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(19) **United States**(12) **Patent Application Publication****Wang**(10) **Pub. No.: US 2006/0216168 A1**(43) **Pub. Date: Sep. 28, 2006**(54) **DRIVING DEVICE FOR AN AIR COMPRESSOR****Publication Classification**(76) Inventor: **Min-Hsieng Wang**, Taipei City (TW)

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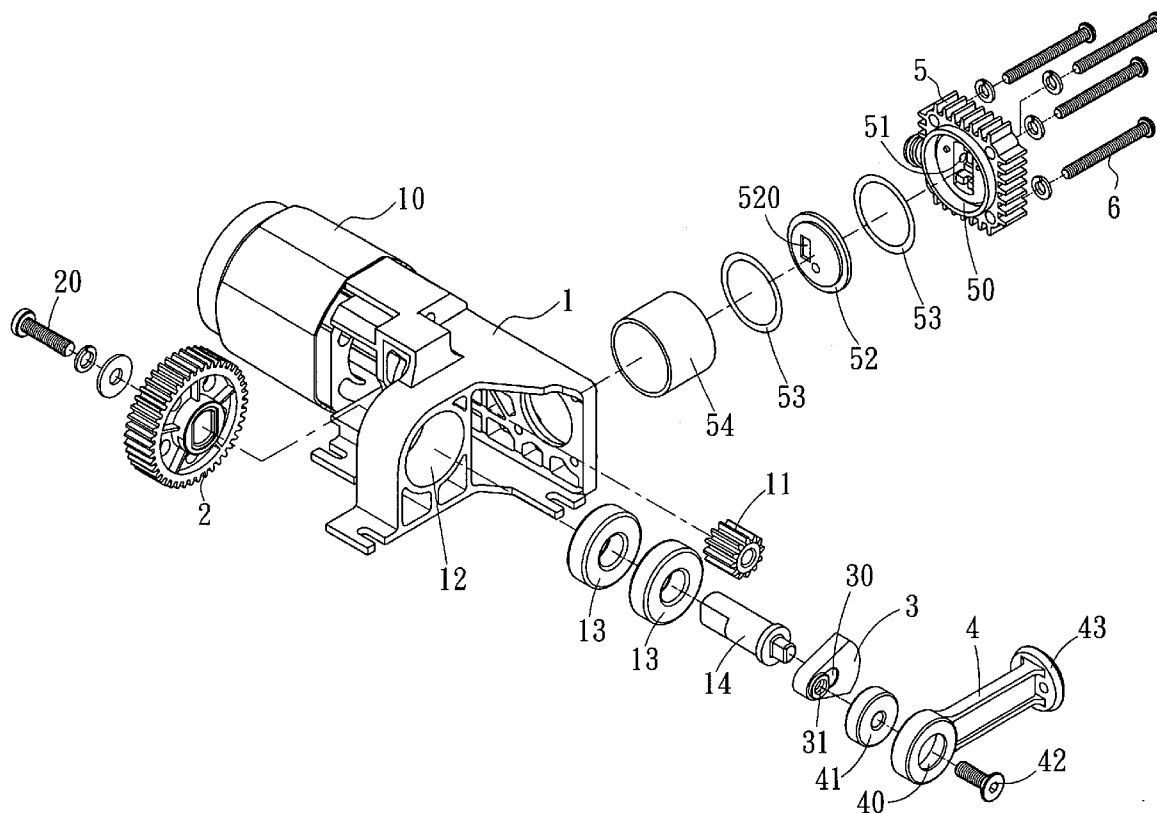
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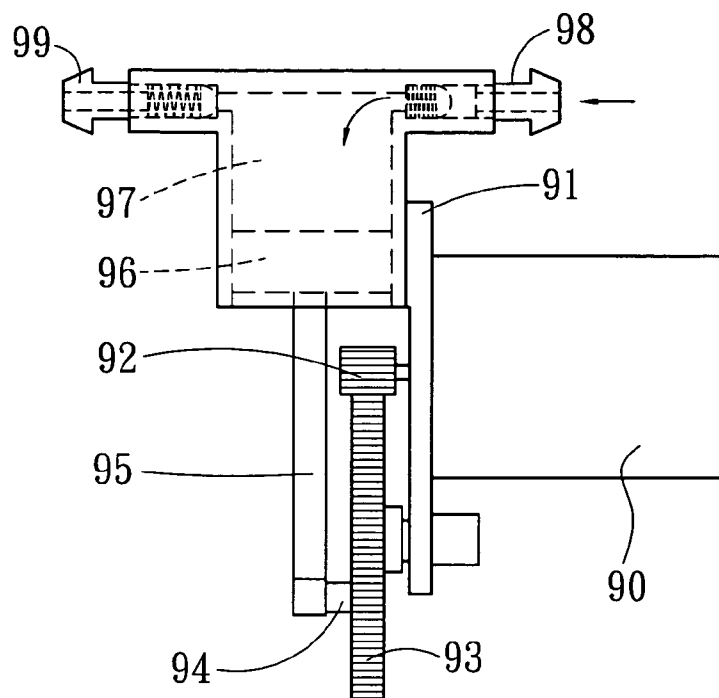
**ABSTRACT**

