J. A. HALLANDER.

APPARATUS FOR MAKING CORES FOR WORM GEARS.

APPLICATION FILED DEC. 7, 1908.

945,941. Patented Jan. 11, 1910.

Fig. 1.

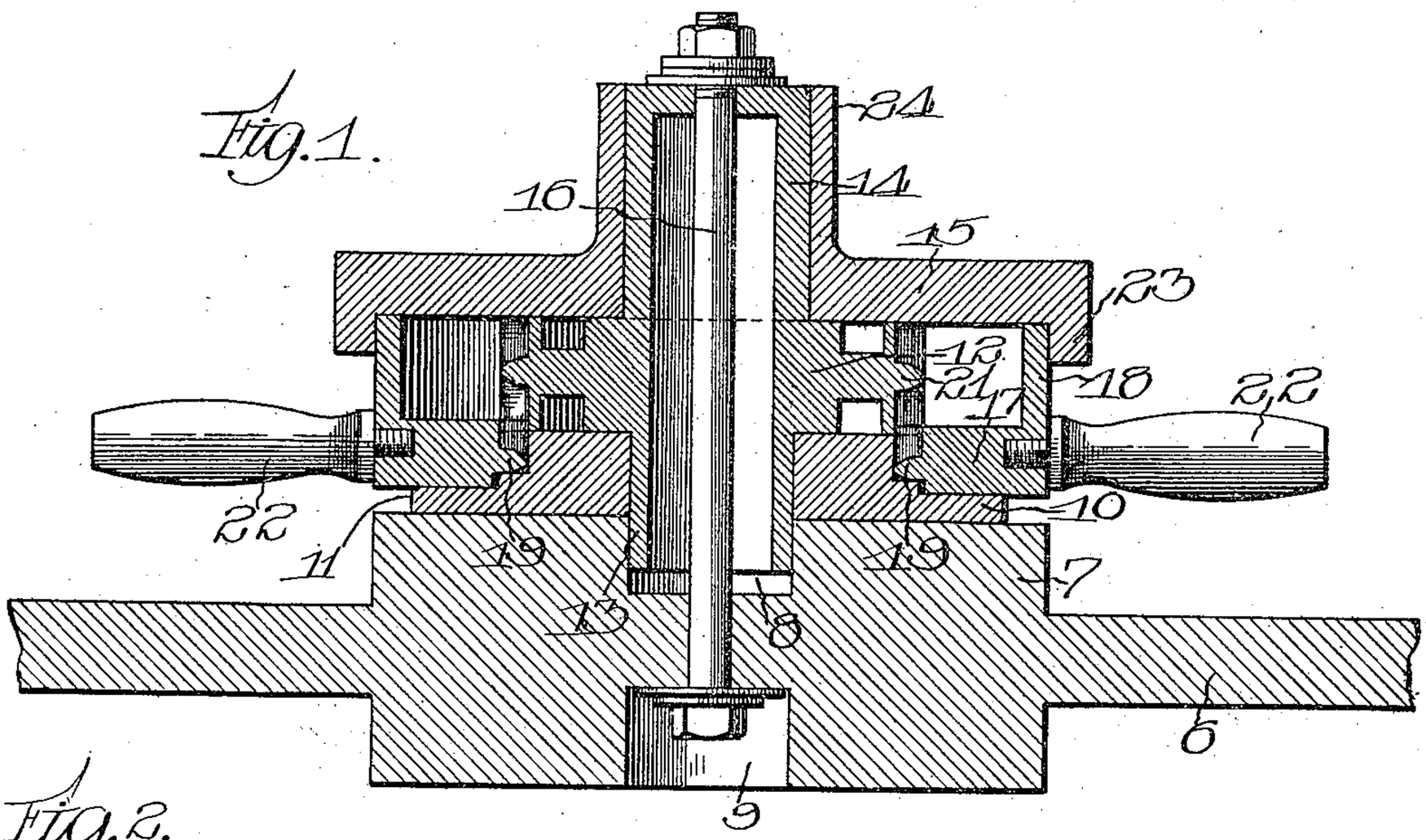


Fig. 2.

