motor for vibration M2, a driving gear 21, an intermediate gear 22, a driven gear 23, a rotating shaft 25 of the driven gear 23, an eccentric connecting mechanism 26 provided in the free edge 25a side of the rotating shaft 25, a vibration supporting shaft 7 of which one of the tips is connected freely swinging to the eccentric connecting mechanism 26, and a metal blade 8 attached to the free edge 7a side of the vibration supporting shaft 7, are included.

[0030] The metal blade unit BU of the composition described above comprises a casing member 28 which supports the metal blade 8 rotatable via the rotatable shaft 27, and the casing member 28 is supported fixed to the upper side member 18A of the rotating disk member 18. The bearing mechanism 29 is provided between the rotating shaft 25 and the casing member 28.

[0031] As shown in Fig. 3, the cleaning device for the metal frame of the spinning nozzle 1 which is to be the present invention is constructed to clean separately the first cleaning area CZ1 along the first revolving locus diameter R1 by the first blade mechanism BM1, and the second cleaning area CZ2 along the second revolving locus diameter R2 by the second blade mechanism BM2.

[0032] On the other hand, the lubricant injecting means OM includes a nozzle supporting member 31 providing a silicon oil discharging nozzle 30 in the upper end. The nozzle supporting member 31 is fixed to the rotating disk member 18, and the silicon oil discharging nozzle 30 is connected to the lubricant supplying source via the silicon oil supplying line 17.

[0033] The lubricant injecting means OM injects silicon oil to the metal frame surface of the nozzle 3a via the silicon oil discharging nozzle 30 during the cleaning by the revolving-vibrating typed blade means BM, and for example, is formed by the silicon spray.

[0034] The cleaning device for the metal frame surface of the spinning nozzle provided with the revolving-vibrating typed blade means BM and the lubricant injecting means OM which are to be the composition described above, is automatically traveled and controlled along the spinning machine SM by the automatic travel control means 32 as shown in Fig. 6 and Fig. 7, for example. In this case, the cleaning device for the metal frame surface of the spinning nozzle 1 is constructed in a cart 34 capable of running on the rail 33 extending along the spinning machine SM.

[0035] The cart 34 loading the cleaning device for the metal frame surface of the spinning nozzle 1 starts the running after the control device specifies the spindle to be cleaned, and is stopped at the appointed position when reaching the position corresponding to the specified spindle by the automatic travel control means 32. After the cart 34 stopping at the position opposing to the specified spindle to be cleaned, the cleaning device for the metal frame surface of the spinning nozzle 1 loaded on the cart 34 transfers along the arrow X direction shown in Fig. 6 and Fig. 7, and the position is appointed directly below the metal frame of the spinning nozzle of the specified spindle by the advancing-receding drive means 35. Then, the revolving-vibrating typed blade means BM and the lubricant injecting means OM of the cleaning device for the metal frame surface of the spinning nozzle 1 are pressed against the metal frame surface of the nozzle 3a of the metal frame of the spinning nozzle 3 by the elevating-descending drive means 36, and the cleaning operation is carried out to the metal frame surface of the nozzle 3a by injecting silicon oil to the metal frame surface of the nozzle 3a.

[0036] As shown in Fig. 8, in the present invention, a spinning yarn suction means SM for sucking the spinning yarn during the spinning nozzle cleaning operation by the metal blade 8, is provided to be located in the downstream side of the metal frame surface of the spinning nozzle. The spinning yarn suction means SM includes a shedding member 41 shedding in a relatively large area in the position facing against the metal frame surface of the spinning nozzle 3a, a suction pipe member 43 connected to the shedding member and forms the spinning yarn suction path 42, and a flexible hose 44 for connecting the suction pipe member 43 to the suction source (not shown in the drawings).

[0037] The suction pipe member 43 is made of metal since it is located near the spinning nozzle 3 which is to reach high temperature. Furthermore, the inner surface of the suction pipe member 43 is formed as a rough internal surface 45 in accordance with the object to allow the passage of the spinning yarn to be smooth. The rough internal surface 45 can be formed of a plurality of grooves in the circumference direction, or can be formed of a spiral groove.

