April 23, 1963 P. E. LA TENDRESSE 3,086,304

SNOW THROWER WITH SELF-RESTORING IMPELLER

Filed Feb. 27, 1961 3 Sheets-Sheet 1

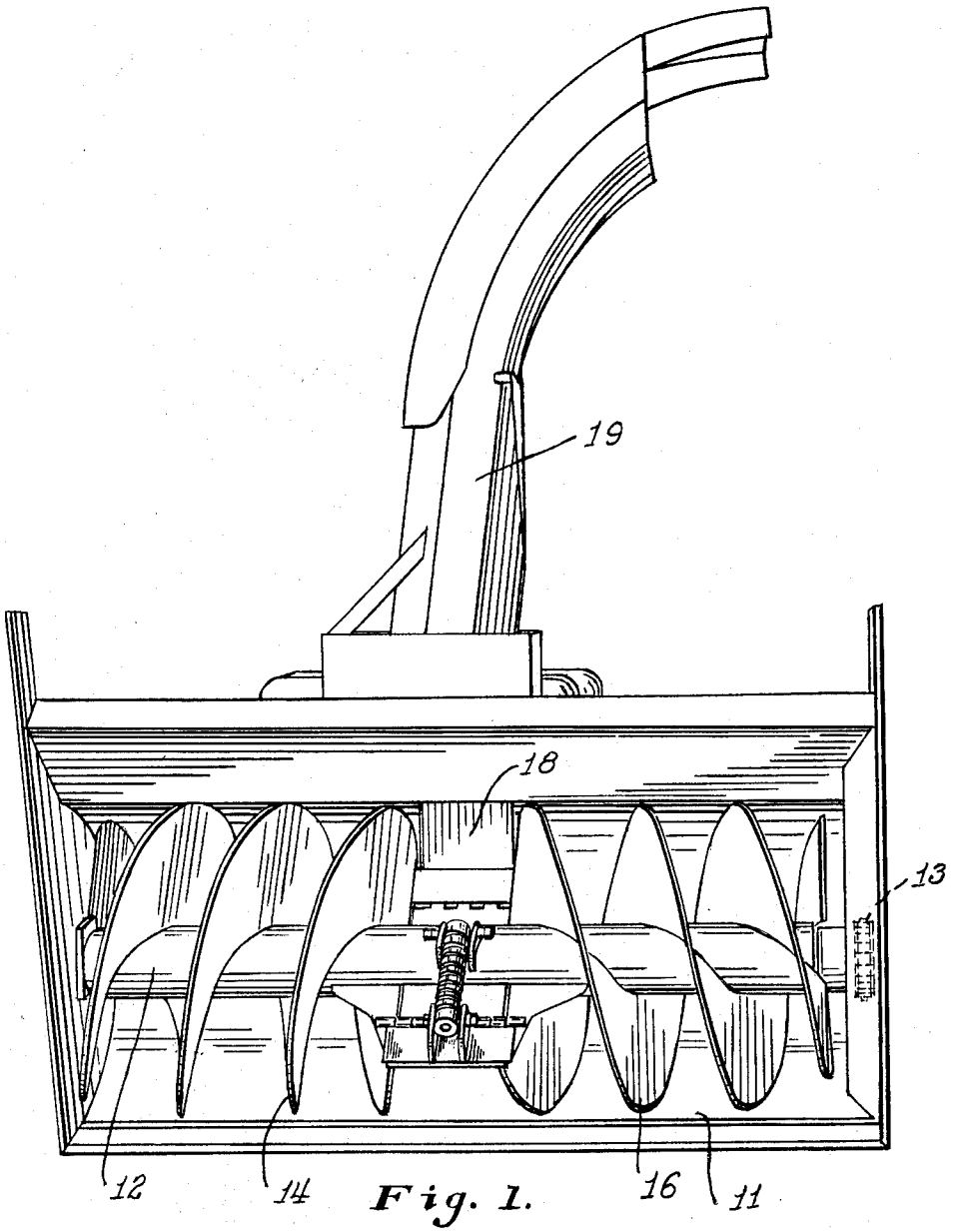


Fig. 1.

