(No Model.)

H. CROFT, Jr.

APPARATUS FOR CASTING WATER WHEELS.

No. 550,948. Patented Dec. 10, 1895.

Fig. 1.

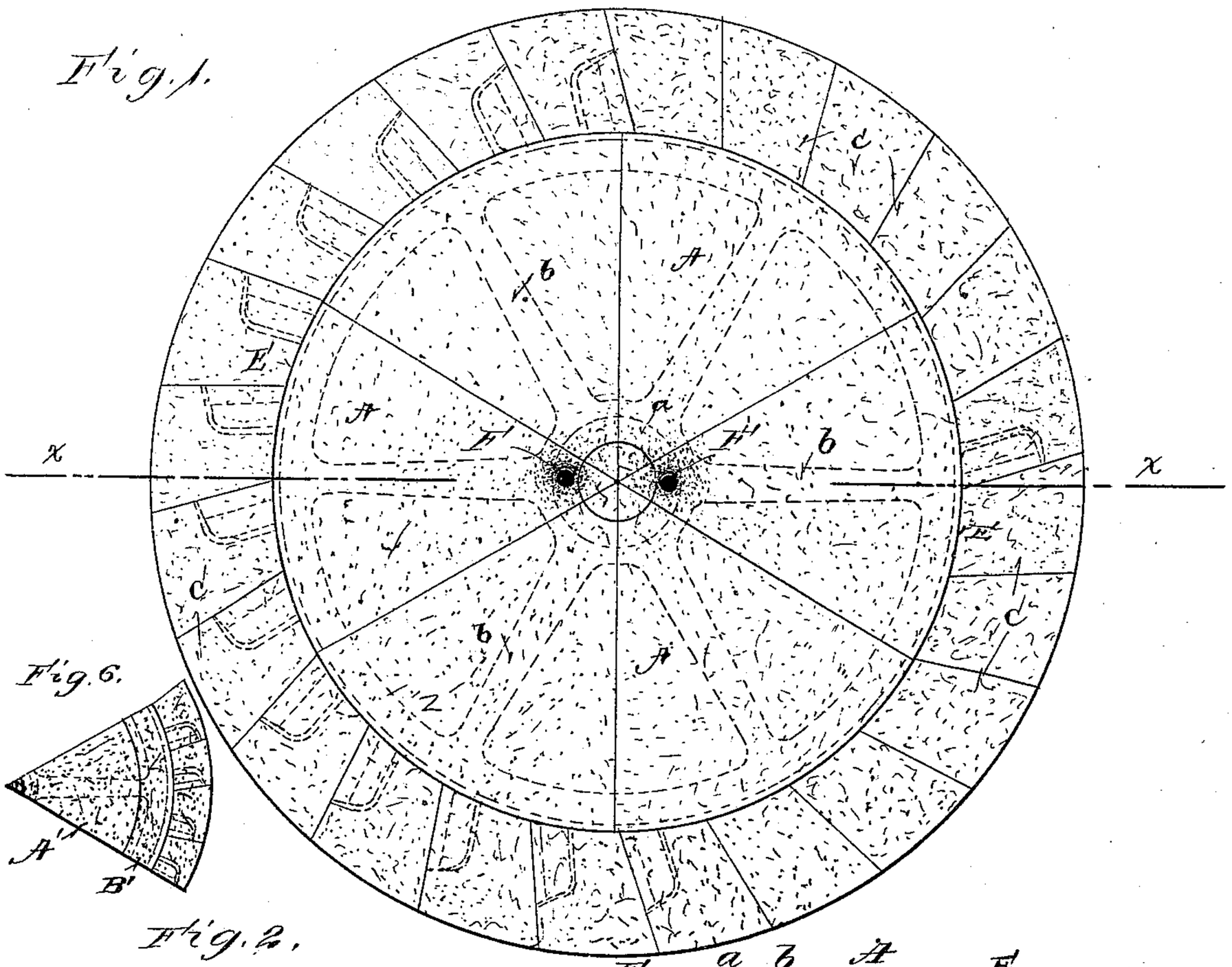


Fig. 6.

