Innovation, Sciences et Développement économique Canada
Office de la Propriété Intellectuelle du Canada

Innovation, Science and Economic Development Canada
Canadian Intellectual Property Office

CA 2820055 C 2019/12/31

(11)(21) 2 820 055

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(22) Date de dépôt/Filing Date: 2013/07/09

(41) Mise à la disp. pub./Open to Public Insp.: 2015/01/09

(45) Date de délivrance/Issue Date: 2019/12/31

(51) Cl.Int./Int.Cl. *A01G 23/00* (2006.01)

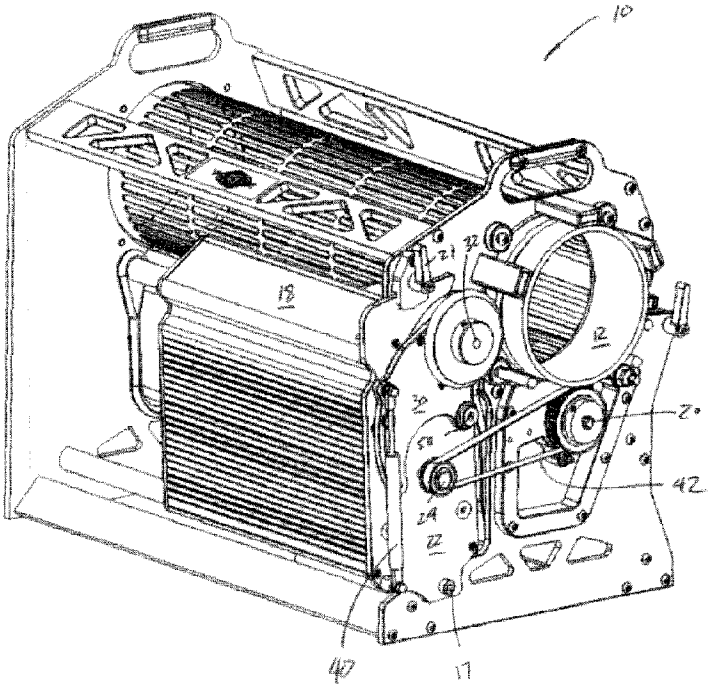
(72) Inventeurs/Inventors:
EVANS, JAY, CA;
MCKELLAR, AARON, CA

(73) Propriétaire/Owner:
KEIRTON INC., CA

(74) Agent: NEXUS LAW GROUP LLP

(54) Titre : CARTER DE MOTEUR AMOVIBLE POUR DISPOSITIF DE TAILLAGE DE MATIERE VEGETALE

(54) Title: REMOVABLE MOTOR HOUSING FOR A PLANT MATERIAL TRIMMING DEVICE



(57) Abrégé/Abstract:
A removable motor housing for a plant material trimming device. The removable housing may include a first motor housing connectable to the plant trimming device. The first motor housing may be slidably or pivotably connectable to the plant trimming device. The first motor housing may be operable to receive an output shaft from a first motor in the first housing. The output shaft may be operable to communicate with an input shaft of the plant trimming device. A biasing device may be connectable to the first motor housing and the plant trimming device for biasing the first motor housing into a first position. When the first motor housing is in the first position a substantially constant force is applied between the input shaft of the plant trimming device and the output shaft of the first motor.

ABSTRACT

A removable motor housing for a plant material trimming device. The removable housing may include a first motor housing connectable to the plant trimming device. The first motor housing may be slidably or pivotably connectable to the plant trimming device. The first motor housing may be operable to receive an output shaft from a first motor in the first housing. The output shaft may be operable to communicate with an input shaft of the plant trimming device. A biasing device may be connectable to the first motor housing and the plant trimming device for biasing the first motor housing into a first position. When the first motor housing is in the first position a substantially constant force is applied between the input shaft of the plant trimming device and the output shaft of the first motor.

TITLE OF THE INVENTION

REMOVABLE MOTOR HOUSING FOR A PLANT MATERIAL TRIMMING DEVICE

COPYRIGHT NOTICE

FIELD OF THE INVENTION

The invention relates to the field of plant trimming devices, and in particular, to a removable motor housing for a plant mater trimming device.

BACKGROUND OF THE INVENTION

Plant trimming devices have been in operation for some time. Generally, these devices incorporate a fixed blade mechanism for trimming away plant material rotated in an adjacent tumbler. Additionally, these devices incorporate a fixed motor housing that houses a motor(s) that run the device. As conventional motor housings are fixed to plant trimming devices, the motors are fixed in location relative to the tumbler and blade mechanisms. Over time and use, contact points between the motors, tumblers and blade devices become worn, necessitating constant maintenance and replacement of parts such as belts and drive wheels. Furthermore in operation, belts lose their tension and drive wheels lose their contact points which causes inefficiencies in the operation of the plant trimming devices. Accordingly, a need exists for a removable motor housing that is easy to remove and self corrects the motor(s) position within the plant trimming

device. Other objects of the invention will be apparent from the description that follows.

SUMMARY OF THE INVENTION

According to the present invention there is provided a removable motor housing for a plant material trimming device. The plant trimming device has an input shaft in communication therewith. The removable housing includes a first motor housing connectable to the plant trimming device. The first motor housing may be slidably or pivotably connectable to the plant trimming device. The first motor housing may be operable to receive an output shaft from a first motor in the first housing. The output shaft may be operable to communicate with the input shaft of the plant trimming device. A biasing device may be connectable to the first motor housing and the plant trimming device for biasing the first motor housing into a first position. When the first motor housing is in the first position a substantially constant force is applied between the input shaft of the plant trimming device and the output shaft of the first motor.

The input shaft and the output shaft may be in direct mechanical communication with one-another, in which case, the constant force is a compressive force across gears, rollers or the like. Alternatively, the input shaft and the output shaft may be in indirect mechanical communication with one-another, for example, via a tensile force across a belt, cable, chain or the like.

The biasing device may be a nut and bolt, a spring, a bungee cord, a hydraulic cylinder, clamping device, or the like.

In accordance with another aspect of the present invention there is provided a removable motor housing for a plant material trimming device. The plant trimming device has a tumbler and an input shaft in communication with the plant trimming device. The removable housing includes a first motor housing

connectable to the plant trimming device. The first motor housing may be operable to receive an output shaft from a first motor in the first housing. The first output shaft may be operable to communicate with the input shaft of the plant trimming device. A second motor housing may be connectable to the first motor housing and it may be operable to receive an output shaft from a second motor in the second housing. The second output shaft may be operable to communicate with the tumbler.

A first biasing device may be connectable to the first motor housing and the plant trimming device for biasing the first motor housing into a first position. When the first motor housing is in the first position a substantially constant force is applied between the input shaft of the plant trimming device and the output shaft of the first motor.

A second biasing device may be connectable to the second motor housing and the plant trimming device for biasing the second motor housing into a second position. When the second motor housing is in the second position a substantially constant force is applied between the tumbler and the output shaft of the second motor.

The first and second motor housings may be slidably or pivotably connectable to the plant trimming device. Additionally, the first and second motor housings may be pivotably connectable to one-another.