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SNOW THROWER WITH SELF-RESTORING IMPELLER

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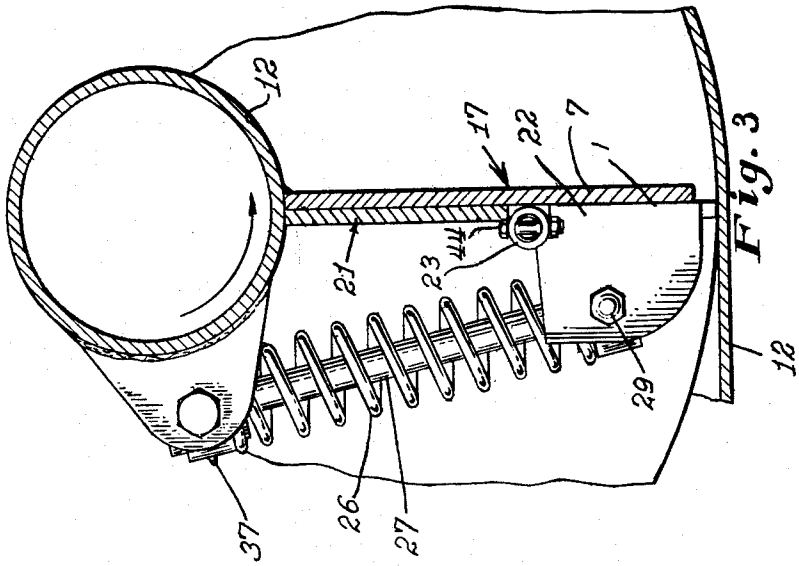


