

**Jan. 23, 1951**

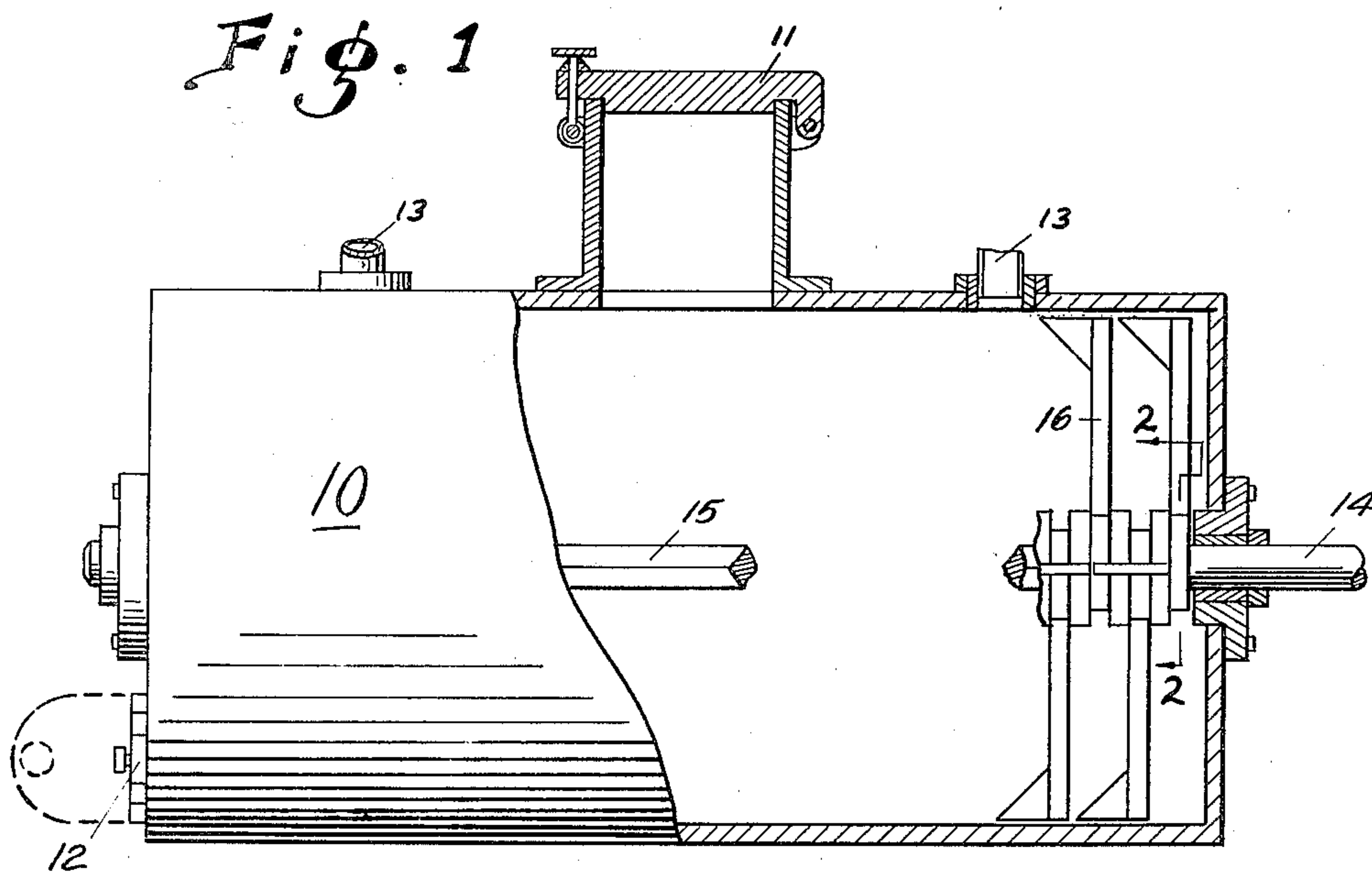
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