The input shaft and the first output shaft may be in direct mechanical communication with one-another, in which case, the constant force is a compressive force across gears, rollers or the like. The tumbler and the second output shaft may also be in direct mechanical communication with one-another in which case, the constant force is also a compressive force across gears, rollers or the like.

Alternatively, the input shaft and the first output shaft may be in indirect mechanical communication with one-another, for example, via a tensile force across a belt, cable, chain or the like. Similarly, the tumbler and the second output shaft may be in indirect mechanical communication with one-another, for example, via a tensile force across a belt, cable, chain or the like.

The first and second biasing devices may be a nut and bolt, a spring, a bungee cord, a hydraulic cylinder, clamping device, or the like.

In accordance with yet another aspect of the present invention there is provided a removable motor housing for a plant material trimming device. The plant trimming device has a tumbler and an input shaft in communication with the plant trimming device. The removable housing includes a first motor housing connectable to the plant trimming device which is operable to receive an output shaft from a first motor in the first housing. The first output shaft may be operable to communicate with the input shaft of the plant trimming device. A second motor housing may be connectable to the first motor housing and it may be operable to receive an output shaft from a second motor in the second housing. The second output shaft may be operable to communicate with the tumbler

A biasing device may be connectable to the first and second motor housings for biasing the first motor housing into a first position and biasing the second motor housing into a second position. When the first motor housing is in the first position a substantially constant force is applied between the input shaft of the plant trimming device and the output shaft of the first motor and when the second motor housing is in the second position a substantially constant force is applied between the tumbler and the output shaft of the second motor.

The first and second motor housings may be slidably or pivotably connectable to the plant trimming device. Additionally, the first and second motor housings may be pivotably connectable to one-another.

The input shaft and the first output shaft may be in direct mechanical communication with one-another, in which case, the constant force is a compressive force across gears, roller or the like. The tumbler and the second output shaft may also be in direct mechanical communication with one-another, in which case, the constant force is also a compressive force across gears, roller or the like.

The input shaft and the first output shaft may be in indirect mechanical communication with one-another while the tumbler and the second output shaft may be in direct mechanical communication with one-another. Here, the constant force across the input shaft and first output shaft is a tensile force via a belt, cable, chain or the like and the constant force across the tumbler and the second output shaft is a compressive force across gears, roller or the like.

The input shaft and the first output shaft may be in direct mechanical communication with one-another while the tumbler and the second output shaft may be in indirect mechanical communication with one-another. Here, the constant force across the input shaft and first output shaft is a compressive force across gears, roller or the like and the constant force across the tumbler and the second output shaft is a tensile force via a belt, cable, chain or the like.

The input shaft and the first output shaft may be in indirect mechanical communication with one-another while the tumbler and the second output shaft may also be in indirect mechanical communication with one-another. The indirect mechanical communication may occur via a tensile force across a belt, cable, chain or the like.

The biasing device may be a hydraulic cylinder or spring connectable to the first and second motor housings.

Other aspects of the invention will be appreciated by reference to the detailed description of the preferred embodiment and to the claims that follow.

BRIEF DESCRIPTION OF THE DRAWINGS

The preferred embodiment of the invention will be described by reference to the drawings thereof in which:

Fig. 1 is perspective view of a plant material trimming device;

Fig. 2 is a reverse perspective view of the plant material trimming device of Fig. 1 showing a removable motor housing inside the plant material trimming device;

Fig. 3 is a reverse perspective view of the plant material trimming device of Fig. 1 showing a removable motor housing removed from the plant material trimming device;

Fig. 4 is a perspective view of an embodiment of the removable motor housing inside the plant material trimming system;

Fig. 5 is a perspective view of another embodiment of the removable motor housing inside the plant material trimming system;

Fig. 6 is a perspective view of another embodiment of the removable motor housing inside the plant material trimming system;

Fig. 7a is a perspective view of the removable motor housing inside the plant material trimming system of Fig. 6 in another configuration;

Fig. 7b is a perspective view of the removable motor housing inside the plant material trimming system of Fig. 6 in another configuration;

Fig. 8 is a perspective view of the removable motor housing inside the plant material trimming system of Fig. 6 in another configuration; and

Fig. 9 is a perspective view of the removable motor housing inside the plant material trimming system of Fig. 6 in another configuration.

DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

Referring to Fig.1, a plant material trimming device **10** is depicted. The device **10** includes a tumbler **12** residing inside of the device. Plant material that requires trimming is inserted into a hopper **14** which then feeds the plant material into the tumbler **12**. A removable blade mechanism **16** is situated inside of the device **10** and adjacent the tumbler **12**. As the plant material is tumbled in the tumbler **12**, the blade mechanism **16** cuts the plant material in a scissor-like fashion as the plant material is exposed between the blade mechanism and tumbler walls. Referring to Fig. 2, a removable motor housing **18** is also situated inside the device **10** and adjacent the tumbler **12**.

Referring to Fig. 4, the plant trimming device **10** has an input shaft **20** in communication therewith. The removable housing **18** includes a first motor housing **22** connectable to the plant trimming device. As depicted in Figs. 2 and 3, the first motor housing may be slidably connected to the plant trimming device **10**. Here, the plant trimming device has rails **13** for which runners **15** of the first motor housing 18 may slidably engage. Referring back to Fig. 4, alternatively, the first motor housing may be pivotably connectable via a pin **17** to the plant trimming device **10**. The first motor housing **22** is operable to receive an output

shaft **24** from a first motor (not depicted) in the first housing **22**. The output shaft **24** is operable to communicate with the input shaft **20** of the plant trimming device. A biasing device is connectable to the first motor housing **22** and the plant trimming device **10** for biasing the first motor housing into a first position. As depicted, the biasing device is a clamping device **26**, but as those skilled in the art will appreciate, the biasing device may also be a nut and bolt, a spring, a bungee cord, a hydraulic cylinder, or the like.

When the first motor housing **22** is in the first position a substantially constant force is applied between the input shaft **20** of the plant trimming device **10** and the output shaft **24** of the first motor. The input shaft **20** and the output shaft **24** may be in direct mechanical communication with one-another, in which case, the constant force is a compressive force across gears, roller or the like. Alternatively, and as depicted, the input shaft **20** and the output shaft **24** may be in indirect mechanical communication with one-another, for example, via a tensile force across a belt **28** cable, chain or the like. Here, the first motor of the first motor housing **22** drives the output shaft **24**, which in turns, drives both the input shaft **20** and the tumbler **12** via belt **28**.

In another embodiment, as depicted in Fig. 5, a second motor housing **30** is pivotably connectable to the first motor housing **22** via a pin **19** and is operable to receive an output shaft **32** from a second motor (not depicted) in the second housing. This second output shaft **32** is operable to communicate with the tumbler **12**. Here, a first self-biasing device **34** (such as a spring, bungee cord, hydraulic cylinder, or the like) is connectable to the first motor housing **22** and the plant trimming device **10** for biasing the first motor housing into a first position. When the first motor housing **22** is in the first position a substantially constant force is applied between the input shaft **20** of the plant trimming device **10** and the output shaft **24** of the first motor from the first housing **22**. A second self-biasing device **36** (such as a nut and bolt, spring, bungee cord, hydraulic cylinder, clamping device, or the like) is also connectable to the second motor

housing **30** and the plant trimming device **10** or first motor housing **22** (as depicted) for biasing the second motor housing into a second position. When the second motor housing **30** is in the second position a substantially constant force is applied between the tumbler **12** and the output shaft **32** of the second motor of the second motor housing **30**.

