Oct. 13, 1959 E. W. KOLLS ET AL 2,908,153

COUPLING MEANS FOR IMPLEMENTS HAVING DETACHABLE POWER UNITS

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Fig. 1.

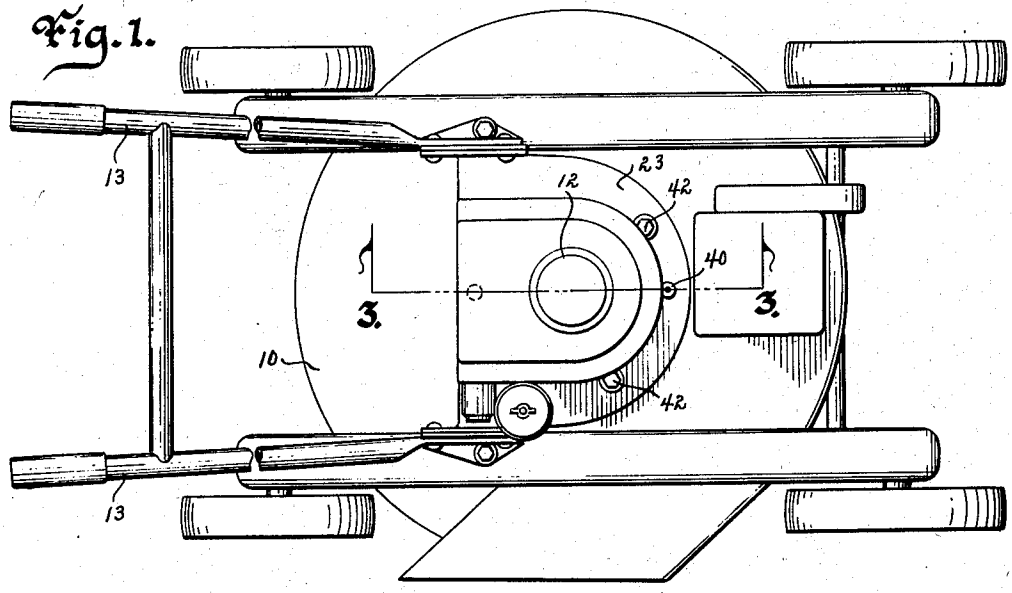
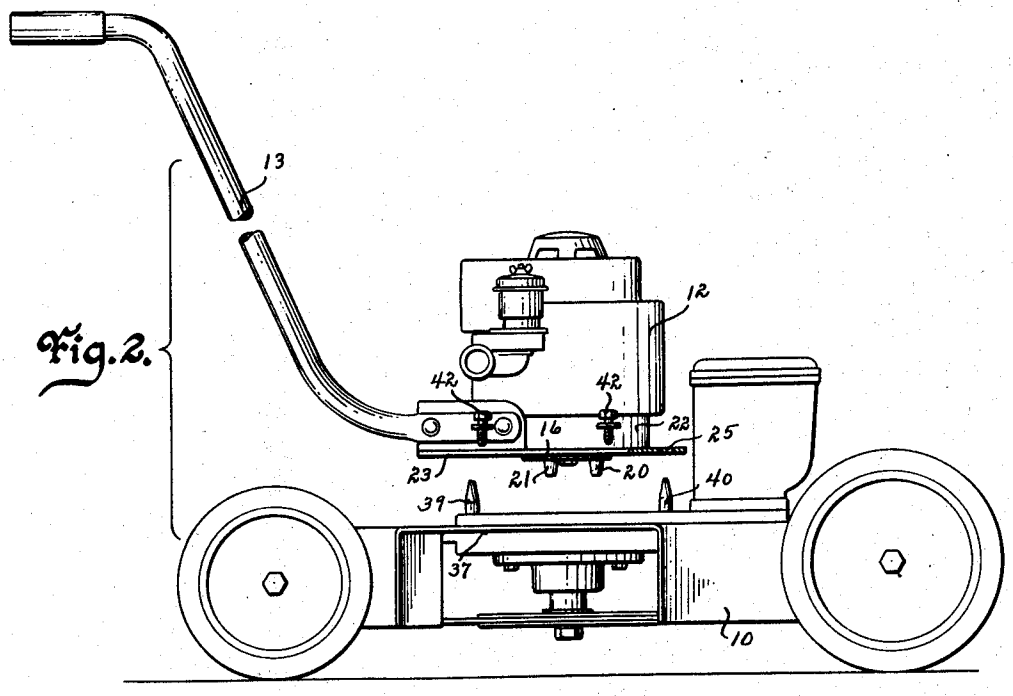


Fig. 2.