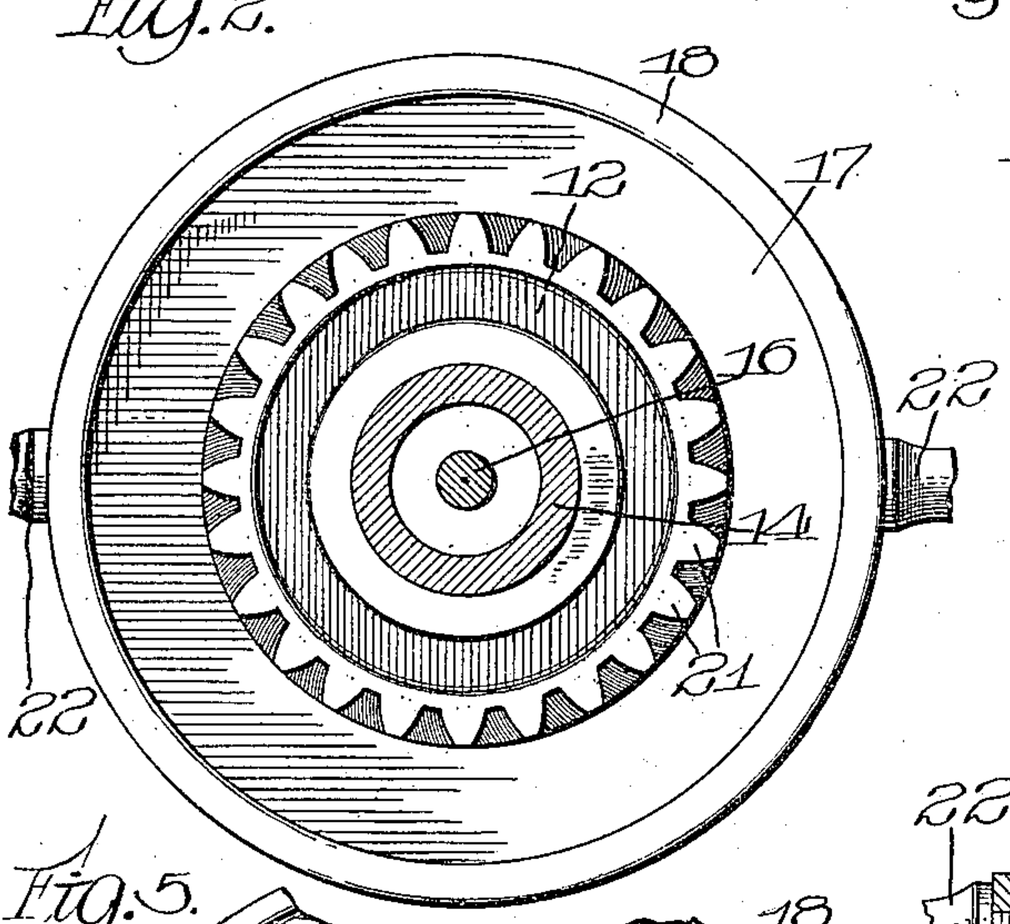


Fig. 3.