[Industrial Applicability]

[0038] According to the cleaning device for the metal frame surface of the spinning nozzle of the present invention constructed as described above, when carrying out the cleaning operation without stopping the spinning and with the spinning continued, by making the metal blade to be revolving-vibrating typed, in other words, by vibrating the metal blade in the place of rotation without rotating, the entangling of the yarn to the metal blade can be instantly prevented, thus the cleaning operation can be carried out extremely effective to this point.

[0039] Furthermore, according to the cleaning device for the metal frame surface of the spinning nozzle which is to be the present invention, by providing a lubricant injecting means for injecting lubricant to the metal frame surface of the spinning nozzle in beforehand to the metal blade, on the revolving orbit of the metal blade, the cleaning of the metal frame surface of the nozzle can be carried out by the metal blade by forming oil film on the metal frame surface of the nozzle, the generating of the scratch to the metal frame surface of the spinning nozzle can be suppressed, and it works extremely effective in that a reliable cleaning can be carried out.

[0040] Furthermore, for the object in which to improve the draining of the silicon oil of which the viscosity is extremely high, the surface of the rough internal surface 45 of the suction pipe member 43 is provided with coating processing layer 46 by the heat resisting resin such as polytetrafluoro-ethylene, so-called Teflon (trademark).

[0041] According to the cleaning device for the metal frame of the spinning nozzle of the present invention

constructed as described above, when carrying out the cleaning operation without stopping the spinning and with the spinning continued, since the spinning nozzle suction means is provided in the downstream side of the spinning nozzle, the spinning yarn discharging from the spinning nozzle by the spinning yarn suction means can be sucked and discharged, the yarn entangling to the blade can be prevented and a smooth cleaning operation can be carried out.

[0042] Furthermore, the cleaning device for the spinning nozzle which is to be the present invention, combines the suction pipe member for the spinning yarn suction means, and since the internal surface of the suction pipe member is formed in a rough surface, the contact surface of the spinning yarn inside the pipe is made in a point contacting state, thus the passing of the spinning yarn can be carried out smoothly. Furthermore, since the surface of the rough internal surface of the suction pipe member is coated with heat resisting resin, the drainage of the silicon oil of extremely high viscosity can be improved, and it can be acted extremely effective to these points.

Claims

1. A cleaning device for cleaning the metal frame surface of the spinning nozzle comprising:

a metal blade for cleaning said metal frame surface;
a revolving means for revolving said metal blade along a revolving orbit; and
a spinning yarn suction means for sucking a spinning yarn, provided to be located in the downstream side of said metal frame surface of said spinning nozzle;

wherein said spinning yarn is sucked during the cleaning operation.

2. A cleaning device for the metal frame of the spinning nozzle according to claim 1, wherein said spinning yarn suction means includes a suction pipe member forming a spinning yarn suction path, and the inner surface of said suction pipe member is made of rough internal surface.

3. A cleaning device for the metal frame of the spinning nozzle according to claim 2, wherein the surface of the rough internal surface of said suction pipe member is coated by a heat-resisting resin.

4. A cleaning device for cleaning the metal frame of the spinning nozzle comprising:

a metal blade for cleaning said metal frame surface;
a revolving means for revolving said metal blade along a revolving orbit;
a blade acting edge wherein said metal blade is extending along the direction intersecting with said revolving orbit; and
a vibration means for vibrating said metal blade acting edge along said revolving orbit.

5. A cleaning device for the metal frame of the spinning nozzle according to claim 4, wherein said revolving orbit is divided into at least two in the diameter direction, said metal blade is provided to each revolving orbit, and the metal frame surface of the spinning nozzle is cleaned by vibrating the blade acting edge of said metal blade along each revolving orbit.

6. A cleaning device for the metal frame of the spinning nozzle according to either of claim 4 or claim 5, wherein a lubricant injecting means for injecting lubricant to the metal frame surface of said spinning nozzle in beforehand to said metal blade, is provided on the revolving orbit of said metal blade.