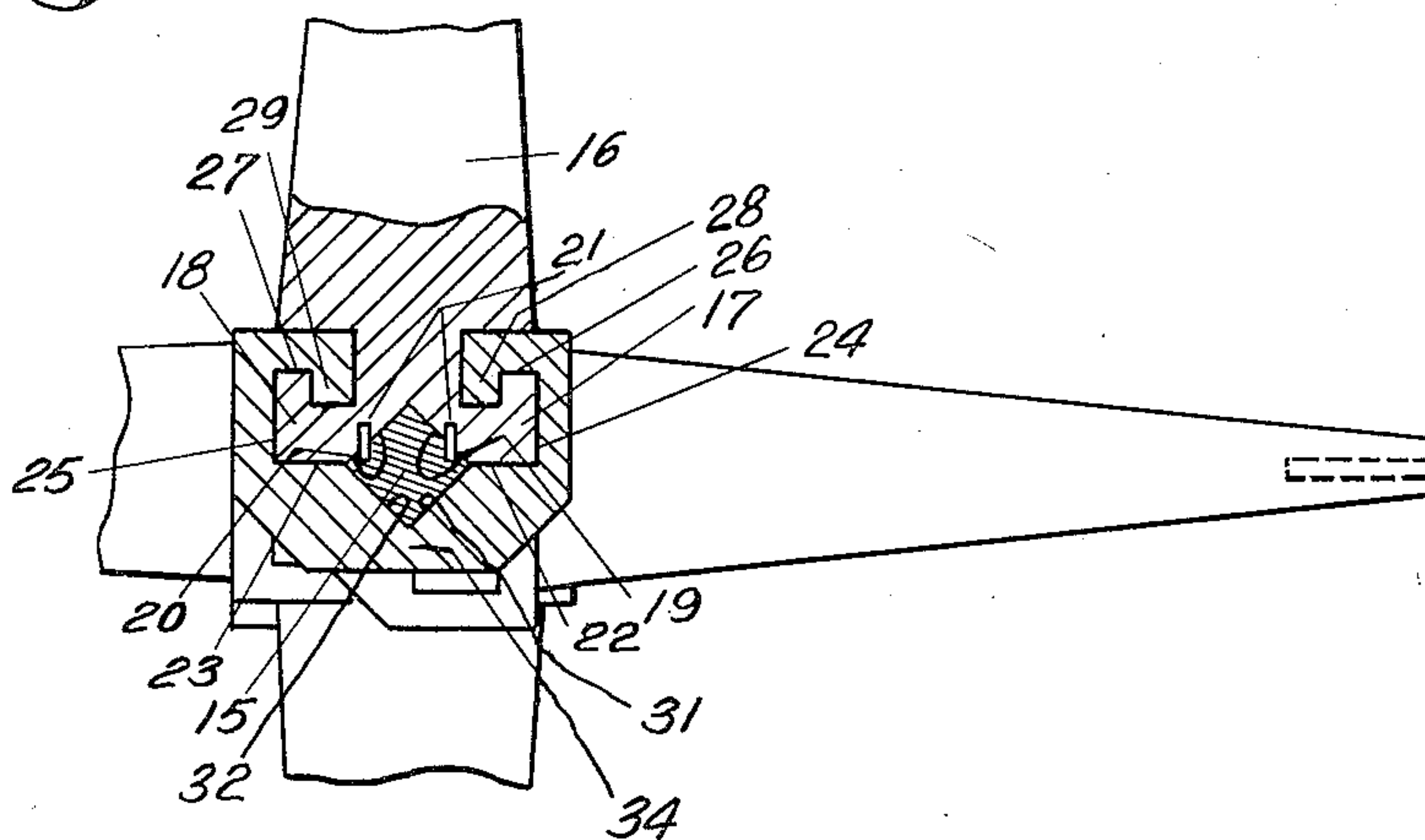
## DRY RENDERING PADDLE