Fig. 3

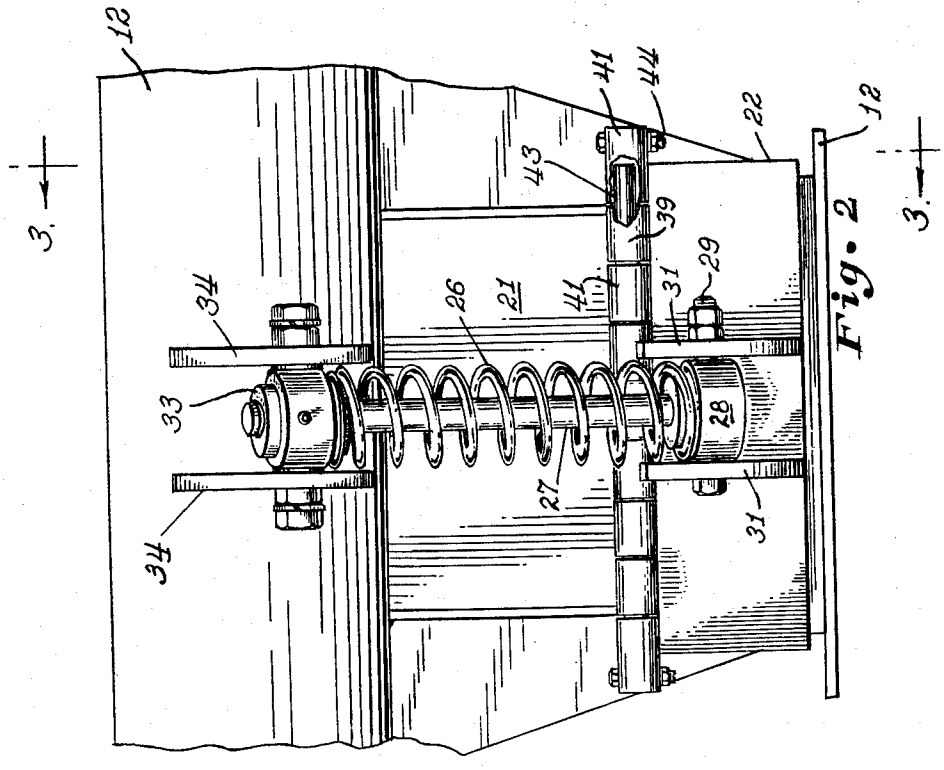


Fig. 2

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SNOW THROWER WITH SELF-RESTORING IMPELLER

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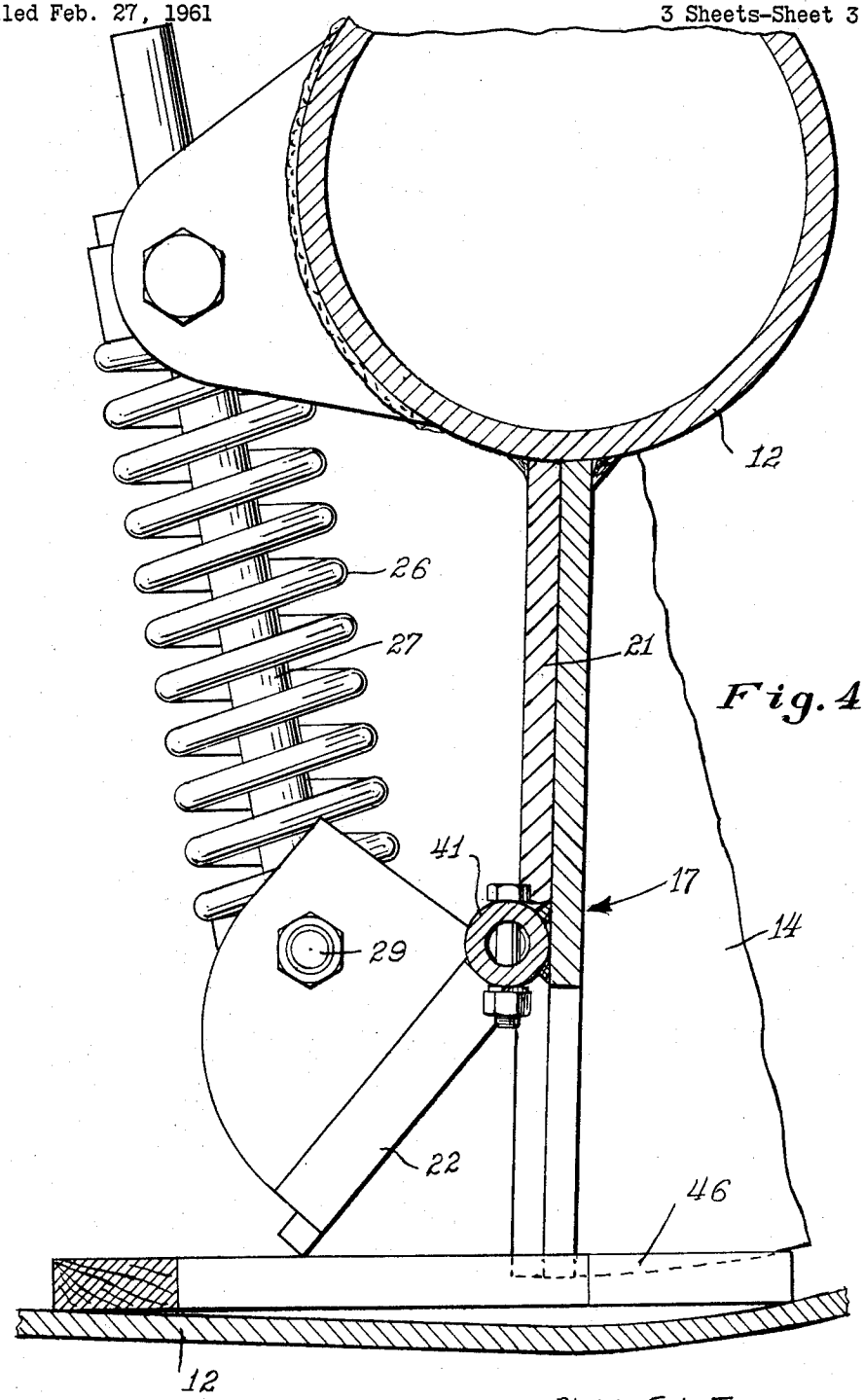


Fig. 4

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3,086,304

SNOW THROWER WITH SELF-RESTORING IMPELLER

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3 Claims. (Cl. 37—43)

