Feb. 10, 1931. C. M. TUCK 1,791,880

BLADE FOR CONCRETE MIXERS

Filed Aug. 10, 1929 2 Sheets-Sheet 1

Fig. 1

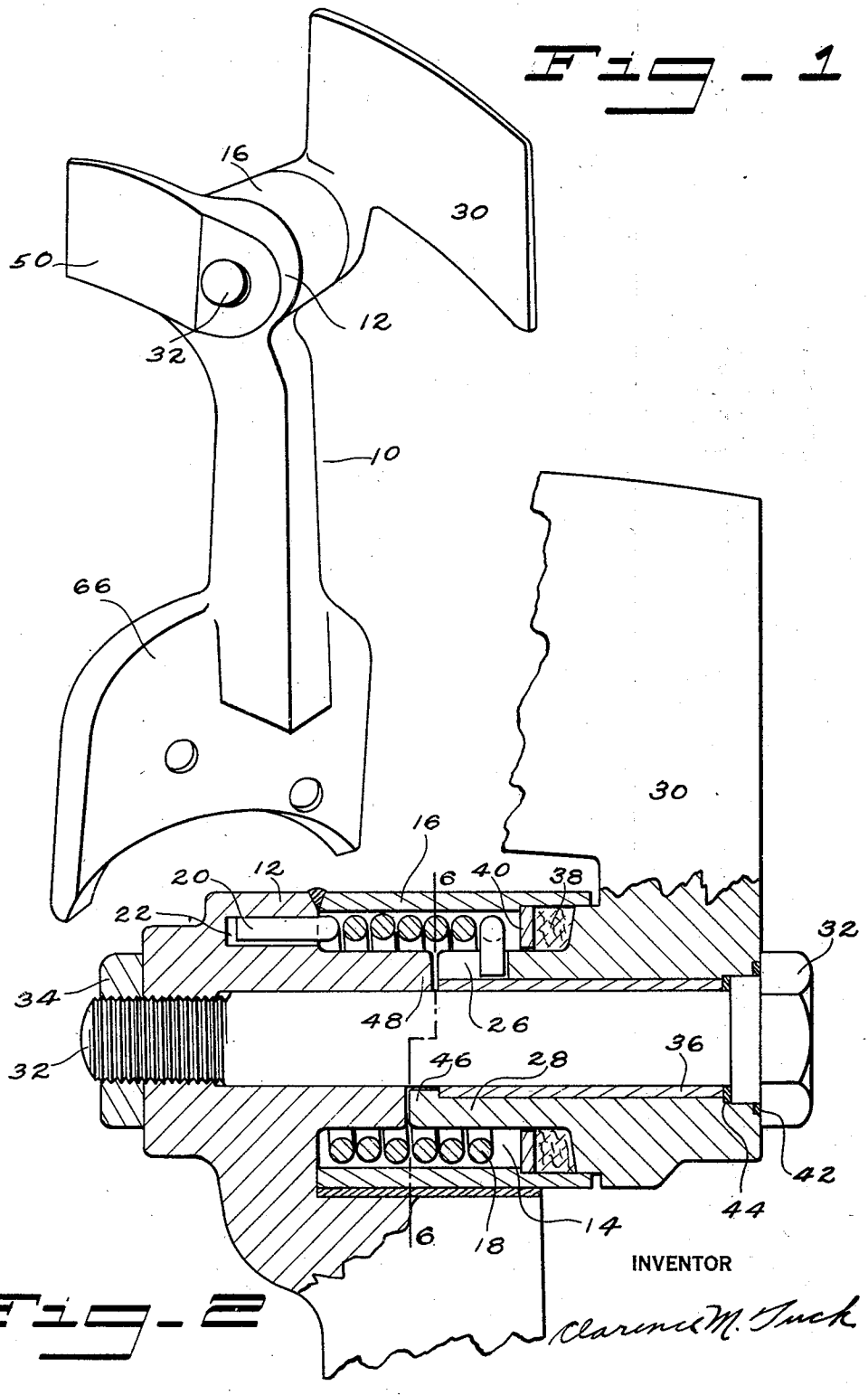


Fig. 2

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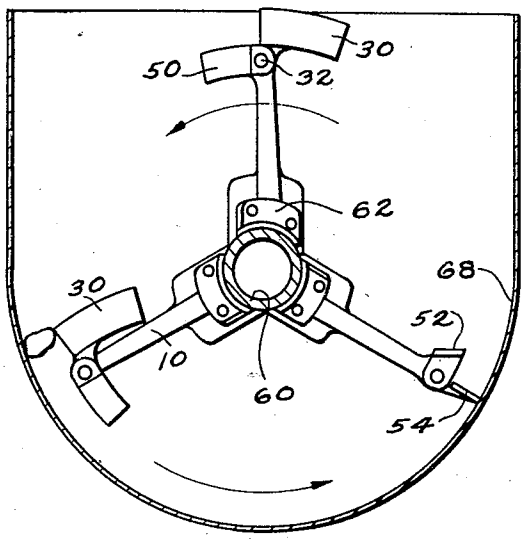


Fig - 3

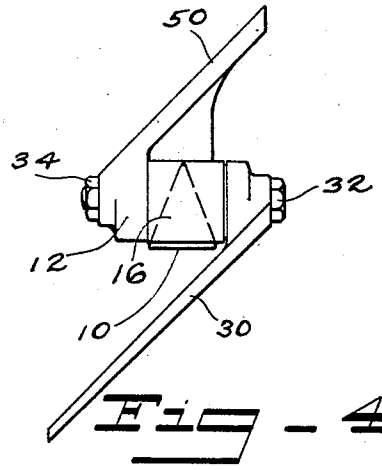


Fig - 4

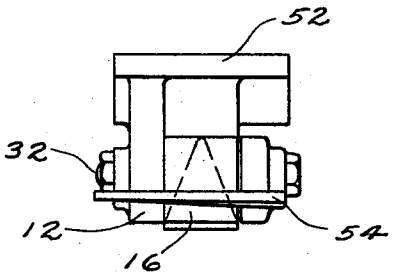


Fig - 5

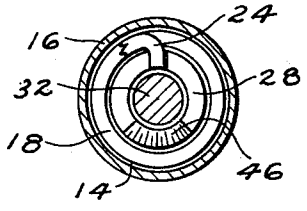


Fig - 6

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Patented Feb. 10, 1931 1,791,880

UNITED STATES PATENT OFFICE

CLARENCE M. TUCK, OF SEATTLE, WASHINGTON, ASSIGNOR TO MORRIS & BOOGHER, INC., A CORPORATION OF WASHINGTON

BLADE FOR CONCRETE MIXERS

Application filed August 10, 1929. Serial No. 384,906.

My invention refers to the art of transit concrete mixers, particularly the type employing a fixed mixing chamber or U-shaped hopper and having a revolving shaft passing therethrough, to which are secured mixing blades or paddles. More particularly my invention refers to a special type of blade for use in this type of mixer.

In the past a great deal of difficulty has been encountered in producing a mixer employing a revolving shaft within a fixed mixing chamber. This type of machine has been in use for years for mixing grains, flour and similar materials. It has been in use for some time for mixing building materials, such as plaster and stucco. Repeated attempts have been made in the last few years to use this type of machine for mixing concrete. When this was attempted, however, many problems arose, due largely to the wide variety of materials used as aggregate in the production of concrete. Concrete normally consists of cement, sand and varying sizes of gravel, to which water is added.

The early experimenters with this type of mixer in the concrete field found a marked tendency for the small bits of gravel to become wedged in between the mixer shell and the paddle or blade. This would tend to spring the two apart, thus making it possible for still larger rocks to wedge in, the final result being that either the arms supporting the paddles would break or the power required to drive the machine would be so great as to be impractical. It naturally follows that if excessive power is required, the strength of the various parts of the machine must be so materially increased that the weights become excessive and it is impossible to use the machine as a transit mixer, which entails, of course, the mounting of the mixer upon a motor vehicle. Therefore:

The principal object of my invention is to provide a blade construction which will make it possible to satisfactorily construct a machine that may be used as a transit mixer.