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Fig.3.

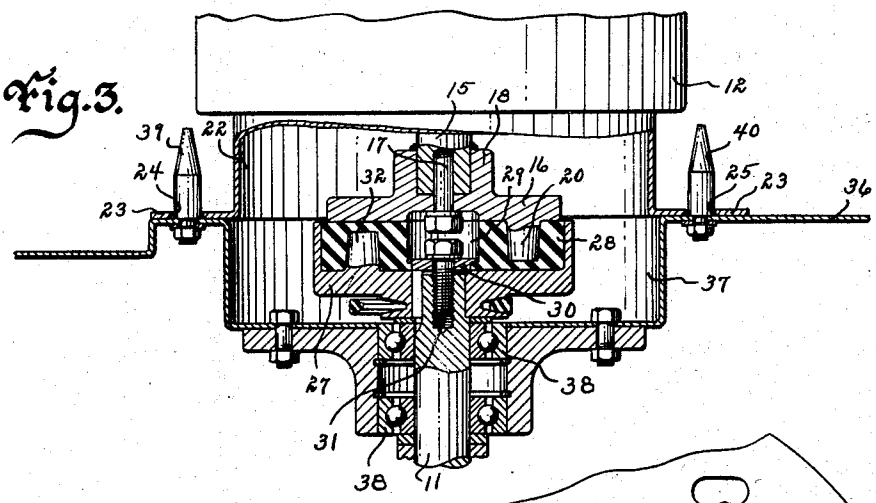
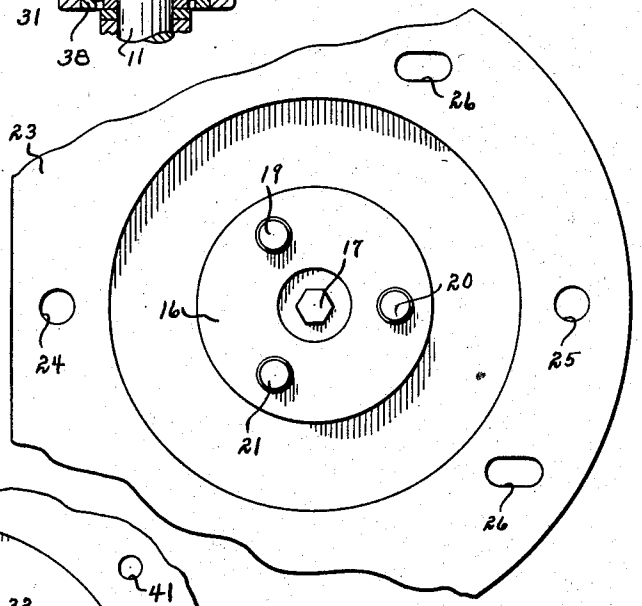


Fig.4.



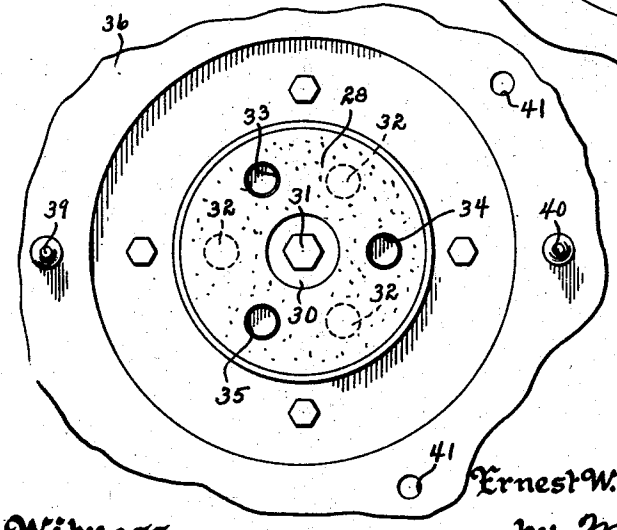


Fig.5.

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COUPLING MEANS FOR IMPLEMENTS HAVING DETACHABLE POWER UNITS

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5 Claims. (Cl. 64—27)

This invention relates to a detachable connecting means and more particularly to a coupling means for implements having a detachable power unit.