While snow throwers operate normally, they do excellent work and have long been satisfactory. They have, however, been vulnerable to foreign objects. The greatest difficulty with foreign objects has been at the impeller. Referring especially to snow throwers having the impeller located between two conveyor screws feeding snow to the impeller, it is apparent that any foreign object entering either feed screw would be fed by it into the path of the impeller. Some objects, such as small boards or heavy tough sticks have tended to get caught between the impeller and the surrounding structure, usually the bottom plate of the scoop. Sometimes the impeller would jam, and the snow thrower would cease to operate until the operator, got out and removed the offending piece by hand, often with great difficulty. Occasionally, the impeller or part of the driving equipment for it, would break. To alleviate more serious trouble, a fail-easy impeller has sometimes been used. This has not made trouble any less frequent, but has made repair easier.

According to the present invention, trouble from ordinary foreign objects, such as can pass through the throwing chute, is virtually eliminated. This is accomplished by hinging the outer part of the impeller plate so that it can swing to accommodate the foreign objects; and providing yieldable but self-restoring means for normally holding the hinged impeller plate in its operating position. Preferably the heart of this means is a spring at the rotational rear of the impeller plate which presses it against stops at its operating position with enough force not to yield under ordinary operating conditions. This spring yields to a tough foreign object, but returns the plate when it has passed the foreign object.

Designation of Figures

FIGURE 1 is a front view of a snow thrower embodying this invention.

FIGURE 2 is a view on an enlarged scale showing the key features of this invention in full side view.

FIGURE 3 is a fragmentary sectional view taken approximately along the line 3—3 of FIG. 2.

FIGURE 4 is a view somewhat similar to FIG. 3 but showing the impeller in tripped position as a result of striking a piece of wood which has entered the snow thrower.

Background Description

Although the following disclosure offered for public dissemination is detailed to ensure adequacy and aid understanding, this is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how others may later disguise it by variations in form or additions or further improvements. The claims at the end hereof are intended as the chief aid toward this purpose; as it is these that meet the requirement of pointing out the parts, improvements, or combinations in which the inventive concepts are found.

The snow thrower of this invention may be conventional in many respects. There may be the usual scoop **11** in which a shaft **12** is driven by a chain and sprocket **13**, the chain of course extending to a power takeoff device on the vehicle which pushes the snow thrower ahead of it. The shaft **12** carries oppositely pitched conveyor screws or feed screws **14** and **16**, each of which preferably includes two helical blades, and is driven in a direction to thrust toward the center all of the snow which

enters the scoop **11**. As the snow approaches the center it moves into the path of one or more impellers **17** which normally function as rigid plates to throw the snow up through an upwardly extending passage **18**. With twin bladed screws as illustrated, there would preferably be two impellers, one bridging across each pair of helical blade ends. The lower part of passage **18** is formed in the back of the scoop **11** and an upper connecting part may be an adjustable upwardly extending tubelike structure **19**. Preferably this is fully adjustable to direct the thrown snow where it is desired.

Novel Features of Impeller

As previously stated the impeller normally functions as if it were a rigid plate, its position being that seen in FIG. 3. In fact, a portion **21** of the impeller is rigid with the shaft **12**. However, the main outer portion **22** is hinged to the rigid portion by hinge **23**. It normally lies parallel to the rigid portion **21**, as seen in FIG. 3. The only need for hinging the portion **22** is the fact that occasionally hard objects such as boards or heavy sticks of wood enter the scoop **11** with the snow. In the past this has caused the whole snow thrower to jam and stop operating, and sometimes has caused breakage.

According to the present invention, the hinged outer portion **22** of the impeller can bend back to accommodate such hard objects. Many such objects, after being struck once, will pass through the chute **19** with the snow. When one is too large to do so, the hinged impeller portion **22** will repeatedly swing back to accommodate it and the noise, usually accompanied by decreased output, will advise the operator of the condition so that he can stop the machine and remove the object, whereupon full service is restored immediately.