Fig. 2.

Fig. 3.

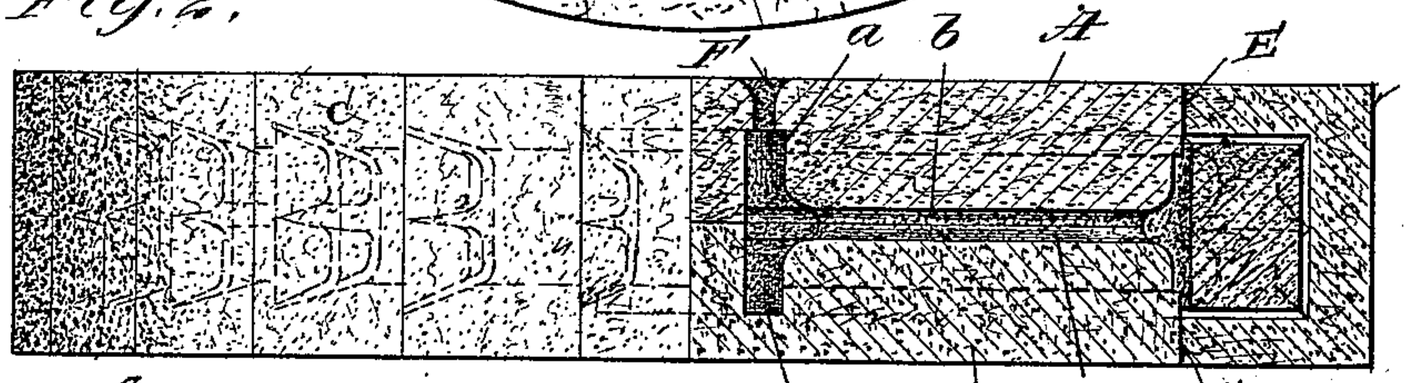


Fig. 4.

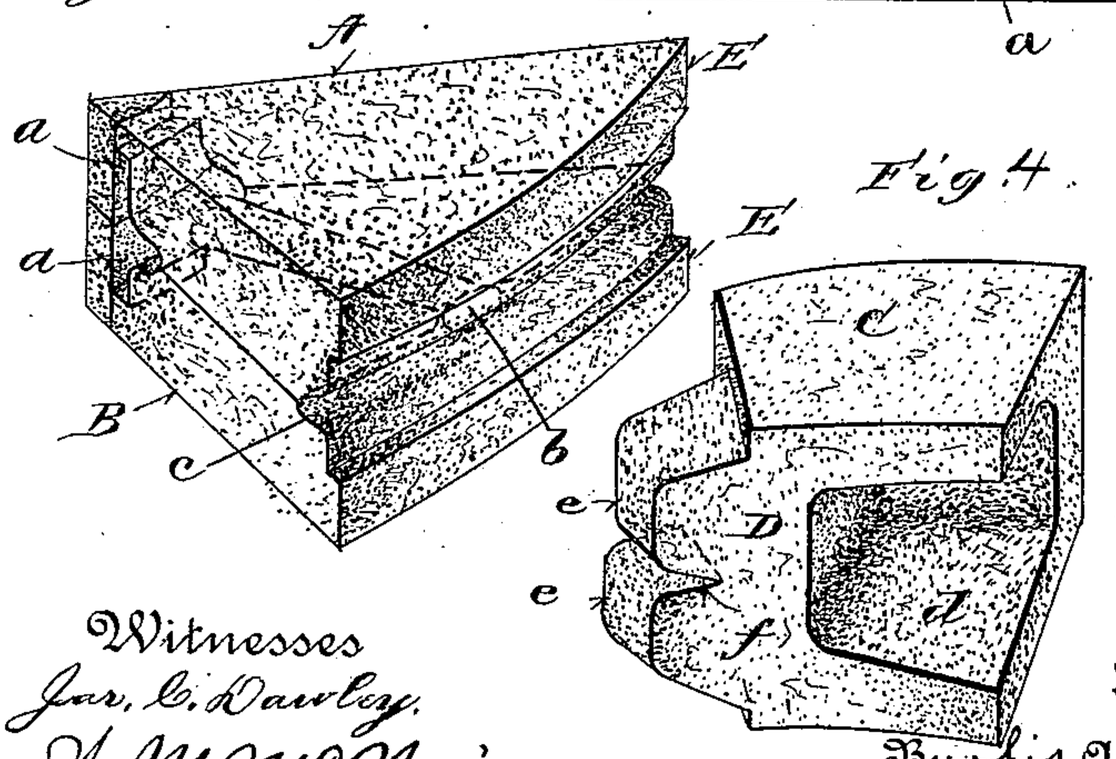
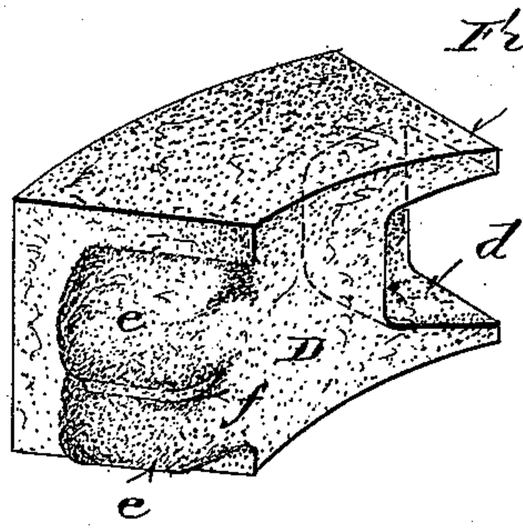