A driving device for an air compressor includes a base, a motor, a main gear, a subordinate gear, a shaft, a weight, and a driving arm combined with an air cylinder and a cylindrical member. When the motor is electrified, the main and the subordinate gear are rotated, with the subordinate gear rotating the shaft, which then rotates the weight. The weight then rotates centrifugally to let a first end of the driving arm rotate and then the piston formed the second end of the driving arm is moved to reciprocate back and forth in the cylindrical member to produce compressed air to flow out for use.

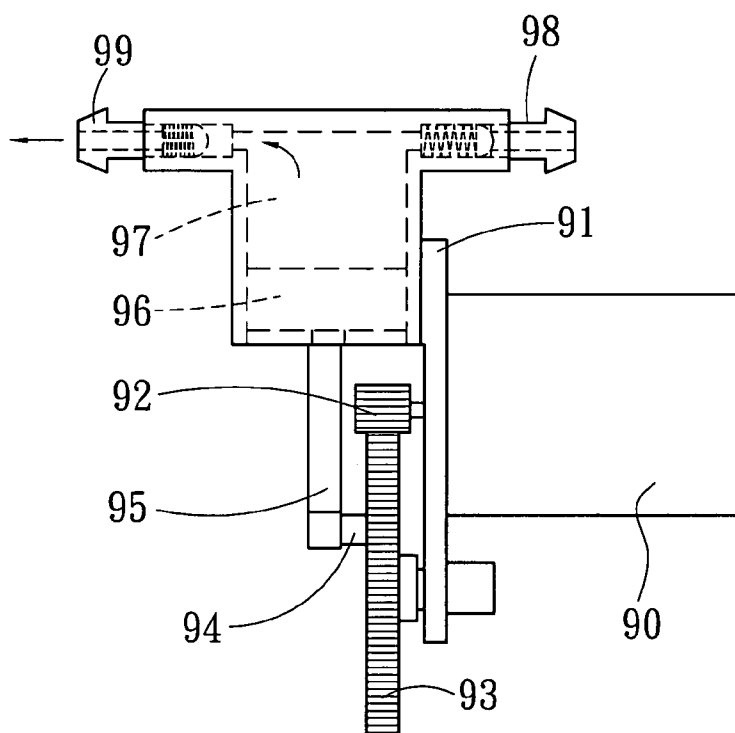
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**FIG.1** (PRIOR ART)