FIG. 1

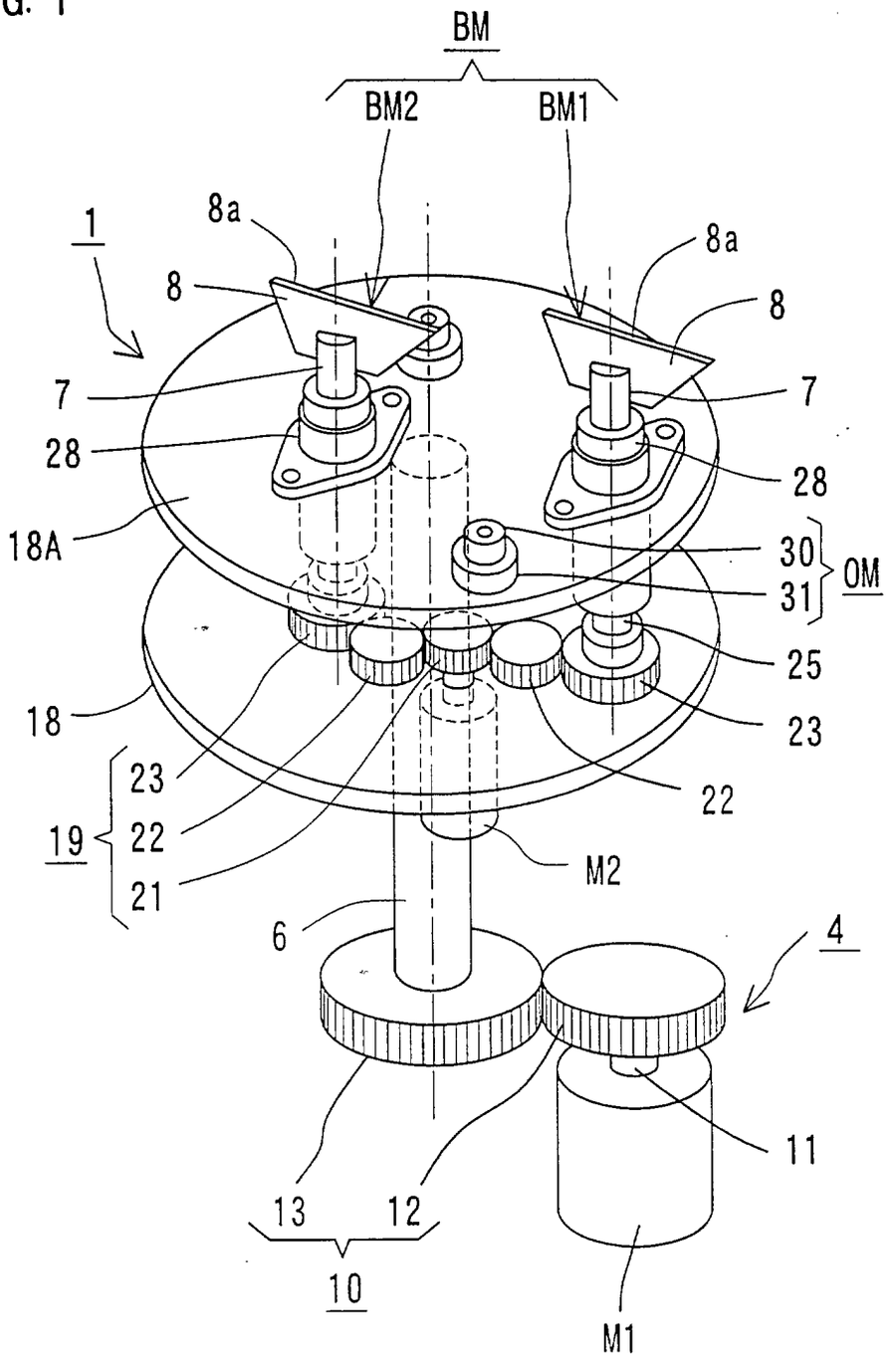
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FIG. 2