A further object is to provide a blade for a transit concrete mixer which obviates all possibility of materials being wedged in between said blade and the shell of the mixing drum.

A further object is to provide a mixing blade that may be deflected under a heavy load and be caused to assume a position which will lessen the power required to revolve the mixer shaft.

A further object is to provide a mixer paddle that in the final stage of the mixing operation will scrape the mixer drum of all adhered materials.

A still further object is to provide resilient means properly protected from the materials in which it works, for assisting in the above named objects.

A final object of my invention is to provide a removable mixer blade which may be readily removed in case of breakage or in case a material is to be mixed which is different than which the blades were originally intended to mix.

I obtained the above named objects and others inherent in the same by the devices illustrated in the accompanying drawings, wherein:

Figure 1, is a perspective view of one of my mixing blades as removed from the machine.

Figure 2, is a cross-sectional view through the hub of the mixing blade, showing the spring construction and the associated parts.

Figure 3, is a cross-sectional view through a concrete mixer of the type mentioned showing two forms of my blades in place.

Figure 4, is a top plan view looking directly down a propelling type of blade.

Figure 5, is a top plan view of a stirring blade.

Figure 6, is a cross-sectional view on a reduced scale, taken along the lines 6—6 of Figure 2.

Referring to the drawings, throughout which like numerals indicate like parts:

Numeral 10 designates the arm proper, which as a matter of convenience, I have made as a casting. The upper end of arm 10 is enlarged to form the hub 12, which in turn, has projecting from its side the thin walled chamber 14. I have found it most convenient to create this chamber by welding a tube 16

to the hub 12, although I believe it will be apparent that the tube 16 might be cast integral with the hub 12.

Chamber 14 serves as a housing for the coiled torsion spring 18 which has one straight end 20 adapted to engage a hole 22, which I normally drill into the hub 12. The other end 24 of spring 18 has a sharp downward bend which is best illustrated in Figure 6 and is engaged by the slot 26. Slot 26 is formed in an outwardly projecting hub 28 of the revolvable blade 30. Blade 30 is supported and held in position by the bolt 32 which is, at one end, threaded into the hub 12 and is further provided with a jam nut 34. In order that the blade 30, which is normally either cast iron or cast steel, will not rust to bolt 32, I normally provide a bushing 36 of suitable material, such as brass.

In order to insure a positive exclusion of all foreign material from the spring chamber 14, I provide a packing 38, which I have found it convenient to retain in position by slightly counter-boring the tube 16 and fitting in the counter-bore a washer 40. Any desired pressure can be applied to the packing by tightening the bolt 32.

To further provide against the entrance of foreign material, I provide packing, usually of the copper asbestos type at points 42 and 44 respectively.

I have found it very necessary to provide a definite stop which will prevent the revolvable arm 30 from going forward of a radial line through the center of the mixer shaft and the center of bolt 32. This stop I find most simply provided by a jaw clutch arrangement, which is illustrated in Figures 2 and 6, and consists of two interlocking jaw members 46 and 48, which are formed on the hubs 28 and 12 respectively.

As the required movement of the blade 30 never exceeds 90 degrees, the lugs 46 and 48 can very conveniently be made to cover at least 90 degrees and still give ample room for movement.

In Figures 1 and 4 I have shown a fixed blade 50, which is set at an angle to the axis of bolt 32. I have also shown the blade 30 as set at substantially the same angle. This is to adapt my blade to that type of mixer in which a circulation of material is desired.