The input shaft **20** and the first output shaft **24** may be in direct mechanical communication with one-another, in which case, the constant force is a compressive force across gears, rollers or the like. The tumbler **12** and the second output shaft **32** may also be in direct mechanical communication with one-another in which case, the constant force is also a compressive force. Alternatively, and as depicted the input shaft **20** and the first output shaft **24** may be in indirect mechanical communication with one-another, for example, via a tensile force across a belt **38** cable, chain or the like. Similarly, the tumbler **12** and the second output shaft **32** may be in indirect mechanical communication with one-another, for example, via a tensile force across another belt **40** cable, chain or the like. Here, the first motor of the first motor housing **22** drives the output shaft **24**, which in turns, drives the input shaft **20** via belt **38**. Additionally, the second motor of the second motor housing **30** drives the output shaft **32** and the tumbler **12** via belt **40**. A locking device **21** may be incorporated to lock the removable motor housing **18** to the plant trimming device **10**.

Figs. 6, 7a, 7b, 8 and 9 depict another embodiment of the present invention. As before, the invention includes a removable motor housing **18** for a plant material trimming device **10**. As depicted, the removable housing **18** may be pivotably connectable via pin **17** to the plant trimming device **10**. The removable housing **18** may alternatively be slidably connectable to the plant trimming device in the same fashion as depicted in Figs. 2 and 3. Referring back to Figs. 6, 7a, 7b,, 8 and 9, the plant trimming device **10** has a tumbler **12** and an input shaft **20** in communication with the plant trimming device. The removable housing **18** includes a pivotably connectable first motor housing **22** and a pivotably

connectable second motor housing **30**, each connectable to one-another via pin **50**. The first motor housing **22** is operable to receive an output shaft **24** from a first motor (not depicted) which is operable to communicate with the input shaft **20** of the plant trimming device **10**. The second motor housing **30** is operable to receive an output shaft **32** from a second motor (not depicted) which is operable to communicate with the tumbler **12**.

A self-biasing device **40** (such as a spring, bungee cord, hydraulic cylinder, or the like) is connectable to both the first **22** and second **30** motor housings for biasing the first motor housing into a first position and biasing the second motor housing into a second position. the first motor housing **22** is in the first position a substantially constant force is applied between the input shaft **20** and the output shaft **24** and when the second motor housing **30** is in the second position a substantially constant force is applied between the tumbler **12** and the output shaft **32**.

As depicted in Fig. 6, when the input shaft **20** and the first output shaft **24** are in direct mechanical communication with one-another across gears, rollers (as depicted) or the like, a constant compressive force is applied there between. Similarly, when the tumbler **12** and the second output shaft **32** are in direct mechanical communication with one-another across gears, rollers (as depicted) or the like, a constant compressive force is also applied there between. Here, self-biasing device **40** may be a hydraulic cylinder or the like that forces first **22** and second **30** motor housings away from each other at their respective connection points. Once the first **22** and second **30** motor housings are located in their respective positions so that the constant forces are applied between the first output shaft **24** and input shaft **20** and second output shaft **32** and tumbler **12**, a locking device **21** may be incorporated to lock the removable motor housing **18** to the plant trimming device **10**.

As depicted in Fig. 7a, when the input shaft **20** and the first output shaft **24** are in indirect mechanical communication with one-another, a constant tensile force is applied there between via a belt **42**, cable, chain or the like. On the other hand, when the tumbler **12** and the second output shaft **32** are in direct mechanical communication with one-another across gears, rollers (as depicted) or the like, a constant compressive force is applied there between. Here, self-biasing device **40** may be a hydraulic cylinder or the like that forces the second **30** motor housing toward the tumbler **12** and the first motor housing **22** away from the input shaft **20**. Here, first motor housing **22** may be locked from pivoting about pin **50**. Furthermore, once the first **22** and second **30** motor housings are located in their respective positions so that the constant forces are applied between the first output shaft **24** and input shaft **20** and second output shaft **32** and tumbler **12**, a locking device **21** may be incorporated to lock the removable motor housing **18** to the plant trimming device **10**.

As depicted in Fig. 7b, when the input shaft **20** and the first output shaft **24** are in indirect mechanical communication with one-another, a constant tensile force is applied there between via a belt **42**, cable, chain or the like. On the other hand, when the tumbler **12** and the second output shaft **32** are in direct mechanical communication with one-another across gears, rollers (as depicted) or the like, a constant compressive force is applied there between. Here, self-biasing device **40** may be a hydraulic cylinder or the like that forces the second **30** motor housing toward the tumbler **12** when first motor housing **22** is pulled away from the input shaft **20**. Furthermore, once the first **22** and second **30** motor housings are located in their respective positions so that the constant forces are applied between the first output shaft **24** and input shaft **20** and second output shaft **32** and tumbler **12**, a locking device **21** may be incorporated to lock the removable motor housing **18** to the plant trimming device **10**.

As depicted in Fig. 8, when the input shaft **20** and the first output shaft **24** are in direct mechanical communication with one-another, across gears, rollers (as

depicted) or the like, a constant compressive force applied there between. On the other hand, when the tumbler **12** and the second output shaft **32** are in indirect mechanical communication with one-another, a constant compressive tensile force applied there between via a belt **42**, cable, chain or the like. Here, self-biasing device **40** may be a hydraulic cylinder or the like that forces the second **30** motor housing away from the tumbler **12** and the first motor housing **22** towards the input shaft **20**. Here, second motor housing **30** may be locked from pivoting about pin **50**. Furthermore, once the first **22** and second **30** motor housings are located in their respective positions so that the constant forces are applied between the first output shaft **24** and input shaft **20** and second output shaft **32** and tumbler **12**, a locking device **21** may be incorporated to lock the removable motor housing **18** to the plant trimming device **10**.

As depicted in Fig. 9, when the input shaft **20** and the first output shaft **24** are in indirect mechanical communication with one-another, a constant tensile force is applied there between via a belt **42**, cable, chain or the like. Similarly, when the tumbler **12** and the second output shaft **32** are in indirect mechanical communication with one-another, a constant tensile force is applied there between via another belt **42**, cable, chain or the like. Here, self-biasing device **40** may be a hydraulic cylinder or the like that forces first **22** and second **30** motor housings towards each other at their respective connection points. Once the first **22** and second **30** motor housings are located in their respective positions so that the constant forces are applied between the first output shaft **24** and input shaft **20** and second output shaft **32** and tumbler **12**, a locking device **21** may be incorporated to lock the removable motor housing **18** to the plant trimming device **10**.

It will thus be seen that a new and removable motor housing for a plant material trimming device has been illustrated and described and it will be apparent to those skilled in the art that the preferred and alternative embodiments have been

described in some detail but that certain modifications may be practiced without departing from the principles of the invention.