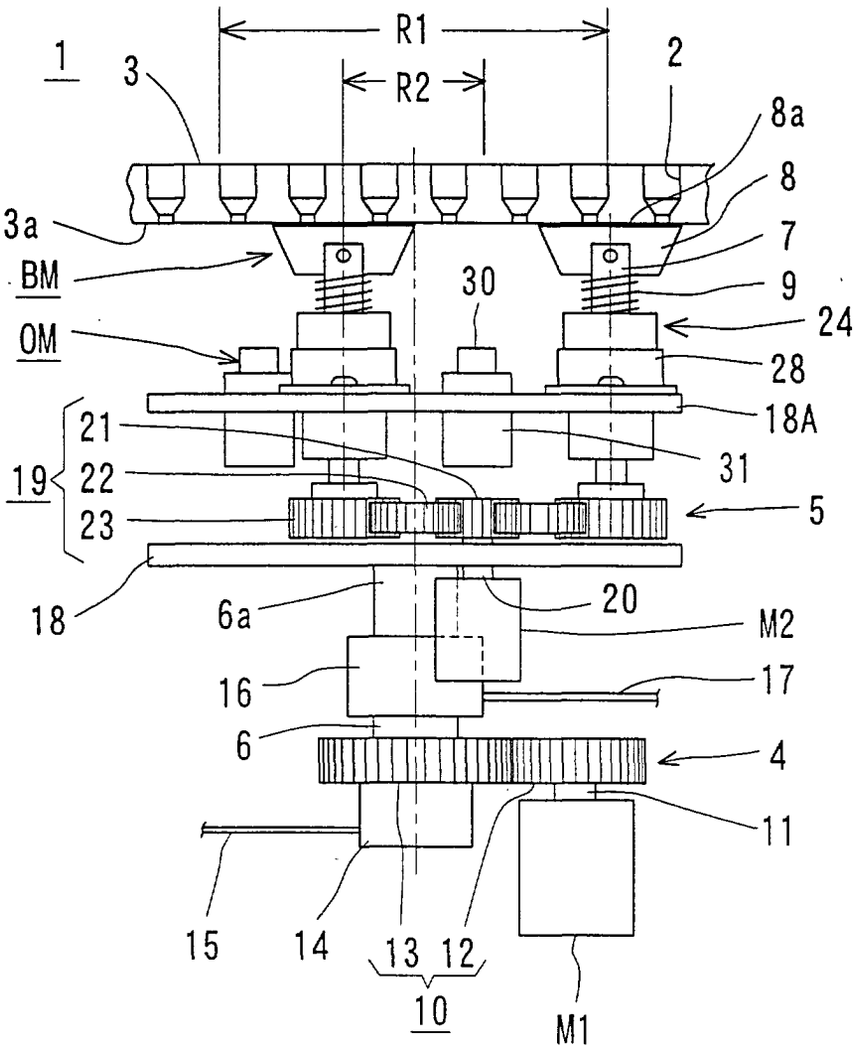
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FIG. 3