**FIG.2** (PRIOR ART)

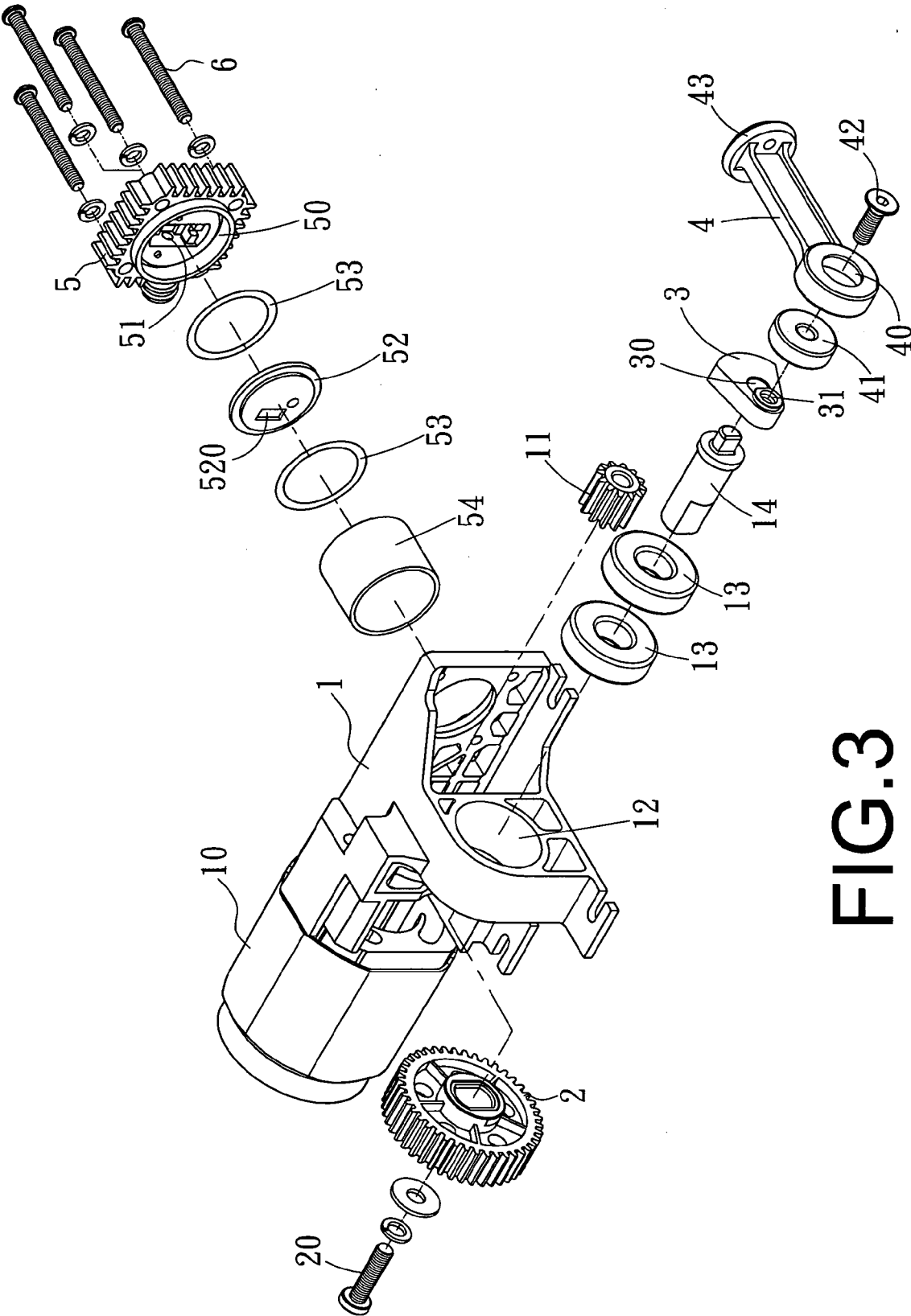


FIG.3