5

CLAIMS

What is Claimed is:

1. A removable motor housing for a plant material trimming device, the plant trimming device having an input shaft in communication therewith, the removable housing comprising:

a first motor housing connectable to the plant trimming device, said first motor housing operable to receive an output shaft from a first motor in said first housing, said output shaft operable to communicate with the input shaft of the plant trimming device; and

a second motor housing connectable to said first motor housing, said second motor housing operable to receive an output shaft from a second motor in said second housing, said second output shaft operable to communicate with the tumbler;

first biasing means connectable to said first motor housing and the plant trimming device for biasing said first motor housing into a first position wherein when said first motor housing is in said first position a substantially constant force is applied between the input shaft of the plant trimming device and the output shaft of said first motor; and

second biasing means connectable to said second motor housing and the plant trimming device for biasing said second motor housing into a second position wherein when said second motor housing is in said second position a substantially constant force is applied between the tumbler and the output shaft of said second motor.

2. The removable housing of claim 1 wherein said first motor housing is slidably connectable to the plant trimming device.

3. The removable housing of claim 1 wherein said first motor housing is pivotably connectable to the plant trimming device.

4. The removable housing of claim 1 wherein said second motor housing is slidably connectable to the plant trimming device.

5. The removable housing of claim 1 wherein said second motor housing is pivotably connectable to the plant trimming device.

6. The removable housing of claim 1 wherein said first and second motor housings are pivotably connectable to one-another.

7. The removable housing of claim 1 wherein the input shaft and said first output shaft are in direct mechanical communication with one another.

8. The removable housing of claim 1 wherein the tumbler and said second output shaft are in direct mechanical communication with one another.

9. The removable housing of claim 1 wherein the input shaft and said first output shaft are in indirect mechanical communication with one another.

10. The removable housing of claim 1 wherein the tumbler and said second output shaft are in indirect mechanical communication with one another.