In recent years, it has been the practice to have several implements using in common a single detachable engine capable of selectively powering any of the implements. An illustration is that of a single small internal combustion motor attachable to a lawn mower, a cultivator, a snow remover, and like. The chief problem, however, has been the connecting of the power shaft of the motor to the parts of the implement to be actuated. The method usually employed is by use of an endless belt. The objection to such a connection is that the belt is difficult to place around the obscure belt wheels and even after the belt has been positioned, the two units must be moved relative to each other in order to tighten the belt. After the belt has been so tightened, the two units must be rigidly secured together at that position. While the use of one motor for a plurality of implements is highly desirable, obviously the changing of the motor from one implement to another is most difficult and complicated.

Therefore, the principal object of our invention is to provide a simple, effective coupling means for use with a plurality of implements using in common a single power plant.

A further object of this invention is to provide a resilient silent direct coupling between the motor and implement upon which it is used.

A still further object of this invention is to provide a coupling means that permits the direct lowering of the power unit onto the implement to make contact, thereby eliminating relative horizontal sliding of the units to effect successful connection.

Still further objects of our invention are to provide a coupler for power and implement units that is economical in manufacture and durable in use.

These and other objects will be apparent to those skilled in the art.

Our invention consists in the construction, arrangements, and combination, of the various parts of the device, whereby the objects contemplated are attained as hereinafter more fully set forth, specifically pointed out in our claims, and illustrated in the accompanying drawings, in which:

Fig. 1 is a top plan view of equipment using our rapid coupling means;

Fig. 2 is a slide exploded view, illustrating the separation or connecting of the units using our coupler means;

Fig. 3 is an enlarged vertical sectional view of our coupler taken on line 3—3 of Fig. 1, and more fully illustrates its construction;

Fig. 4 is an enlarged bottom view of that part of our coupler that is secured to the motor unit; and

Fig. 5 is an enlarged top view of that part of our coupler that is secured to the implement unit.

In these drawings, we have used the numeral 10 to generally designate a wheeled implement, such as a lawn mowing machine, with a blade driving shaft 11. We

have used the numeral 12 to generally designate an internal combustion engine. This unit has handle bars 13. The numeral 15 designates the motor's rotating drive shaft. It is to such units that we install our coupling and which we will now describe in detail.

Onto the vertical motor shaft 15 we secure a horizontal metallic plate 16 by use of a cap screw bolt 17. The plate has a wall 18 embracing the lower end portion of the shaft 15. The bolt 17 extends upwardly through the circular plate 16 and is threaded into the end area of the motor shaft. The plate may also be either keyed or welded to the shaft to eliminate independent rotation. The numerals 19, 20 and 21 designate three evenly spaced apart downwardly extending lugs on the bottom of the plate. These three lugs form a triangle around the bolt stud 17, as shown in Fig. 4. These lugs taper in diameter as they extend downwardly, as shown in Fig. 2. Loosely embracing the plate is the motor skirt 22. The numeral 23 designates a circular horizontal flange on the bottom of the skirt 22. The lugs 19, 20 and 21 extend downwardly beyond the horizontal plane of the flange 23, as shown in Fig. 3. The flange 23 has two diametrically positioned holes 24 and 25, as shown in Fig. 4. The flange also has bolt hole slots 26. This assembly completes the motor unit. On the upper end of the driven shaft 11 of the implement, we secure a cup 27. This cup has an enlarged hole in its center. In the cup is a resilient plate 28 of rubber, or like, having a central well 29 having a reduced diameter at its lower end to provide a shoulder. The numeral 30 designates a washer having a top flange engaging the shoulder in the well 29 and having its bottom engaging the inside bottom of the cup. The numeral 31 designates a cap screw bolt extending downwardly through the washer 30 and threaded into the upper end of the implement driven shaft. The cup 27 is also keyed to the shaft 11. Thus, the resilient plate 28 is secured in the cup 27, and the cup 27 is secured onto the upper end of the shaft 11 by the cap screw bolt 31. The resilient pad plate 28 is prevented from independent rotation in the cup 27 by three upwardly extending spaced apart lugs 32 on the inside bottom of the cup 27 and which penetrate into wells in the bottom of the resilient member 28, as shown in Fig. 3. In the top of the resilient plate 28 are three downwardly extending evenly spaced apart wells 33, 34 and 35. These three wells decrease in diameter as they extend downwardly and form a triangle around the cap screw bolt 31. This triangle is the same as the triangle formed by the lugs 19, 20 and 21. The tapering wells 33, 34 and 35 are adapted to receive the tapered lugs 19, 20 and 21. The numeral 36 designates the housing of the implement having a cup portion 37 loosely embracing the cup member 27, as shown in Fig. 3. The top horizontal plane of the housing cup is substantially that of the top horizontal plane of the cup 27. The numeral 38 designates a bearing means around the shaft 11 and secured to the bottom of the housing cup 37. The numerals 39 and 40 designate two diametrically positioned upwardly extended pointed spike posts on the housing 36 and adapted to enter the holes 24 and 25, respectively, of the skirt flange 23. The numeral 41 designates holes in the housing 36. The numeral 42 designates bolt means for extending through holes 26 and 41 for rigidly bolting the power unit and implement together. To selectively attach our motor unit to an implement, it is merely necessary to set the same downwardly onto the implement with the centering and guiding prongs 39 and 40 passing through the holes 24 and 25, respectively. If the lugs 19, 20, and 21 do not synchronize with and enter the receiving wells 33, 34 and 35, the motor is rotated slightly to bring the lugs in alignment with the wells. By tapering both the lugs and wells, not only will the entrance