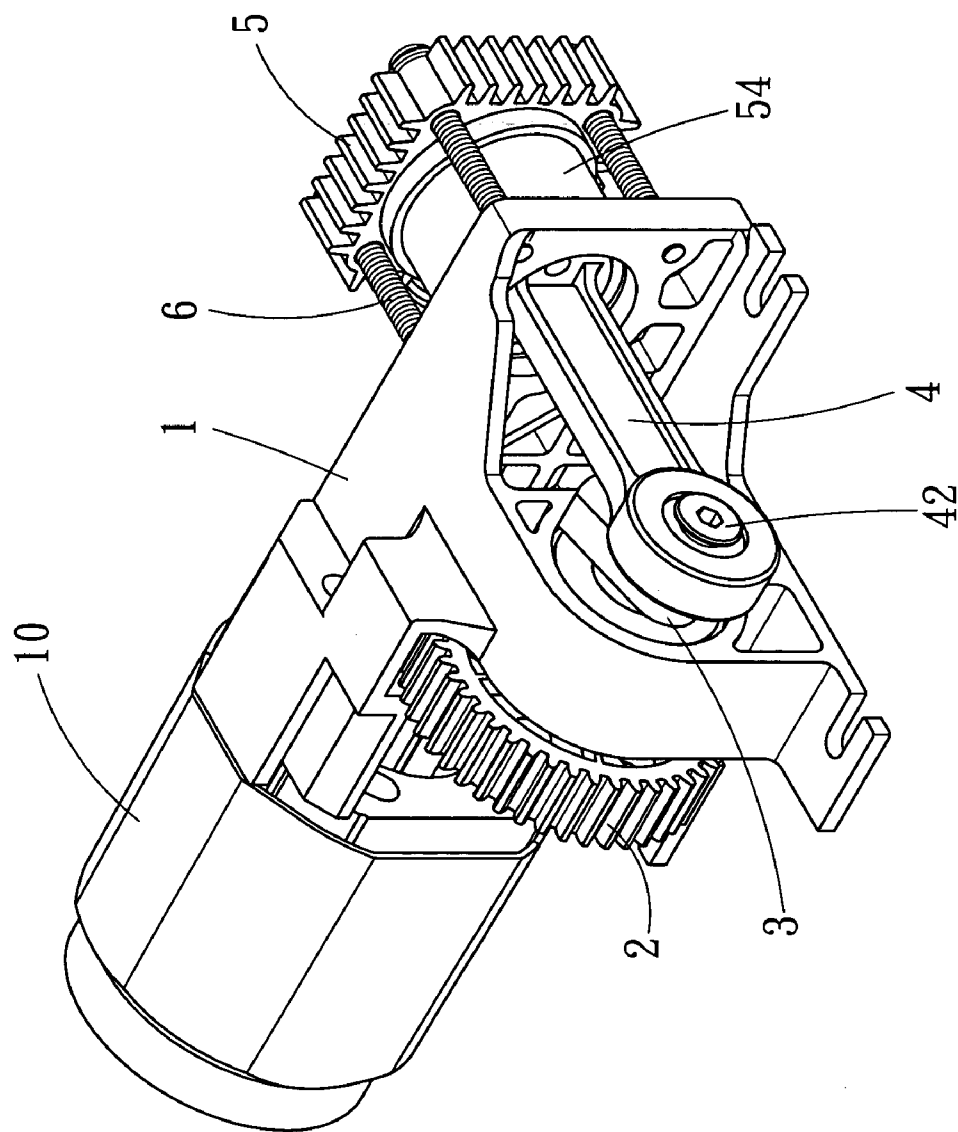
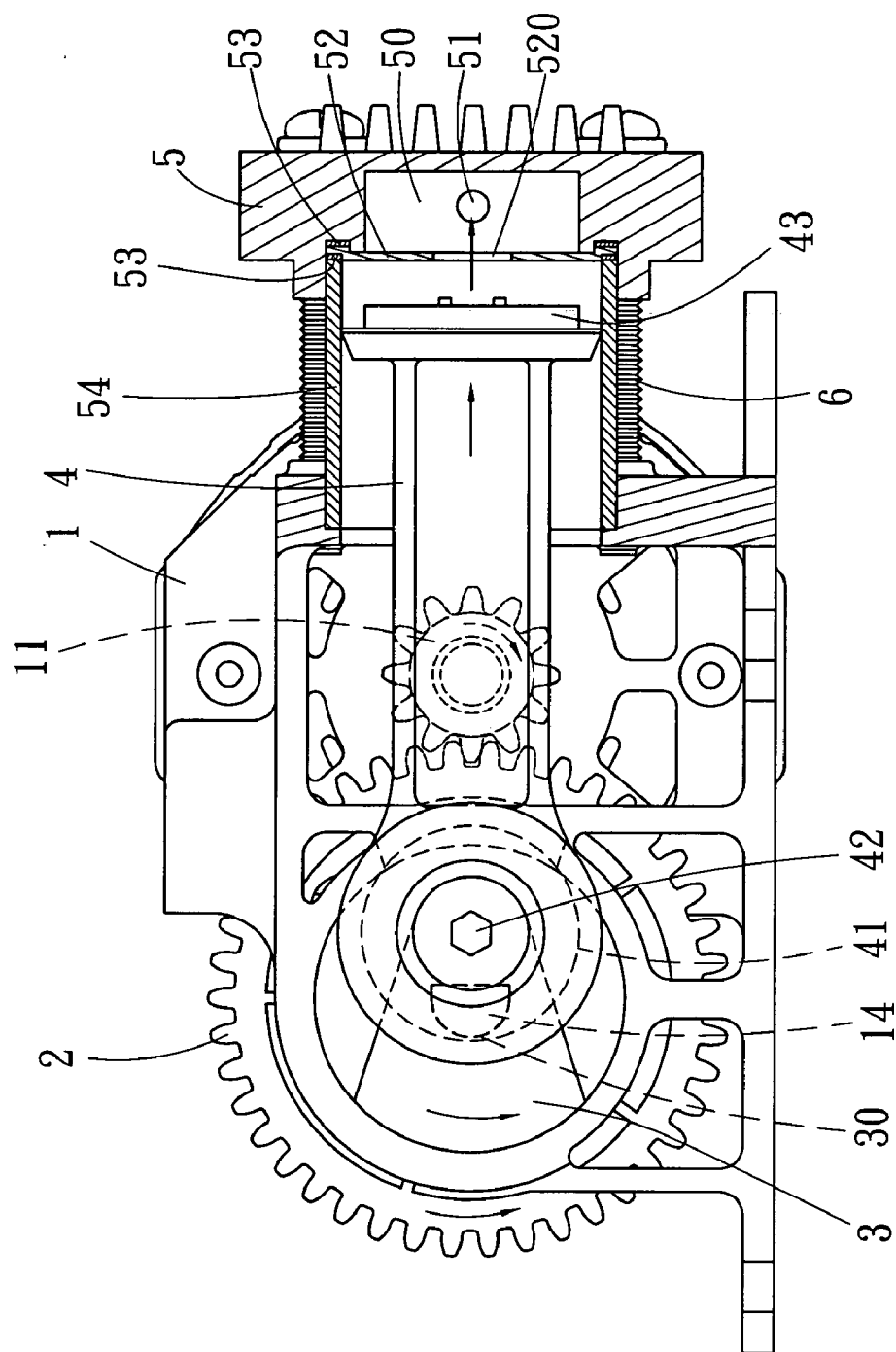