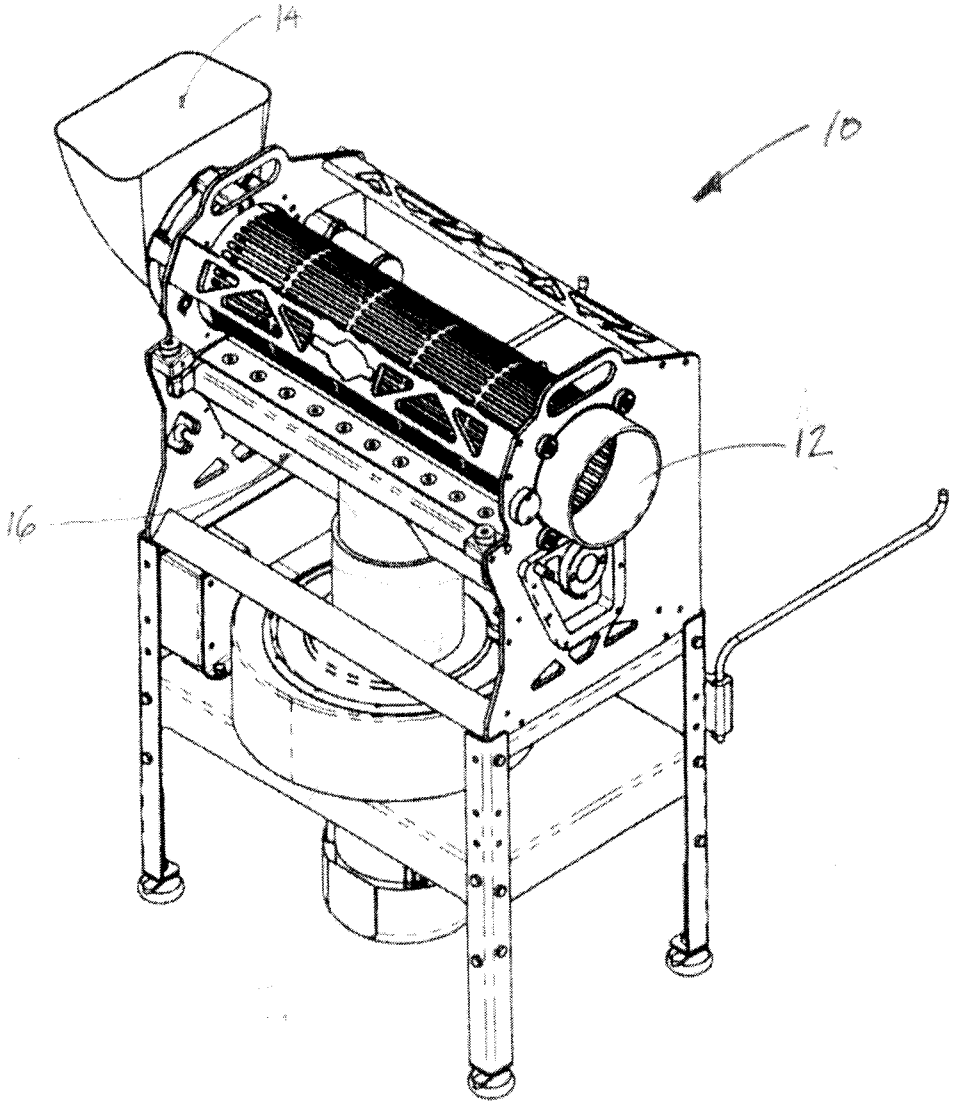


FIG. 1

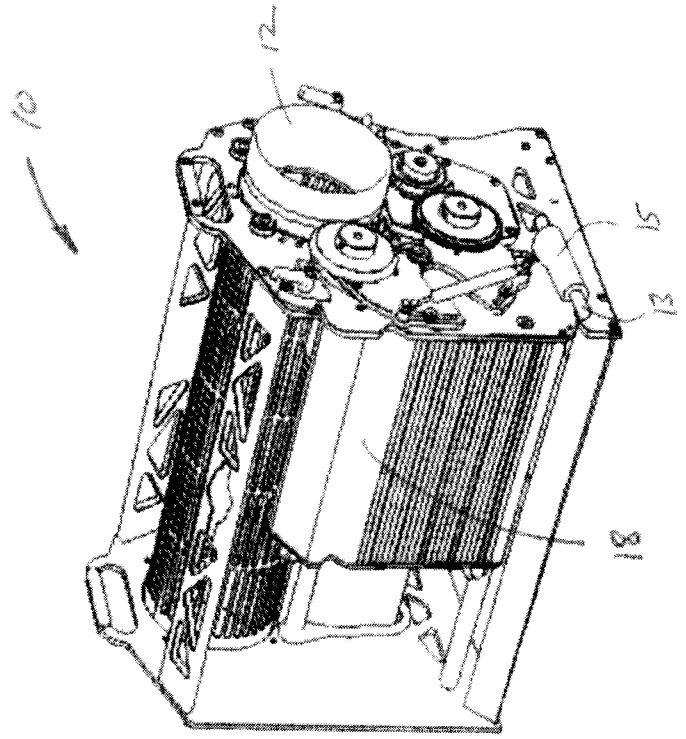


FIG. 2

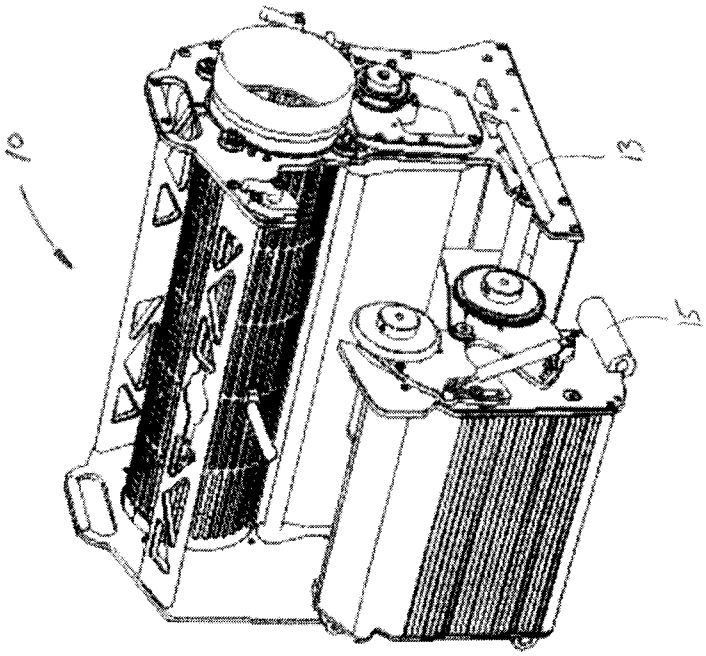