Filed Jan. 10, 1948

2 Sheets-Sheet 1



*Fig. 2*



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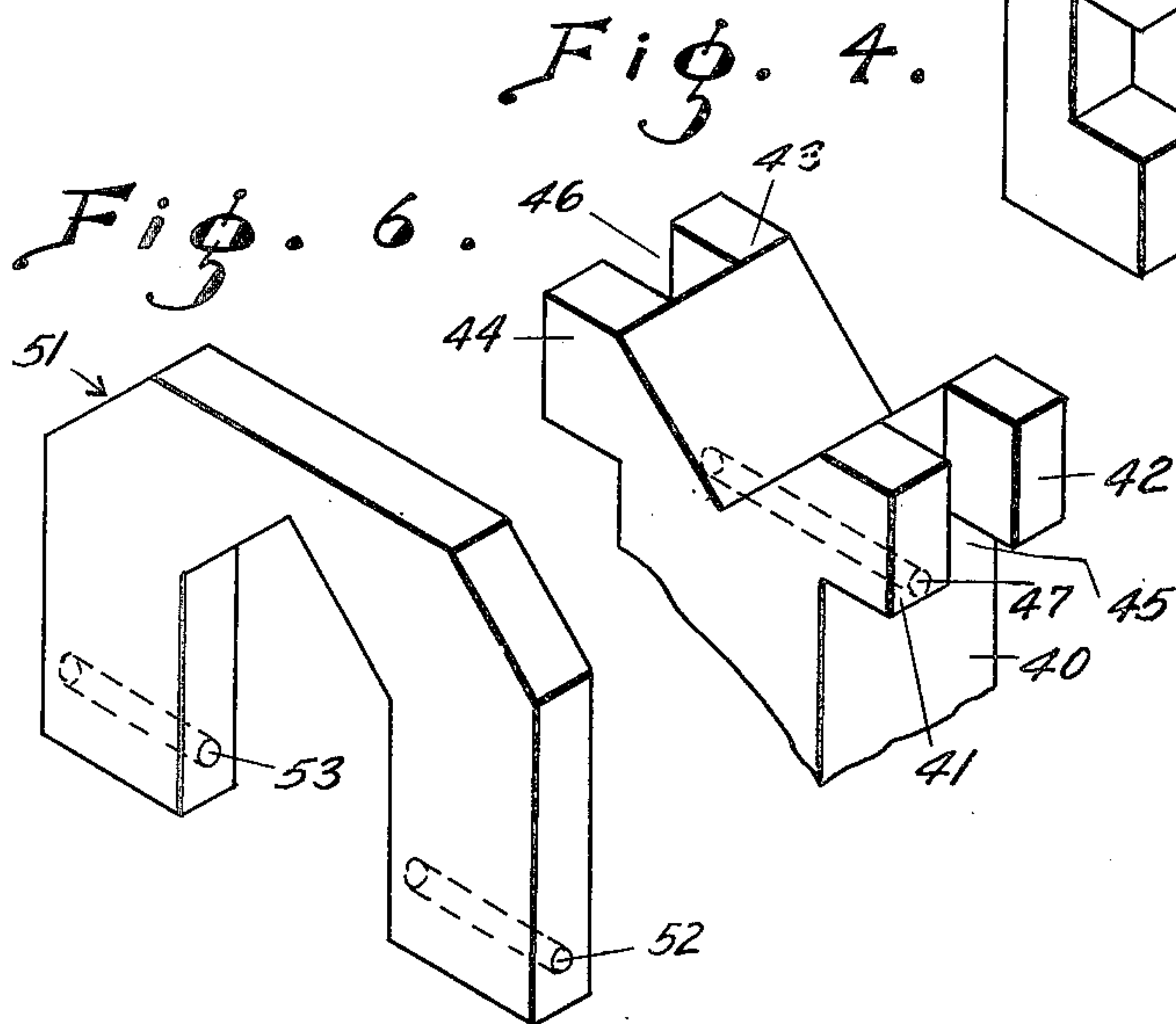
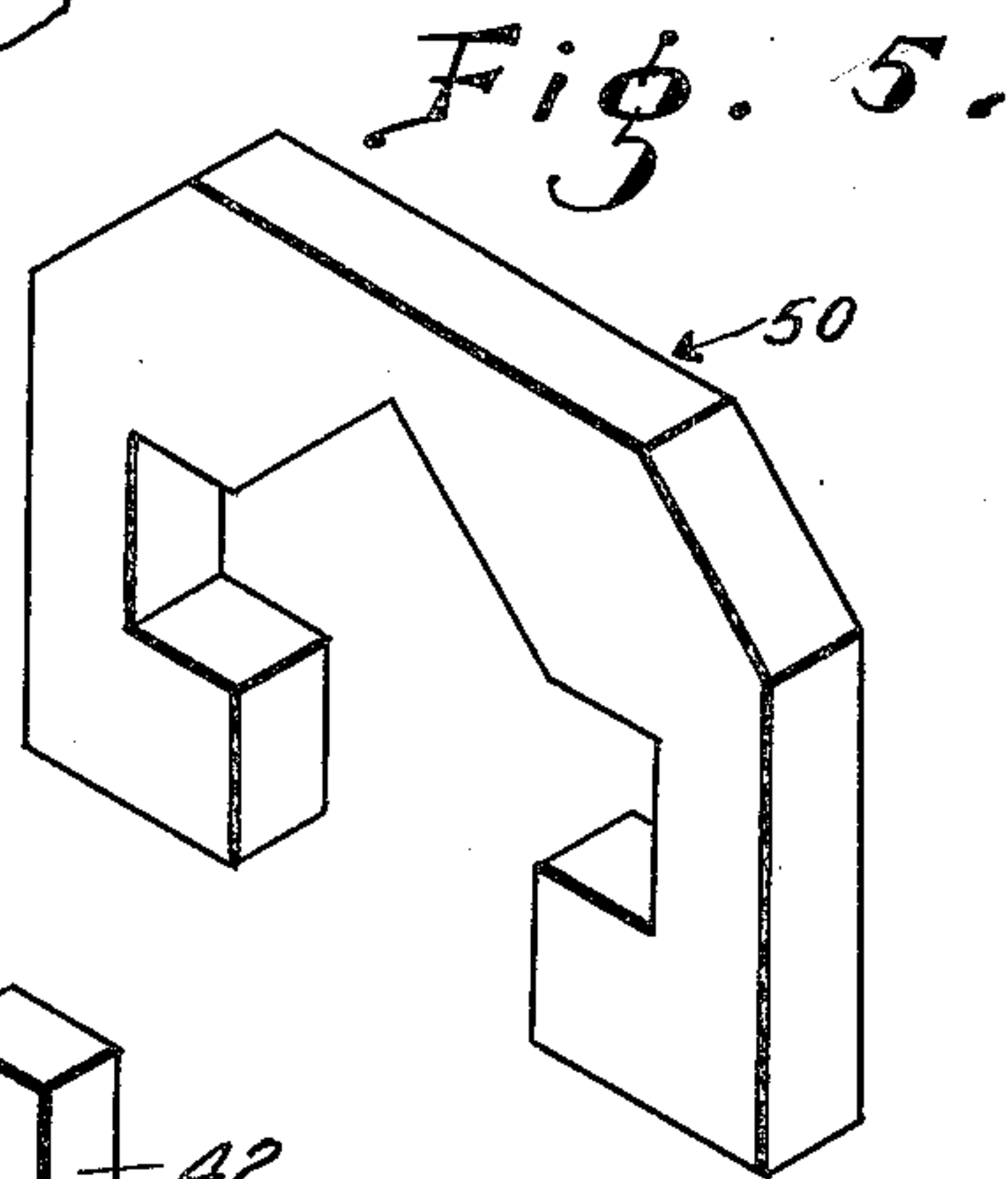
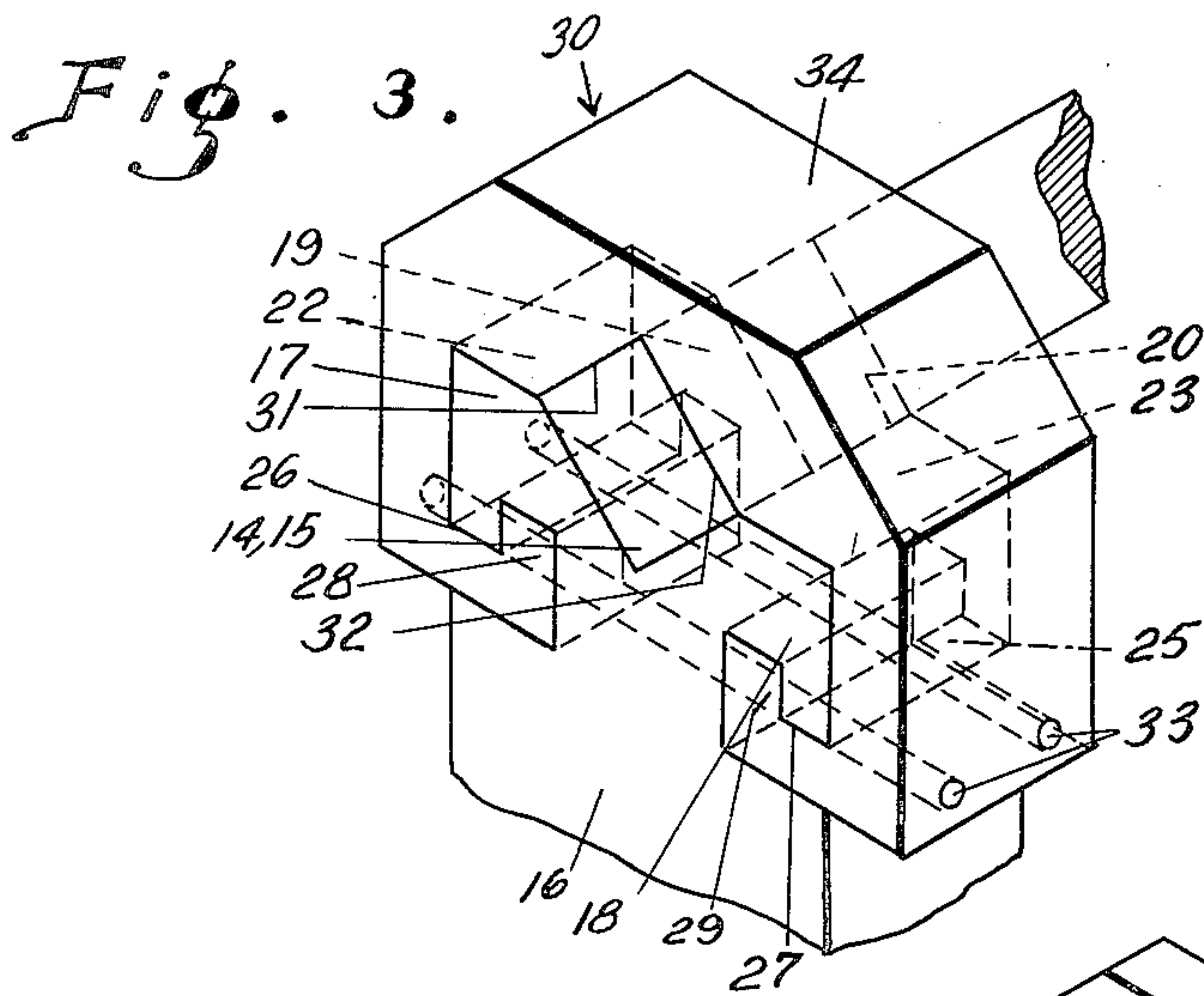
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## UNITED STATES PATENT OFFICE