FIG. 4



# FIG. 5

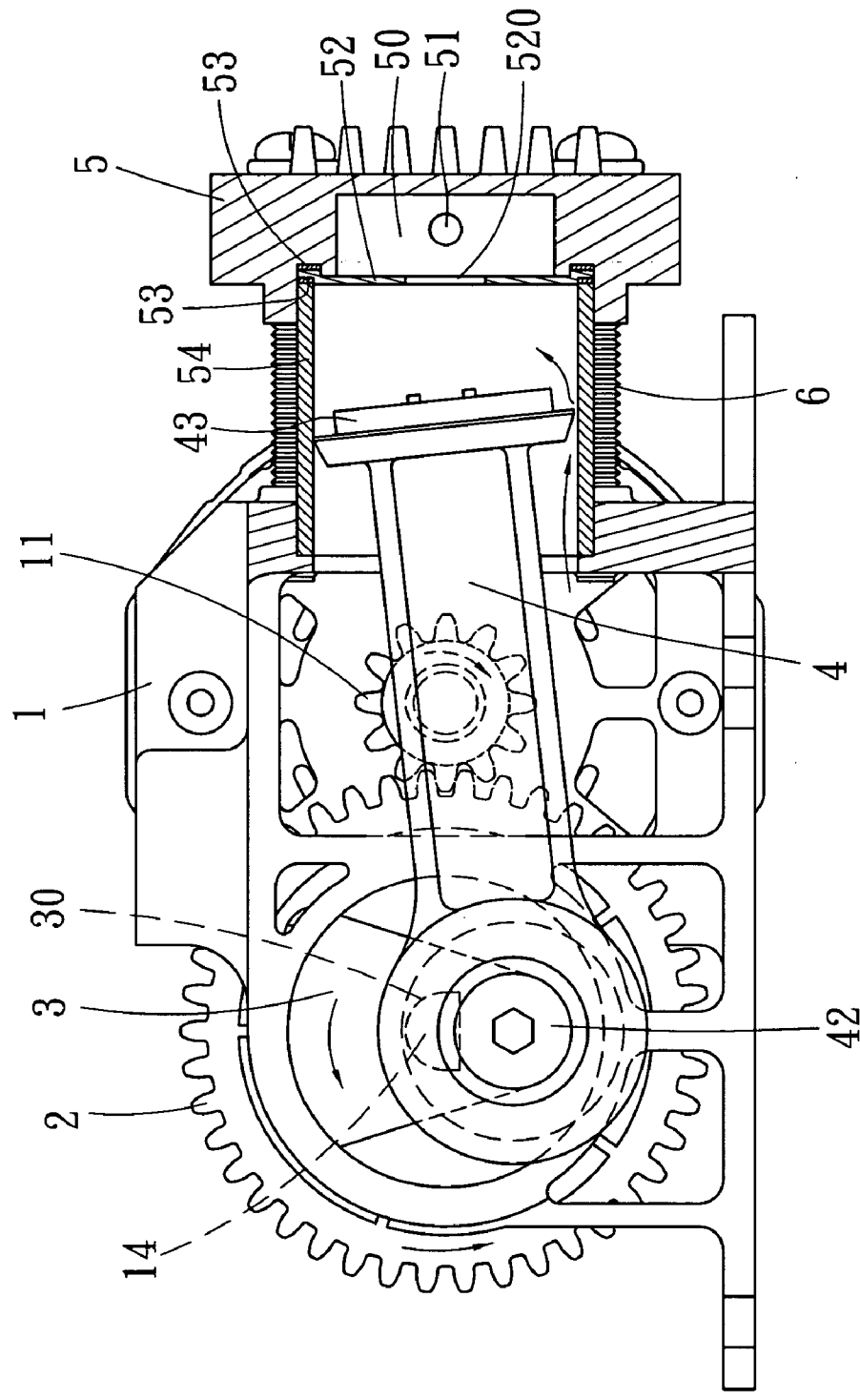