FIG. 3

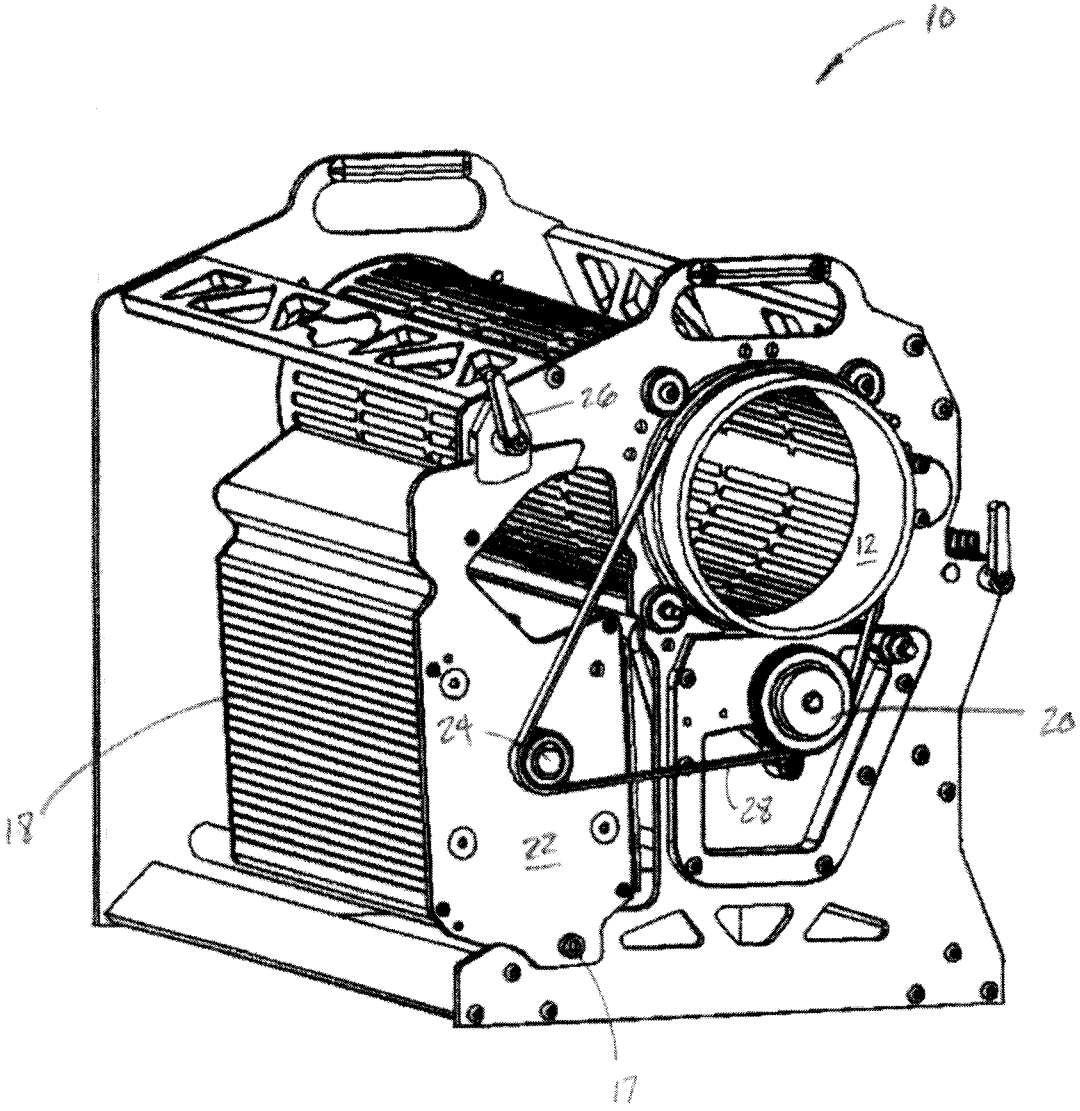


FIG. 4

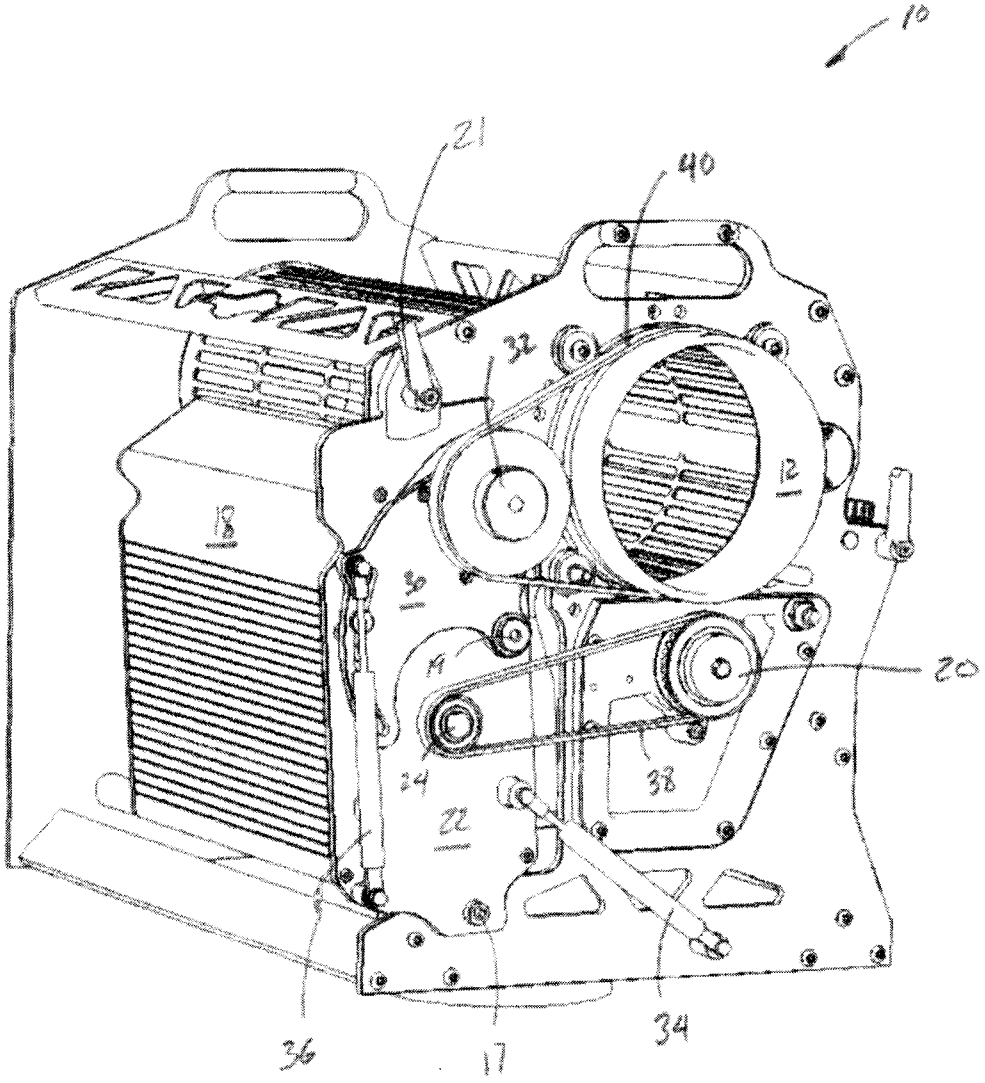


FIG. 5

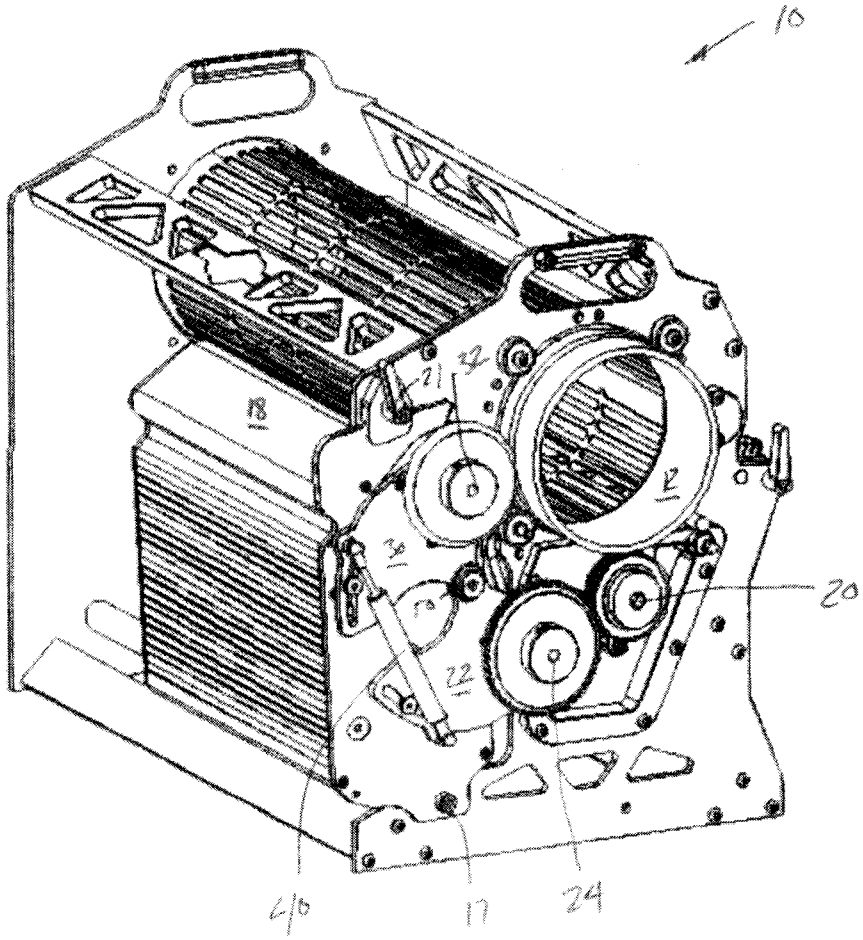