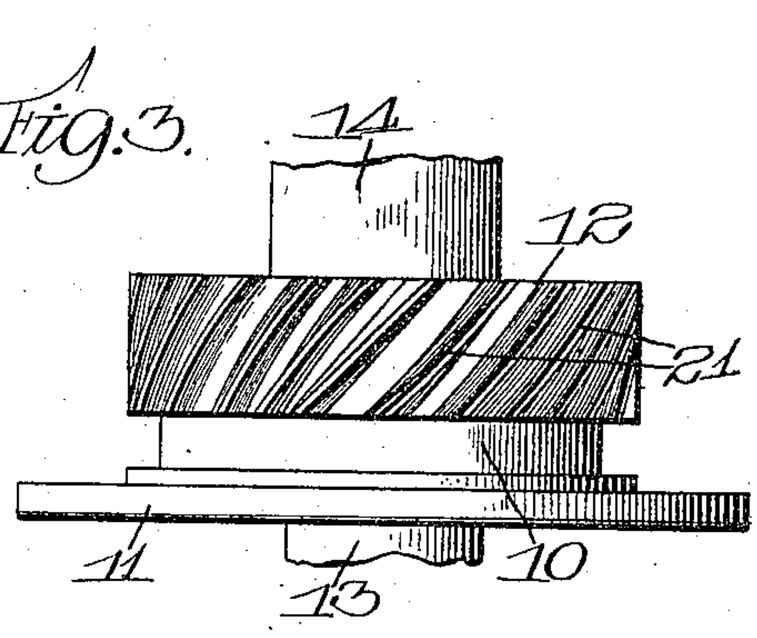


Fig. 4.

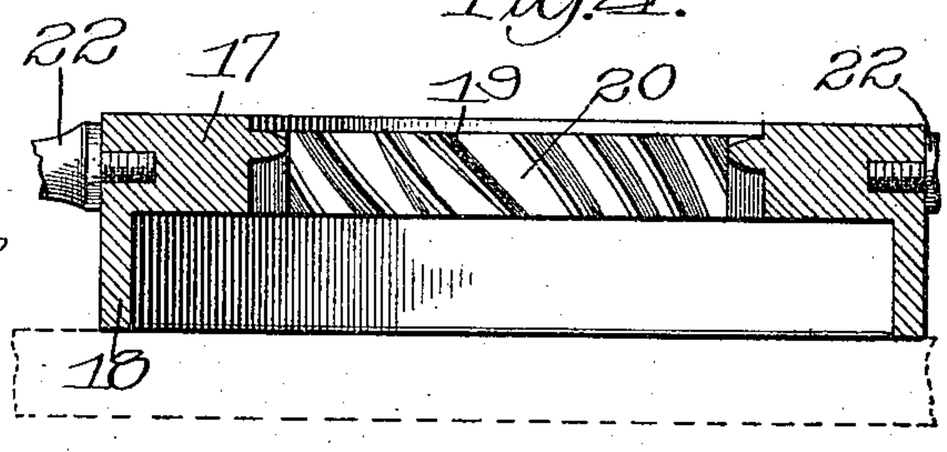
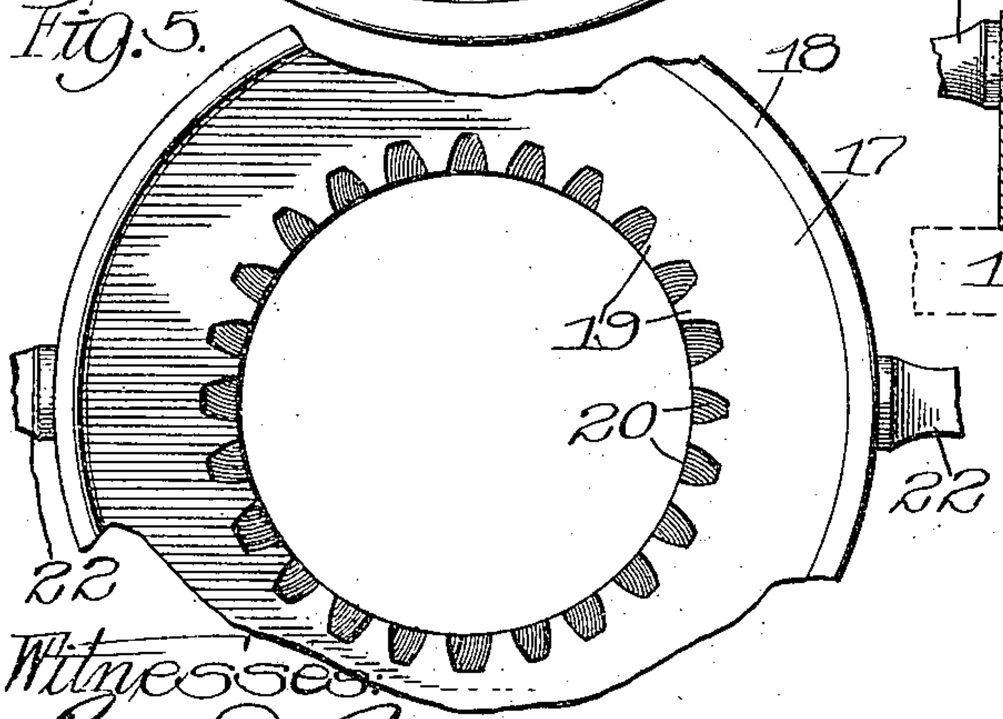