The hinged impeller portion **22** is urged to the position shown in FIG. 3, by a sturdy spring **26** which surrounds a slide rod **27**. One end of the slide rod carries a rigidly fitted collar or head **28** which is pivotally carried on a bolt **29** extending through wings **31** welded to the hinged impeller plate **22**. The other end of slide rod **27** slides through a collar **33** which is pivotally mounted between wings **34** welded to the shaft **12**. A lubrication nipple **37** in the outer portion of collar **33** may communicate with a passage leading to the bore through collar **33** for lubricating slide rod **27** in collar **33**.

The spring **26** is normally in partially compressed condition firmly pressing the impeller plate **22** against stop means which may comprise essentially the ends of the two feed screws **14** and **16**, or of one of the helical blades of each.

A very simple form of hinge **23** has been shown. It may comprise the usual interfitting tubelike members **39** and **41**, one set carried by the hinged impeller plate **22** and the other part by the rigid impeller portion **21**. A hinge pin **43** extends through the two sets as seen best in FIG. 2, but terminates short of the ends. This is maintained in place by a pair of small bolts **44**, one at each end. As seen in FIG. 4, the tubular hinge sections may be welded to their respective members.

FIG. 4 also shows the impeller plate **22** swung back to accommodate a foreign object **46**. By comparison with FIG. 3, it will be seen that in FIG. 4 the spring **26** is compressed and the slide rod **27** has moved upwardly through collar **33** by an amount corresponding to the swinging movement of the impeller plate **22**. It will be observed that the impeller plate **22** can swing something like twice as far as shown in FIG. 4 so that it can accommodate itself to a much larger foreign object than the object **46** shown.

As soon as foreign object **46** has passed through or been removed, or as soon as the impeller plate **22** swings past it, spring **26** returns plate **22** to its active or normal

position shown in FIGS. 1 to 3. Conceivably this could be accomplished by centrifugal force alone, some other form of resiliently yieldable means (a spring detent for example) holding it there. However, the more positive spring return illustrated is much preferred, has been found satisfactory, and represents full use of the invention.

It is greatly preferred to use this invention with a plurality of impellers as shown so that in their normal position they balance each other. This makes the invention especially suitable for the common snow throwers having two helical blades on each screw.

One advantage of holding the impeller plate 22 in its normal position by resiliently yieldable means is to prevent noisy chattering when operating under normal load. Hence spring 26 should be mildly compressed in that position.

I claim:

1. A snow throwing rotor including
a pair of oppositely pitched feed screws, and
an impeller between the feed screws, including
a peripherally located plate disposed normally in an operating position generally radially of the rotor and hinged along its inner edge to the rotor to swing between the operating position, and a position rearwardly therefrom, that is, in the direction opposite to the direction of rotation causing the screws to feed toward the impeller, and
a compression spring rearwardly of the plate normally holding it in operating position, but yieldable to allow the plate to swing rearwardly to accommodate a foreign object, and effective after the object has been passed to restore the plate to its operating position;
said rotor including stop means against which said plate is pressed by said spring.

2. A snow throwing rotor including
a pair of oppositely pitched feed screws, and
an impeller between the feed screws, including
a peripherally located plate disposed normally in an operating position generally radially of the rotor and hinged along its inner edge to the rotor to swing between the operating position, and a position rearwardly therefrom, that is, in the direction opposite to the direction of rotation causing the screws to feed toward the impeller, and
a compression spring assembly at the rear of the plate including a guide rod pivoted to the plate and slidingly engaging a guide member pivoted to the rotor, and a compression spring surrounding said rod and compressed to exert a steadying force between said guide member and said plate when said plate is in operating position to yieldably hold said plate in said position;
said rotor including stop means against which said plate is pressed by said spring.

3. A snow throwing rotor assembly including
a pair of oppositely pitched feed screws, and
an impeller between the feed screws, including
a peripherally located plate disposed normally in an operating position generally radially of the rotor and hinged along its inner edge to the rotor to swing between the operating position, and a position rearwardly therefrom, that is, in the direction opposite to the direction of rotation causing the screws to feed toward the impeller, and
resiliently yieldabe means normally holding the plate in its operating position;
said rotor assembly being constructed to cause said plate, after passing a foreign object which has swung it from its operating position, to return to its operating position.

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