FIG 6

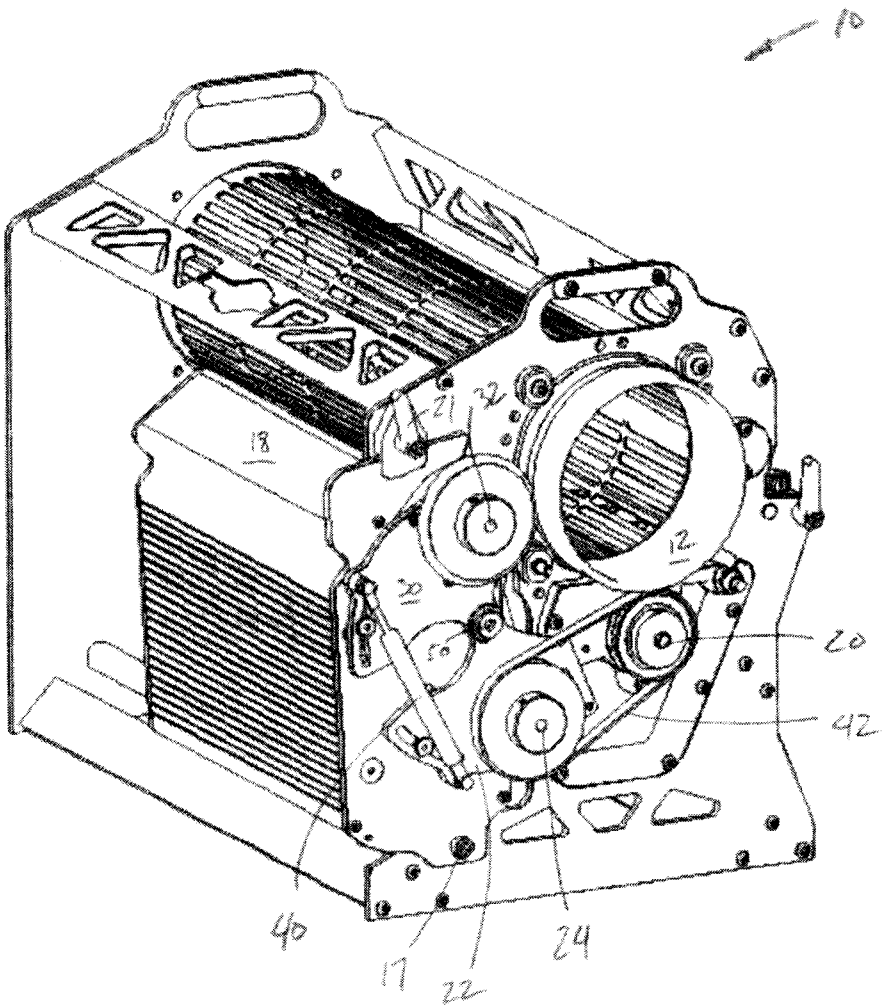


FIG 7a

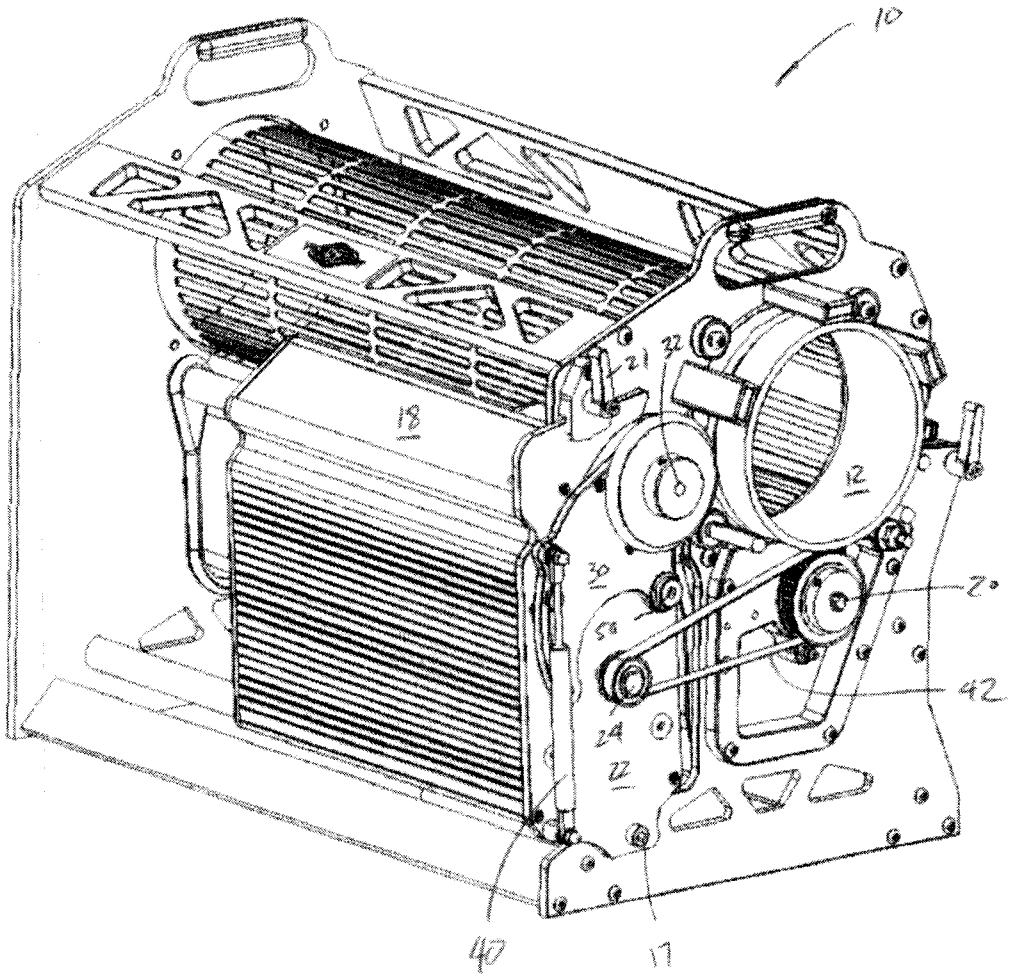


Fig. 7b

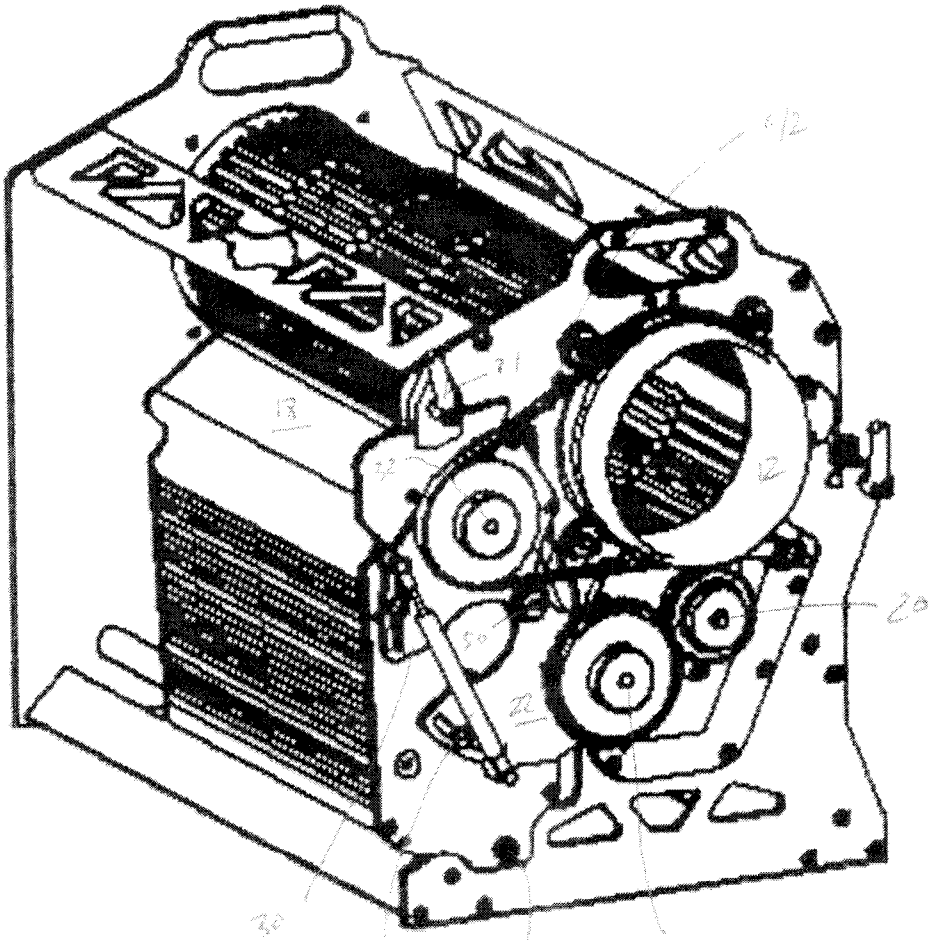