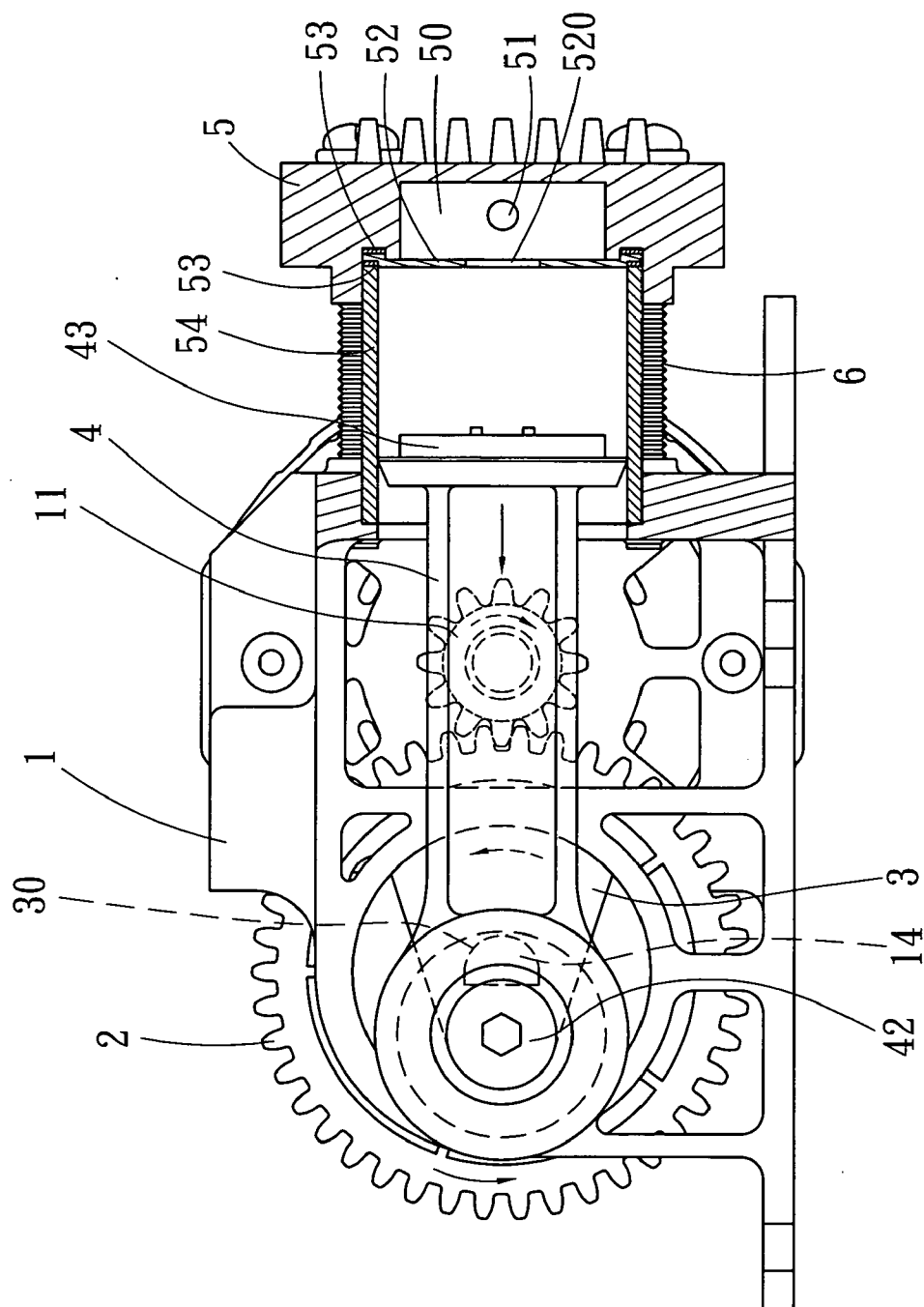