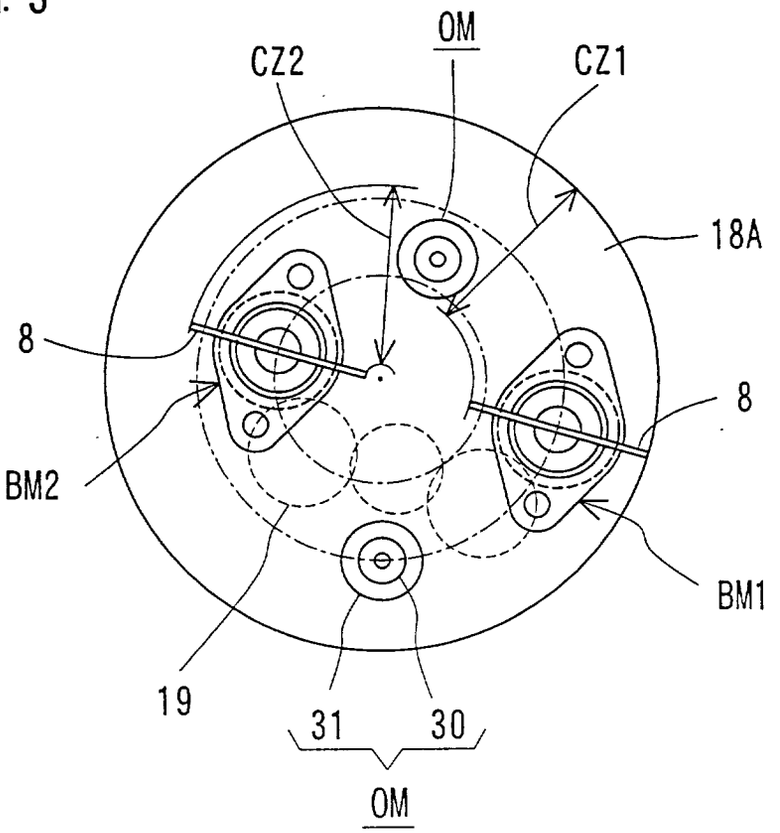


FIG. 4

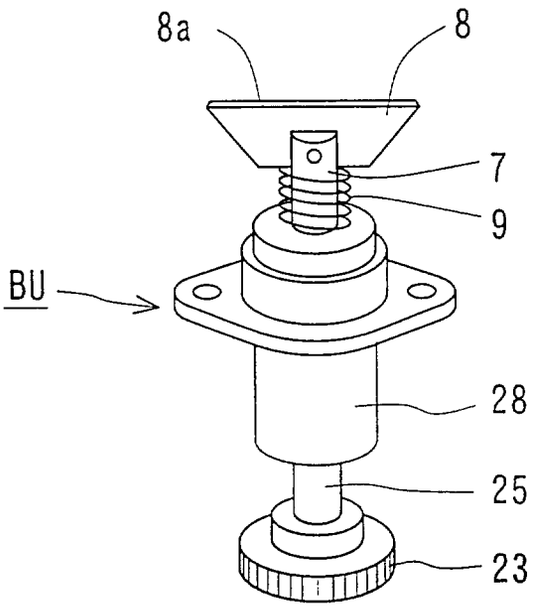


FIG. 5

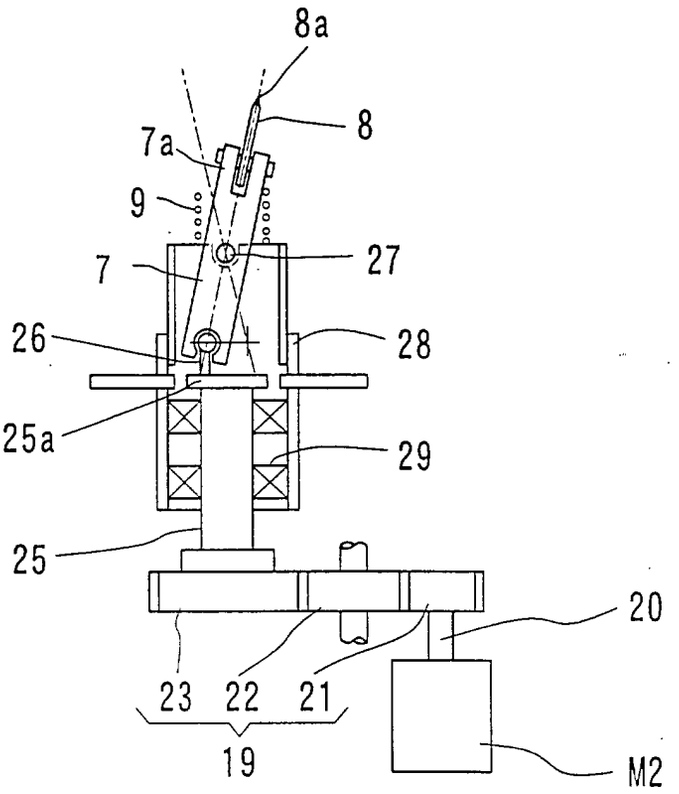


FIG. 6

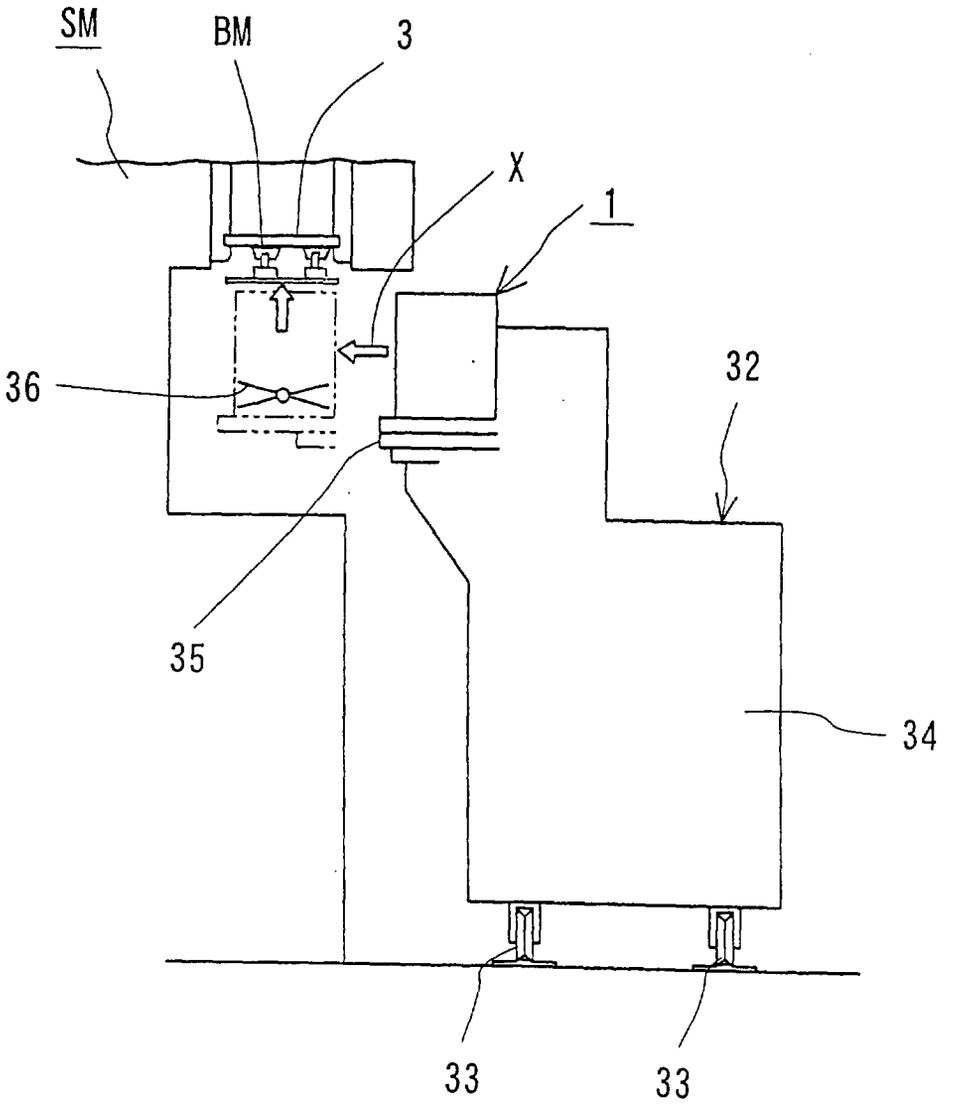


FIG. 7

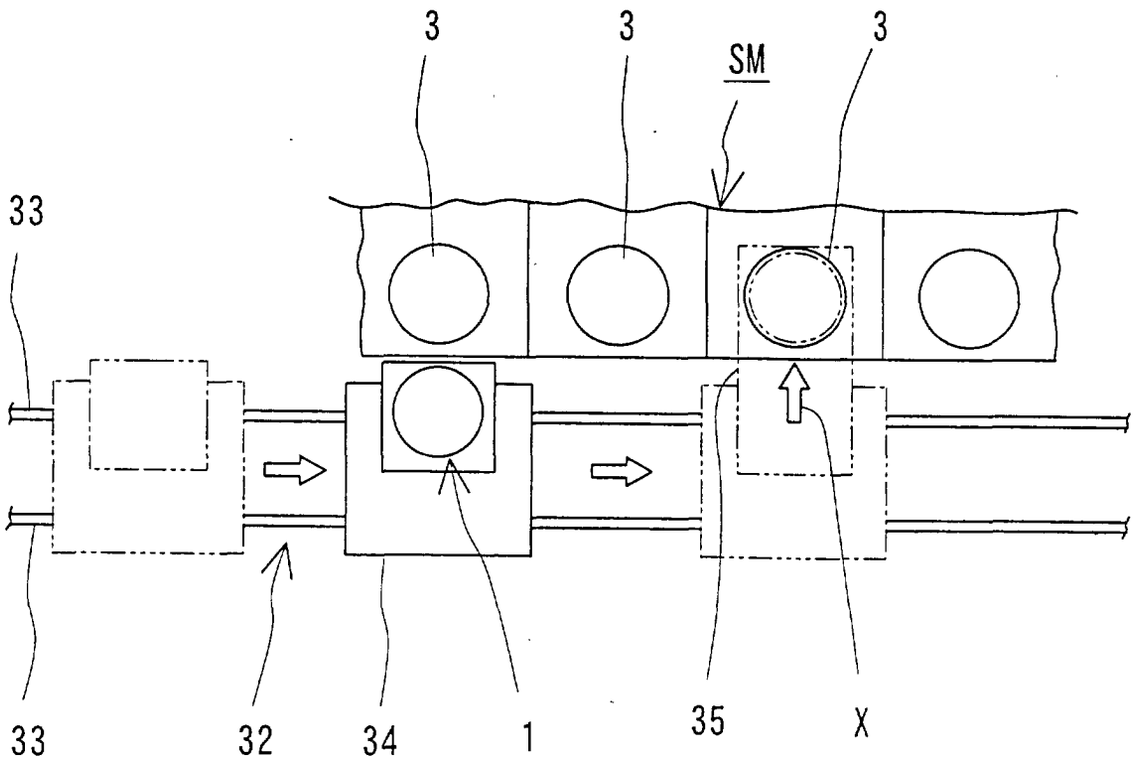
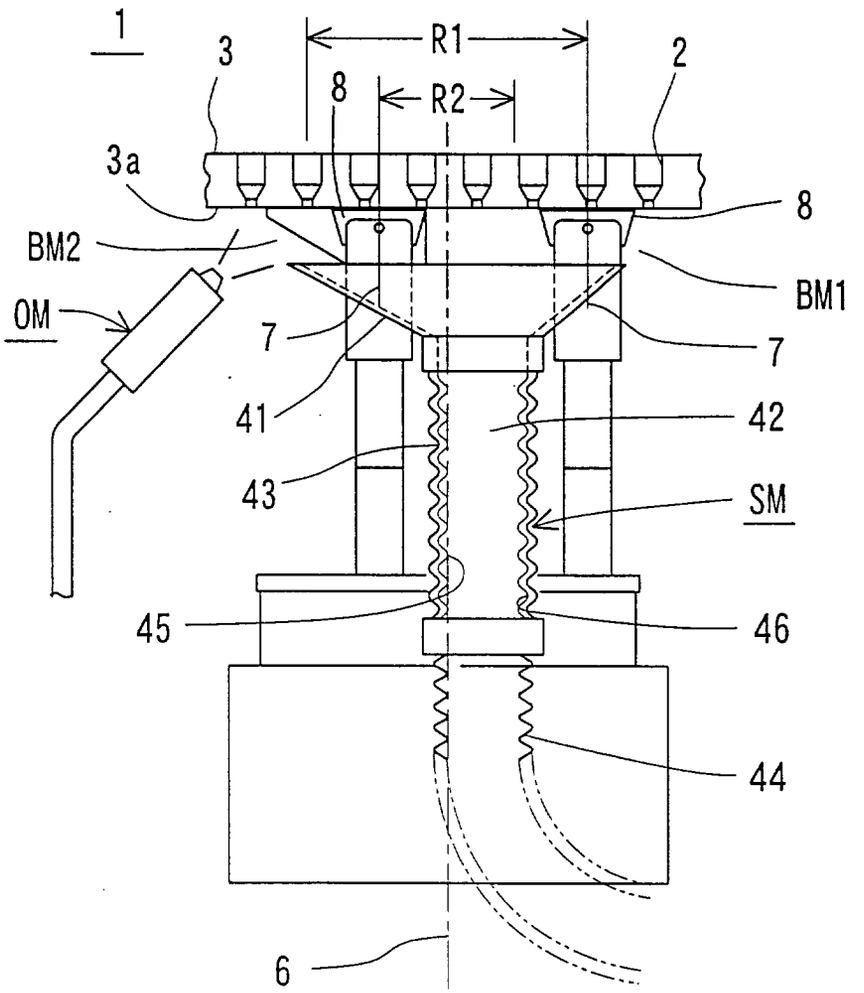


FIG. 8



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EUROPEAN SEARCH REPORT

Application Number
EP 01 12 1783

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.7)
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A	PATENT ABSTRACTS OF JAPAN vol. 010, no. 321 (C-382), 31 October 1986 (1986-10-31) & JP 61 132607 A (TORAY IND INC), 20 June 1986 (1986-06-20) * abstract *	1-6	
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A	US 4 255 109 A (EMMERICH HERMANN ET AL) 10 March 1981 (1981-03-10) * the whole document *	1-6	TECHNICAL FIELDS SEARCHED (Int.Cl.7) D01D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	30 January 2002	Tarrida Torrell, J

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