FIG. 3

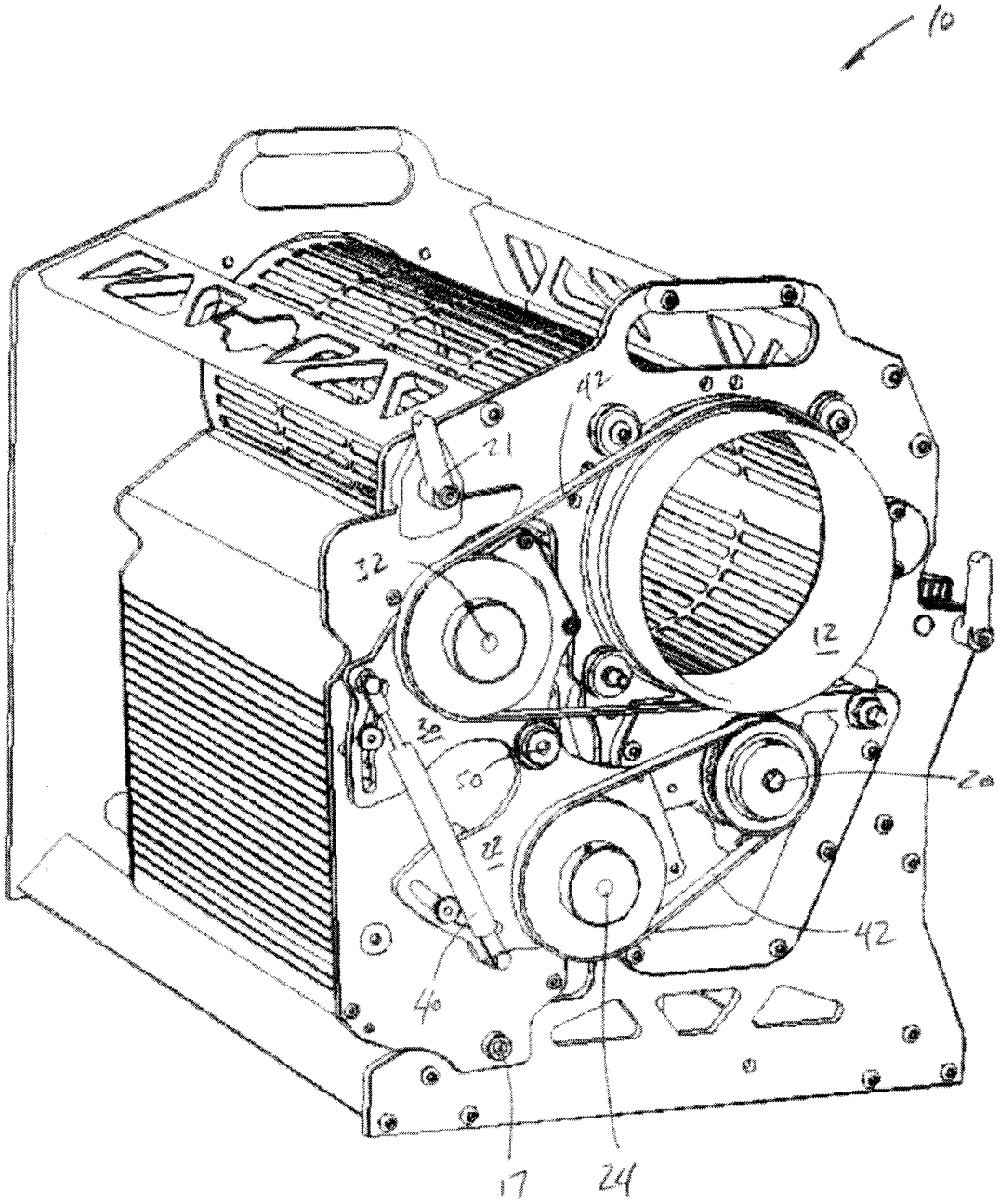
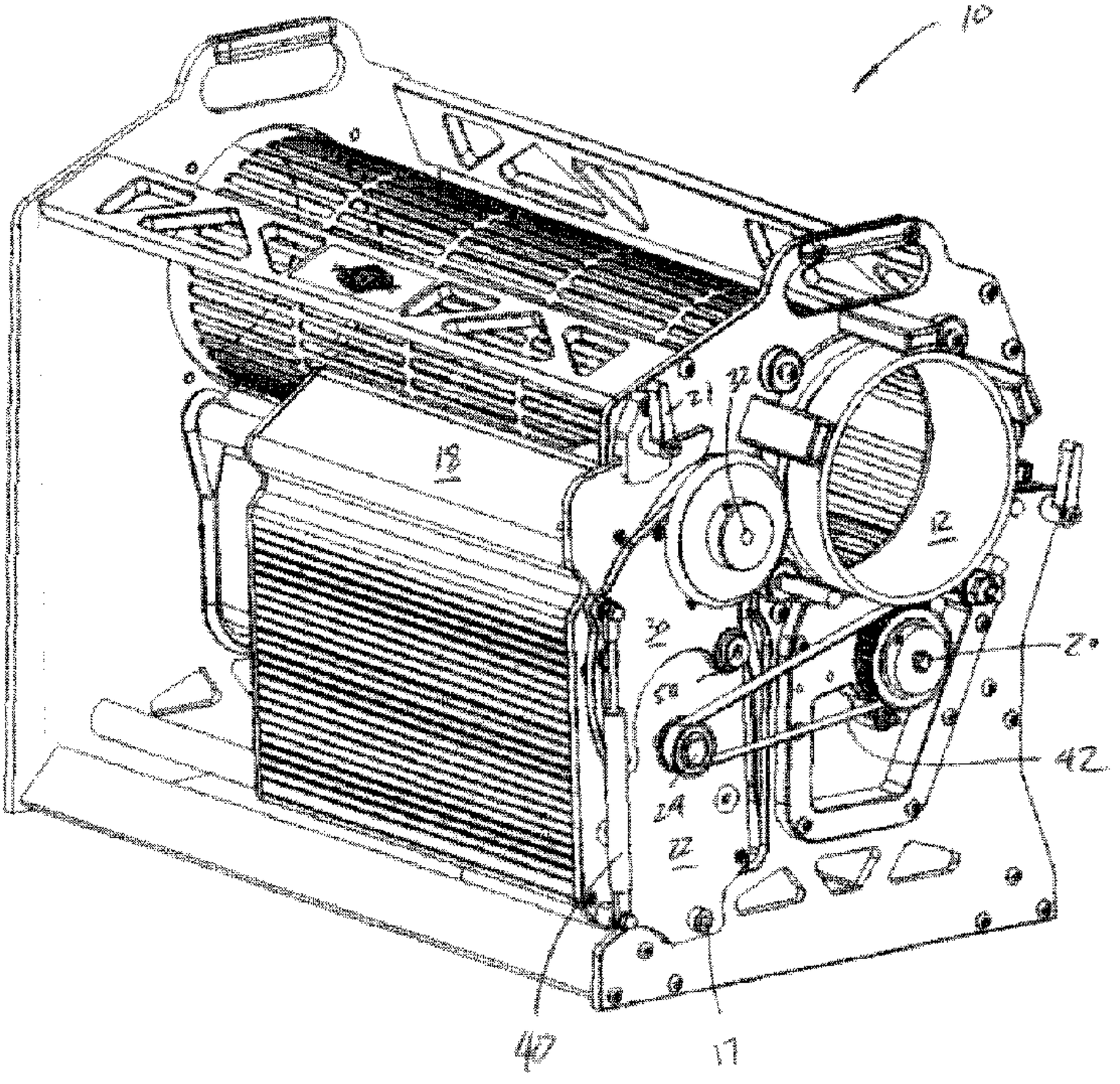


FIG. 9


10
12
18
20
32
42
47
17