Fig. 5.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MAKING CORES FOR WORM-GEARS.

945,941. Specification of Letters Patent. Patented Jan. 11, 1910.

Application filed December 7, 1908. Serial No. 466,372.

To all whom it may concern:

Be it known that I, JOHN A. HALLANDER, a citizen of the United States, residing at Ottumwa, in the county of Wapello and State of Iowa, have invented certain new and useful Improvements in Apparatus for Making Cores for Worm-Gears, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to the manufacture of cast worm-gears, and has for its object to provide a new and improved apparatus for making cores to be used in casting such worm-gears.

Heretofore many attempts have been made to manufacture malleable cast worm-gears, but without success owing to the fact that it was considered necessary to make the cores in sections and afterward unite them with the result that where the cores were matched there would be a large seam in the castings and consequently the castings were unsatisfactory. Furthermore, the expense of so making the castings is excessive.

By my invention the objections incident to the former practice are avoided and I am able to produce perfect integral cores from which malleable worm-gears may be cast with entire accuracy and at a reasonable cost.

In the accompanying drawings, which illustrate the apparatus employed in making the cores, Figure 1 is a sectional view through the complete apparatus, showing the several parts assembled in the position they occupy after the sand has been filled in; Fig. 2 is a plan view, the cap piece being removed and the handles being broken away, certain parts being in section; Fig. 3 is a side elevation of the pattern piece; Fig. 4 is a longitudinal section of what may be termed the "core-box;" and Fig. 5 is a plan view thereof, certain parts being broken away showing the core-box in its normal position—*i. e.*, the position which it occupies when the sand is being applied.

Referring to the drawings,—6 indicates a board or table, which may be of any suitable construction, desired to support the apparatus. Said board is provided on its upper side with a circular projection 7 flattened on the top and provided centrally with a recess 8 on its upper side and a corresponding recess 9 on its under side, as shown in Fig. 1.

10 indicates the pattern piece which is provided at the base with a disk 11 adapted to rest on the projection 7 and provided with a central opening which registers with the recess 8.

12 indicates the pattern, the periphery of which is provided with teeth corresponding with the spiral or worm teeth that are to be cast. The pattern is provided also with an axial sleeve, the lower part 13 of which is adapted to project into the recess 8, as shown in Fig. 1. The outwardly-projecting part 14 of said sleeve is adapted to receive a cover-plate 15 which will be hereinafter particularly described.

16 indicates a bolt, which passes axially through the pattern and serves to secure the pattern to the table 6, as also shown in Fig. 1.

17 indicates the core-box, which also is preferably circular in form and is adapted to rest upon the pattern-plate 10 below the pattern 12. Said core-box is provided with an upwardly-projecting flange 18, the diameter of which is sufficiently greater than the pattern to provide the requisite body of sand for the core. The main portion of the core-box, by which I mean that portion from which the flange 18 rises, is of such thickness that the upper face thereof lies slightly above the lower margin of the pattern when the core-box is in its normal or operative position, as shown in Fig. 1. On its inner margin the core-box is provided with inwardly-projecting teeth 19 forming recesses 20 between them adapted to fit upon the spiral teeth of the pattern, as shown in Figs. 1, 4 and 5.