FIG.6



**FIG. 7**

## DRIVING DEVICE FOR AN AIR COMPRESSOR

### BACKGROUND OF THE INVENTION

#### [0001] 1. Field of the Invention

[0002] This invention relates to a driving device for an air compressor, particularly to one having a base, a main gear fixed on the base and engaging with a subordinate gear, a weight fixed on the shaft of the subordinate gear, and a driving arm connected with eccentrically with the weight. When a motor is powered, the main gear and the subordinate gear are orderly rotated to let the weight rotate so that the driving arm may eccentrically be moved so that a piston formed at one end of the driving arm and contained in an cylinder member to reciprocate for pushing out a large amount of compressed air.

#### [0003] 2. Description of the Prior Art

[0004] A conventional air compressor shown in **FIGS. 1 and 2**, includes a motor **90**, a fixing base **91** located in front of the motor **90**, a main gear **9** fixed on the spindle of the motor **90**, a subordinate gear **93** fixed on the fixing base **91** and engaging with the main gear **92**. Further, an eccentric shaft **94** is connected with the subordinate gear **93**, and a piston rod **95** is connected with the eccentric shaft **94**. Then the piston rod **95** has its end fixed with a piston **96** movably fitted in an air cylinder **97**, which has an inlet valve **98** and an outlet valve **99**.

[0005] When the motor **90** is powered, the main gear **92** is rotated and then the subordinate gear **93** is then rotated accordingly, moving the piston rod **95** with the piston **96** up and down. Then the piston **96** sucks in air during down movement in the air cylinder **97** and then into the air cylinder **97** through the inlet valve **98**, and compresses out air in the air cylinder **97** through the outlet valve **99** during up movement therein.

[0006] However, in the conventional air compressor the piston **96** generates sucking force during down movement, sucking outer air into the air cylinder **97** in a limited amount, and then presses out air in the air cylinder **97** through the outlet valve **99**, but the driving distance and force of the piston rod **95** is comparatively small, and accordingly the air amount compressed out is also comparatively small, not ideal in the inlet and outlet amount of air.

### SUMMARY OF THE INVENTION

[0007] This invention has been devised to offer a driving device for an air compressor, which is possible to produce a large amount of air pressure to obtain preferable intake and outgo of air pressure.

[0008] The feature of the invention is a motor, a main gear, a subordinate gear, a weight fixed on a shaft, and a driving arm having a piston at an end, and a air cylinder and a cylindrical member combined together. The motor is combined with a rear side of a base, having a spindle, and the main gear is fixed on the spindle and engaging with the subordinate gear fixed on the shaft, which the driving arm has its one end combined with. So when the motor is powered, the main and the subordinate gear are rotated together, and then the shaft rotates with the subordinate gear, also rotating the weight and a first end of the driving arm connected eccentrically with the weight so that the piston

formed at a second end of the driving arm may be moved to reciprocate back and forth in the cylindrical member to suck in air and compress out air out of the air cylinder to obtain a large amount of compressed air.

### BRIEF DESCRIPTION OF DRAWINGS

[0009] This invention will be better understood by referring to the accompanying drawings, wherein:

[0010] **FIG. 1** is a simple view of a conventional air compressor with air sucking condition;

[0011] **FIG. 2** is a simple cross-sectional view of the conventional air compressor;

[0012] **FIG. 3** is an exploded perspective view of a driving device for an air compressor in the present invention;

[0013] **FIG. 4** is a perspective view of the driving device for an air compressor in the present invention;

[0014] **FIG. 5** is a cross-sectional view of the driving device for an air compressor in the present invention, showing air compressed out;

[0015] **FIG. 6** is a cross-sectional view of the driving device for the air compressor in the present invention, showing air sucked in; and, **FIG. 7** is a cross-sectional view of the driving device for the air compressor in the present invention, showing the piston moved to the outermost point.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0016] A preferred embodiment of a driving device for an air compressor in the present invention, as shown in **FIGS. 3, 4 and 5**, includes a base **1**, a motor **10**, a main gear **11**, a subordinate gear **2**, a shaft **14**, a weight **3**, a driving arm **4**, an air cylinder **5**, and a cylindrical member **54** as main components.

[0017] The motor **10** is fixed with a rear side of the base **1**, and the base **1** has a hole **12** for two bearings **13** to fit therein, and a shaft **14** fitted through the two bearings **13**.

[0018] The main gear **11** is fixed on the spindle of the motor **10**, and located in parallel beside the hole **12** of the base **1**.