of the lugs into the wells be guided and facilitated, but a progressively tight fit will result. There will be no loose play between the plate 16 and resilient plate 28. The bolts 42 are then used to secure the flange 23 to the housing 36. To remove our motor unit for placement on another implement, the bolt means 42 are removed and the motor unit merely lifted upwardly to clear the implement to which it has been attached. The bolt means 42 draw the motor unit toward the implement, thus forcing the lugs into the wells and tightening the coupling.

Some changes may be made in the construction and arrangement of our coupling means for implements having detachable power units without departing from the real spirit and purpose of our invention, and it is our intention to cover by our claims, any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

We claim:

1. In combination, a motor unit having a drive shaft and a housing, an implement having a driven shaft and a housing, and a coupling means, comprising, a plate on said drive shaft, a plurality of lugs on said plate, a supporting member on said driven shaft, a resilient member secured on said supporting member having a complementary plurality of wells for detachably receiving said plurality of lugs, a means for rigidly connecting the housing of said motor unit to the housing of said implement; said motor unit housing having at least two guide holes and a complementary number of guiding and centering prongs on the housing of said implement adapted to extend into the guide holes of the housing of said motor unit.

2. In combination, a motor unit having a drive shaft and a housing, an implement having a driven shaft and a housing, and a coupling means, comprising, a plate on said drive shaft, a plurality of lugs on said plate, a supporting member on said driven shaft, a resilient member secured on said supporting member having a complementary plurality of wells for detachably receiving said plurality of lugs, a means for rigidly connecting the housing of said motor unit to the housing of said implement; said motor unit housing having at least two guide holes and a complementary number of guiding and centering pointed prongs on the housing of said implement adapted to extend into the guide holes of the housing of said motor unit.

3. In a coupling means having a drive shaft and a driven shaft, a plate on said drive shaft, a plurality of evenly spaced apart lugs on said plate forming a continuous row, a cup member on said driven shaft having an inside diameter greater than that of the outside diameter of said plate and a resilient plate member secured in said cup member having a complementary plurality of wells detachably embracing said plurality of lugs; said lugs decreasing in diameter as they extend into said wells, and said wells increasing in diameter as they extend toward said lugs.

4. In a coupling means having a drive shaft and a driven shaft, a plate on said drive shaft, a plurality of evenly spaced apart lugs on said plate forming a continuous row, a cup member on said driven shaft having an inside diameter greater than that of the outside diameter of said plate, a resilient plate member secured in said cup member having a complementary plurality of wells detachably embracing said plurality of lugs, and lugs on the inside bottom of said cup member extending into said resilient plate member for preventing independent rotation of said resilient plate member relative to said cup member; said lugs decreasing in diameter as they extend into said wells, and said wells increasing in diameter as they extend toward said lugs.

5. In combination, a motor unit having a drive shaft and a housing, an implement having a driven shaft and a housing, and a coupling means, comprising, a plate on said drive shaft, a plurality of lugs on said plate, a supporting cup member on said driven shaft having an inside diameter greater than that of the outside diameter of said plate, a resilient member secured in said supporting member having a complementary plurality of wells for detachably receiving said plurality of lugs; said lugs tapering in diameter as they extend into said wells and said wells increasing in diameter as they extend toward said lugs, and a means for rigidly connecting the housing of said motor unit to the housing of said implement.

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