2,538,936

## DRY RENDERING PADDLE

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Application January 10, 1948, Serial No. 1,518

7 Claims. (Cl. 259—136)

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The present invention relates to a dry rendering machine and refers more particularly to a rotary paddle for use in a stationary cylindrical kettle as presently employed in the rendering of fragments of animal carcasses by means of steam under pressure and agitation by a plurality of paddles.

The art as presently practised comprises partially filling a horizontally disposed cylindrical kettle or drum with fragments of animal carcasses, the latter being placed between a plurality of paddles extending radially from an axially disposed square shaft which is caused to rotate in the stationary kettle. Each paddle extends at 90 degrees of rotation to the paddle immediately adjacent, the paddles being located in substantial contact one with the other for the length of the shaft.

The rendering process once commenced must continue for a given time, and great difficulties are encountered due to failure of the means connecting the paddles to the shaft. Despite any such failure, the shaft must continue to rotate and a loose paddle frequently gets in the way of other paddles and causes additional failures, causing progressively greater damage to paddles, kettle and power transmission machinery.

An object of the present invention is the provision of improved connecting means between paddles and shaft.

A further object is the provision of an improved paddle adapted to be connected to the shaft by a massive connecting cap.

Still another object is the provision of a special paddle adapted to be connected to the shaft after all the other paddles have been connected and of special caps for use with said special paddle.

In accomplishing the objects of the present invention a paddle is provided having its inner end of substantially Y shape, the inner boundaries of the arms of the Y constituting flat faces disposed at right angles one to the other and thus adapted to engage two adjacent sides of the square shaft. Pins set in each of the faces and parallel one to the other project into the shaft to fix the paddle against movement axially of the shaft. The length of said faces measured from the angle of the Y is equal to a side of the cross section of the square shaft, and the end surfaces of the arms of the Y lie in the plane of the diagonal of said cross section, the outer surfaces of the arms being substantially perpendicular to the end surfaces and extending backward toward the body of the paddle, the

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arms further having under surfaces opposite and parallel to the end surfaces, the arms further being formed with rectangular recesses reentrant from the last mentioned under surfaces. A massive cap has inside surfaces complementary to the two remaining sides of the shaft, and to the end, outer side, under side and reentrant surfaces of the arms of the paddle, and is engaged with the paddle by sliding axially of the shaft.

It is evident that the length of the shaft may be thus filled up with paddles connected thereto in operative relationship until there is only room for one more paddle, and that the last paddle cannot be connected by a cap which must be slid into engagement from a position outside the paddle axially of the shaft. In this last paddle, called the master paddle, the arms of the Y are relieved for the central third of their width and a set of three master caps are used to connect it to the shaft, each master cap being one third as thick as the ordinary cap. Two of the master caps are holder caps similar in cross section to the ordinary cap, and are engaged with the paddle by sliding motion radial to the shaft through the central recess in the arms of the Y, then slid axially of the shaft to engage the reduced arms of the paddle. The third master cap which is a filler cap and which is not relieved to correspond to the reduced arms but rather engages only the two sides of the shaft and the relieved body of the paddle, is slid in between the two holder caps and pinned to the paddle.

Other objects of this invention will in part be obvious and in part hereinafter pointed out. The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts which will be exemplified in the construction hereinafter described and of which the scope of application will be indicated in the following claims. In the accompanying drawing, in which is shown one of the various possible illustrative embodiments of this invention;

Figure 1 is a side elevational view, partly in section, of a conventional dry rendering kettle provided with my improved paddles.

Figure 2 is a sectional view on the broken line 2—2 of Figure 1.

Figure 3 is a perspective view of a paddle and cap operatively connected to the shaft, paddle and shaft being shown fragmentarily.

Figure 4 is a fragmentary perspective view of the master paddle.

Figure 5 is a perspective view of one of the two holder caps for the master paddle.



Figure 6 is a perspective view of the filler cap for the master paddle.

Referring now in detail to the drawings, the conventional dry rendering drum or kettle 10 is provided with a charging door 11 and a discharge door 12 and is capable of retaining under pressure steam introduced through pipes 13. A shaft 14 is disposed axially of kettle 10 and the portion 15 of shaft 14 within kettle 10 is of square cross section. Drive means for rotating shaft 14 within kettle 10 are conventional, as well as temperature and pressure gauges, and are therefore not shown.