In Figure 5 I have shown a straight blade 52 with a straight revolvable blade 54. The spring mechanism of course, is identical with the construction of Figure 4 and this type of blade finds a wide variety of uses. For instance, in a circulating type of mixer employing a plurality of blades, of the type shown in Figure 4, the material is moved to one end of the mixing drum where it will tend to pack. In a case of this nature I have found it very desirable to employ one or more blades of the type shown in Figure 5.

Further, in mixers of this general character where it is not desired to circulate the material but rather to mix it thoroughly and rely upon a hoisting device to raise one end of the mixer so that the finished mix will pour therefrom, this type of blade may be used throughout. I have found, however, that for certain types of material, it is desirable to modify the general shape of blade 52. I have not illustrated the various forms that might be used, as I do not feel that there would be any invention involved but rather ordinary mechanical judgment would select that type of blade best suited for the material to be mixed.

Blades shaped like cultivator teeth, as plow shares and many other forms have been used. I have used at times combinations of the straight blade 52 and the angle revolvable blade 30, and found under certain conditions that it was the most satisfactory arrangement.

The method of securing arm 10 to the central mixing shaft 60 is a matter of personal judgment.

In the arrangement shown in Figure 3 I have employed a hollow tube as a shaft and have welded to it a number of lugs 62 to which the arms 10 may be easily bolted.

In Figure 1 I have shown a wide palm or blade 66, which is pitched at an angle opposite that of the outer blades. This makes a simple solution where it is desired to make a circulating mix machine.

In operation the spring 18 is so placed as to normally hold the revolvable blade in its full extended position, where it comes to rest against the jaw clutch formed by the members 46 and 48. In this position the blade 30 is in close contact with the mixer shell 68. However, as the blades are turned through the aggregate in mixing a batch of concrete, the turning effort required when the aggregates are dry, is very great. Consequently the blades 30 will fold back to a point where they present but little resistance to the revolving of the shaft. When the mix has been wetted, the resistance becomes but a fraction of the starting load and the blades again assume their proper position against the shell 68.

However, from time to time small pebbles may get in between the blade 30 or the blade 54 and the shell, leaving a crack there where still larger rocks may become wedged in. It is then necessary for the blade to be deflected, as is illustrated in Figure 3 and permit the rocks to pass under the blade.

In the final cleanup of the machine, the blades 30 are forced tightly against the shell and thus remove any of the materials that would normally tend to adhere to the surface and eventually dry and harden there.

Having thus described my invention and its method of operation, I believe its construction and operation will be clear to those

skilled in the art. Manifestly, however, changes may be made in the form, proportions and arrangement of parts of my invention without departing from the spirit thereof.

What I claim is:

1. In a blade for concrete mixers a supporting arm, a fixed blade secured to said arm, a revolvable blade pivotably secured to said supporting arm and resilient means adapted to normally maintain said revolvable blade in its extended position.

2. In a blade for concrete mixers a supporting arm, a fixed blade secured to said arm and a revolvable blade pivotably mounted and resiliently maintained in its normal working position.

3. In a blade for concrete mixers, a supporting arm, a fixed blade secured to the upper end of said arm, a spring cavity shielded by said blade, a revolvable blade pivoted coaxially with said spring cavity, a coil spring secured at one end in said spring cavity and having its other end secured to said revolvable blade, and stop means adapted to limit the forward movement of said revolvable blade.

4. In a blade for concrete mixers, a supporting arm, a fixed blade, a spring cavity, a coil spring in said cavity, a revolvable blade resiliently supported by the coil spring and means adapted to prevent the entrance of foreign materials into said spring cavity.

5. In a blade for concrete mixers, a supporting arm; a hub at the outer end of the supporting arm; a pivot and binding member adjustably secured to said hub; an angled blade, resiliently held in position, revolvable on said pivot member, a cavity adjacent said hub to house the means which resiliently support the revolvable blade and a fixed blade positioned in front of said cavity to shield it and to serve as the principal mixing member.

In witness whereof, I hereunto subscribe my name this 25th day of July, A. D. 1929.

CLARENCE M. TUCK.