22 indicates diametrically-arranged handles for lifting the core-box.

The flange 18 rises to a level with the upper surface of the pattern, as shown in Fig. 1, and the cover-plate 15 fits thereupon and also upon the upper surface of the pattern and is provided with a marginal flange 23 which fits over the upper margin of the flange 18. The cover-plate is also provided with an inner flange 24 which fits upon the upper portion 14 of the pattern sleeve.

In Fig. 1 I have illustrated the several parts of the apparatus assembled in the position they occupy when the sand which is to form the core has been rammed in place in the upper portion of the core-box. It will be understood that in assembling the parts the pattern plate is first placed

upon the table 6, the pattern then being applied thereto and secured in position by the bolt 16, after which the core-box is fitted upon the pattern plate and the sand filled in. The cover-plate is then applied and given a few turns to fit it snugly in place. The core-box is then lifted by the handles,—its inwardly-projecting teeth moving in the teeth of the pattern so as to give the core-box a partial rotation. In other words, the core-box is withdrawn by an unscrewing movement, the intermeshing of the teeth of the core-box with those of the pattern compelling the core-box to rotate properly so as to remove the core of sand without damaging it. The frictional engagement between the sand and the teeth of the pattern also serves to smooth that portion of the sand forming the teeth and to a certain extent finish the core. After the core-box has been removed the cover-plate is taken off and the core-box inverted upon the drying board, thereby depositing the core thereupon. The core is then ready for drying. In this way I am able to successfully produce integral cores having teeth of any desired spiral form and at much less expense than has heretofore been possible.

It will be understood that the term "worm-gears" is used to indicate gears or equivalent devices having any form of inclined or spiral peripheral teeth.

That which I claim as my invention, and desire to secure by Letters Patent, is,—

1. An apparatus for making cores for worm gears, comprising a pattern, a support to which said pattern is secured, a core-box adapted to fit upon said pattern, and means carried by the core-box for causing the core and pattern to separate by a movement corresponding with the pitch of the pattern teeth.

2. An apparatus for making cores for worm-gears, comprising a pattern, means for supporting the same, a core-box adapted to fit upon said pattern, and means carried by the core-box and engaging the pattern for causing the core and pattern to separate by a spiral movement corresponding with the pitch of the pattern teeth.

3. An apparatus for making cores for worm gears, comprising a pattern, a support therefor, a core-box adapted to fit upon said pattern, and means carried by the core-box and moving therewith for causing the core and pattern to separate by a movement corresponding to the pitch of the pattern teeth.

4. An apparatus for making cores for worm gears, comprising a suitable support, a pattern secured thereto, a removable core-box adapted to fit upon said pattern, and means for causing the core to rotate in leaving the pattern by a movement corresponding with the pitch of the pattern teeth.

5. An apparatus for making cores for worm-gears, comprising a support, a pattern having inclined teeth, a bolt extending through the pattern for securing the same to said support, and a core-box adapted to fit upon the pattern and having teeth adapted to mesh with the teeth of the pattern.

6. An apparatus for making cores for worm-gears, comprising a support, a pattern having inclined teeth, means for securing the pattern to the support, a core-box adapted to fit upon the pattern and having teeth adapted to mesh with the teeth of the pattern, and a cover-plate adapted to fit upon the pattern and core-box.

7. An apparatus for making cores for worm-gears, comprising a support having a recess, a pattern having upwardly and downwardly projecting sleeves, the latter sleeve being adapted to fit in said recess, a core-box adapted to fit upon said pattern, said pattern and core-box having inclined teeth adapted to intermesh, and a cap adapted to fit upon said upwardly-projecting sleeve and over the core-box.

8. An apparatus for making cores for worm-gears, comprising a pattern, means for holding the pattern fixedly in position, and a removable core-box adapted to fit around the pattern, said core-box having teeth adapted to mesh with the teeth of the pattern, whereby the removal of the core-box and core is effected by a spiral movement thereof corresponding with the pitch of the pattern teeth.

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