The paddles 16 are elongated members firmly connected to the square portion 15 of shaft 14 and extend radially therefrom to within about half an inch of the cylindrical wall of kettle 10. According to conventional practice the inner end of the paddle is enlarged, and extends around and beyond the shaft, opposite the body of the paddle. The enlarged inner end of the shaft is divided along a line extending substantially longitudinally of the paddle, one half of the divided end being integral with the paddle and the other half being separate therefrom to permit attachment of the paddle to the shaft and detachment therefrom. The separate half of the enlarged end is connected to the paddle by bolts extending substantially perpendicularly to the length of the paddle, one bolt being adjacent the shaft on the paddle side thereof and on bolt being adjacent the shaft on the side opposite from the body of the paddle. The last named bolt continually fails in operation, despite all possible excellence of manufacture and design. Such failure causes the paddle to become loose and the loose paddle imposes undue strain on other portions of the mechanism and the damage is aggravated by the fact that a shutdown is not possible during the period of the rendering process. At the end of that time, extensive damage has been done.

My improved paddle 16 is provided with an inner shaft engaging end portion of substantially Y shape, and comprising the arms 17, 18, of a Y. The inner shaft engaging surfaces 19, 20 of the arms 17, 18 of the Y are substantially flat faces of which the length, measured from the angle of the Y, is equal to a side of the cross section of the square shaft 15. Pins 21 set in paddle 16 substantially parallel to the length thereof extend from the faces 19, 20 and into shaft 15, the principal function of pins 21 being to fix paddle 16 against movement axially of shaft 15. The end surfaces 22, 23, of the arms 17, 18, said surfaces also being the inner end surfaces of paddle 16, extend in a plane substantially perpendicular to the length of paddle 16 and common to a diagonal of the square cross section of shaft 15.

The side surfaces 24, 25, of arms 17, 18 extend perpendicularly to the end surfaces 22, 23, thereof and the under surfaces 26, 27 of arms 17, 18, respectively extend perpendicularly to the side surfaces thereof and parallel to the end surfaces thereof. The under surfaces 26, 27, are further rectangularly reentrantly recessed or relieved as at 28, 29.

The cap 30 of massive construction has surfaces 31, 32 complementary to the two remaining sides of the square shaft 15, and other surfaces complementary to and engaging end surfaces 22, 23, side surfaces 24, 25, under surfaces 26, 27, and the reentrantly recessed portions 28, 29, of the under surfaces 26, 27 of arms 17, 18. Cap 30

extends across the entire width of paddle 16 and is further provided with the holes 33 extending therethrough and coincident with holes in paddle 16, for bolting cap 30 to paddle 16, principally to prevent movement of cap 30 relative to paddle 16 axially of shaft 15.

Cap 30 thus has surfaces bearing on paddle 16 from at least four equiangularly spaced directions, namely those surfaces bearing against the surfaces 22, 23, then surface 25, then surfaces 27, 26, then surface 24. It is further evident that the surfaces 26, 27 extend substantially perpendicularly to the length of paddle 16, and are on the paddle side of the axis of shaft 15. Since the bight portion 34 of the substantially U-shaped cap 30 is on the opposite side of the axis of shaft 15 from the surfaces 26, 27, and also from the portions of cap 30 engaging the reentrant recesses 28, 29, and since cap 30 is of massive construction, it is admirably suited to resist the severe torsional strain to which it is subjected and which has caused the failure of previous means used to connect the paddle to the shaft.

The paddle 16 is attached to the shaft by inserting the pins 21, already connected to the paddle, into their respective recesses in the shaft, and by sliding cap 30 axially of shaft 15 into engagement with the arms 17, 18 of paddle 16. The entire square shaft 15 may thus be filled up with paddles 16 in contact with one another, until there is only room left for one more paddle. This last paddle cannot be connected to the shaft by sliding motion of a cap axially of shaft 15 from a point outside the outline of the paddle, since the shaft is already completely filled.