[0019] The subordinate gear **2** is fixed on a rear end of the shaft **14** with a screw **20**, engaging with the main gear **11** to rotate together.

[0020] The weight **3** is preferably fan-shaped, fixed eccentrically on a front end of the shaft **14** at its small end, having a shaft hole **30** and a threaded hole **31** in the small end.

[0021] The driving arm **4** has its first end eccentrically connected with the weight **3**, having the first end formed with a hole **40**, with a bearing **41** fitted in the hole **40** and a screw **42** passing through the bearing **41** and screwing with the weight **3**. The driving arm **4** has its second end formed with a piston **43**.

[0022] The air cylinder **5** is combined laterally with the front end of the base **1** by means of plural bolts **6**, provided with a recess **40** in a front portion, an air outlet **51** formed in the recess **40**, a disc **52** with a through hole **520** and two gaskets **53** sandwiching the disc **52** fitted in the recess **50**. Further, a cylindrical member **54** is provided, having one



end fitted stably in the recess **50** and the other end connected with the base **1**. The piston **43** of the driving arm **4** is movably contained in the cylindrical member **54**.

[0023] In using, referring to **FIGS. 4, 5, 6** and **7**, the motor **10** is first powered, and the main gear **11** is rotated by the motor **10**, with the subordinate gear **2** also rotated by the main gear **11**. Then the shaft **14** is rotated together with the subordinate gear **2**, driving the weight **3**, which rotates one end of the driving arm **4**, which then moves in a line to let the piston **43** to reciprocate back and forth in the cylindrical member **54**. Then the weight **3** is rotated to swing around centrifugally, with the first end of the driving arm **4** rotating. When the larger portion of the weight **3** moved to the outer side, the piston **43** is pushed to move further into the interior of the cylindrical member **54**, as shown in **FIG. 5**, with air squeezed through the through hole **520** of the disc **52** to flow out of the outlet **51**. As the weight **3** is rotating to have its larger portion coming to the upper side, the first end of the driving arm **4** is rotating downward, making the piston **43** inclined as shown in **FIG. 6**, with a gap formed between the lower side of the piston **43** and the inner wall of the cylindrical member **54**, so that outer air flows into the cylindrical member **54**, as the piston **43** moving outward may cause sucking force.

[0024] When the larger portion of the weight **3** rotates to move to the inner side, the piston **43** moves to the outermost point in the cylindrical member **54**, as shown in **FIG. 7**, with the piston **43** becoming located in parallel to the cylindrical member **54** in a sealed condition. In this way, the weight **3** is further rotated by the subordinate gear **2** to move the piston **43** reciprocate forcefully in the cylindrical member **54**, compressing out the air in the cylindrical member **54**.

[0025] As can be seen from the aforesaid description, the engagement and rotation of the main gear **11** and the subordinate **2** gear can force the weight **3** rotate stably and accurately so that the weight **3** can move the first end of the driving arm **4** to let the piston **43** reciprocate in the cylindrical member **54** and compressing a large amount of air for producing the most preferable intake and outgo of compressed air.

[0026] While the preferred embodiment of the invention has been described above, it will be recognize and under-

stood that various modifications may be made therein and appended claims are intended to cover all such modifications that may fall within the spirit and scope of the invention.

What is claimed is:

1. A driving device for an air compressor, said driving device comprising:

a base having a hole at a front-end, said hole having two bearings fitted therein, a shaft fitted through said two bearings;

a motor fixed at a rear side of said base, said motor having a spindle;

a main gear fixed on said spindle of said motor;

a subordinate gear fixed on a rear end of said shaft in said hole of said base and engaging with said main gear;

a weight of a preferably fan-shaped fixed on an outer end of said shaft;

a driving shaft having a first end combined eccentrically with said weight by means of a screw and having a hole at said first end, a bearing fitted in said hole, said driving shaft having a second end formed with a piston;

an air cylinder fixed laterally at a front end of said base and having a recess, an air outlet formed in said recess, a disc with a through hole and two gaskets sandwiching said disc fitted in said recess, a cylindrical member having one end fixed with said recess of said air cylinder and the other end connected with said base, said piston of said driving arm movably fitted in said cylindrical member; and,

said driving arm moved to reciprocate back and forth by said weight rotated by said main gear and said subordinate gear after said motor is powered to rotate said main gear, said piston of said driving arm thus moved to reciprocate in said cylindrical member so that air can be sucked in and compressed to be exhausted out of said air cylinder to produce compressed air for use.

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