The master paddle 40, Figure 4, is the last paddle to be attached to the shaft. The inner end of paddle 40 is Y-shaped, comprising the arms 41, 42, 43, 44, arms 41, 42 each occupying substantially one third of the width of paddle 40, and being separated by the channel 45, also approximately one third the width of paddle 40. Arms 43, 44 are similarly proportioned and separated by the channel 46. A bolt hole 47 extends through paddle 40.

Master paddle 40 is attached to shaft 15 by means of two holder caps 50 and a filler cap 51, the three caps being referred to as a set of master caps, and each being one third of the width of master paddle 40. It may generally be said that master paddle 40 is similar in shape to paddle 16 except for the presence of the channels 45, 46, and also except for the absence of the reentrant recesses 28, 29 of paddle 16. The master caps 50 may be said to be complementary to master paddle 40 and shaft 15, and in particular to the outside thirds of the width of paddle 40 including the arms 41, 42, 43, 44. Master caps 50 are engaged with master paddle 40 by being slid through channels 45, 46, radially of shaft 15 and thence axially thereof into engagement with one or the other set of lugs or arms 42, 43, or 41, 44. The caps 50 are thus constituted holder caps, and they are positioned axially of shaft 15 by engagement between their outer surfaces and the adjacent caps of adjacent paddles, while the two holder caps 50 are separated one from each other by the filler cap 51 which is slid into channels 45, 46, radially of shaft 15 and bolted to master paddle 40 by a bolt passing through holes 52, 53, thereof and hole 47 of paddle 40.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use. As various



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possible embodiments might be made, of the above invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a machine in which paddles or the like are firmly fixed to a shaft for rotation therewith, the improvement comprising a paddle having inner end surfaces substantially perpendicular to the length thereof, said paddle further having side surfaces adjacent and substantially perpendicular to said inner end surfaces, said paddle further having under surfaces adjacent and substantially perpendicular to said side surfaces, said paddle further having shaft engaging surfaces, and a cap separate from said paddle, said cap having shaft engaging surfaces and surfaces complementary to said inner end, said side surfaces and said under surfaces and being engageable with said shaft and paddle by sliding axially of said shaft.

2. A master paddle according to claim 1, the inner end of said master paddle being relieved for substantially the central third of its width to constitute two inner end portions of reduced width separated by a channel, and a set of three master caps comprising two holder caps according to claim 1 and substantially one third the thickness of said master paddle and engageable with said reduced end portions by sliding into said channel and thence axially of said shaft, said master caps further comprising a filler cap engageable with said shaft and paddle by sliding into said channel.

3. A paddle and cap according to claim 1, said under surfaces of said paddle further being reentrantly recessed, and said cap being shaped complementarily to said paddle.

4. A paddle and cap according to claim 1, said under surfaces of said paddle further being reentrantly rectangularly recessed, and said cap being shaped complementarily to said paddle.

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5. In a paddle and cap according to claim 1 and adapted to engage a square shaft, said inner end portions of said paddle constituting arms of a Y, the inner surfaces of said arms being flat faces equal in length from the angle of the Y to the side of the square cross section of said shaft, said inner end surfaces of said paddle extending in the plane of the diagonal of said cross section of said shaft perpendicular to the length of said paddle.

6. In a machine in which paddles or the like are firmly fixed to a shaft for rotation about the axis thereof, the improvement comprising a paddle and a cap extending laterally across said shaft on the opposite side thereof from said paddle, said cap further extending beyond the width of said paddle and engaging the same by surfaces of said cap extending in a plane substantially perpendicular to the length of said paddle and located on the paddle side of the axis of said shaft.

7. In a machine of the type comprising an elongated member firmly and directly connected to a torsionally actuatable shaft, the combination of an elongated member, said member comprising an inner, shaft engaging end portion, said portion comprising at least one shaft engaging surface and other surfaces facing in four equiangularly spaced directions, with a cap comprising surfaces complementary to and engaging said other surfaces.

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