Fig. 5.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR CASTING WATER-WHEELS.

SPECIFICATION forming part of Letters Patent No. 550,948, dated December 10, 1895.

Application filed June 25, 1895. Serial No. 553,975. (No model.)

To all whom it may concern:

Be it known that I, HENRY CROFT, Jr., a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Apparatus for Casting Water-Wheels, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improved apparatus for casting in one solid integral piece hurdy-gurdy water-wheels. The strength required of these water-wheels is great, by reason of the hydraulic forces to which they are subjected in use and by reason of the velocity of rotation which is imparted to them. It is also necessary to obtain from them their highest degree of efficiency, that their buckets shall all stand at the same distance apart, at the same relation or relative position to each other, to the wheel-rim, and to the plane of their rotation, and that the structure shall be as rigid as possible, and to this end free from joints, particularly between the buckets and wheel proper, and bolts whose nuts which are liable to become loose and even fly off.

The object of my invention is to make it possible and practicable to construct such a wheel, a hurdy-gurdy water-wheel, which shall possess all of these requisites in the most perfect highly-developed state, mechanically and commercially.

The peculiarities of my apparatus will be developed in the following detail description, and will be particularly pointed out in the appended claim.

In the accompanying drawings, on which like reference-letters indicate corresponding parts, Figure 1 is a plan view looking down upon my mold for a hurdy-gurdy water-wheel of a selected type; Fig. 2, a partial transverse vertical sectional view on the line *x x* of Fig. 1 and a partial side elevation; Fig. 3, a detail perspective view of an upper and lower segment of the hurdy-gurdy mold in that part which constitutes the hub, spoke, and rims of the wheel; Fig. 4, a detail perspective view of one of the bucket-segments; Fig. 5, a similar view of another of the bucket-segments of the apparatus, and Fig. 6 a detail of a modification.

This apparatus consists of what I term an "upper" series of segments and a "lower" series of segments, constituting a double series of segments, and further consists of an outer series of segments.

The letter A designates the segments of the upper series, and the letter B the segments of the lower series. In the present instance there are six of the upper segments and six of the lower segments, and the hurdy-gurdy wheel to be cast has six spokes. The number of these segments in each series may vary. When these segments are all assembled, they constitute, collectively, a body in the form of a disk, and the upper series rest upon the lower series. Referring particularly to Figs. 2 and 3, it will be seen that each segment is fashioned with a depression *a* near the inner end corresponding in shape with a portion of the hub of the wheel to be cast, is fashioned with a radial depression *b*, corresponding with part of the spoke, and is further fashioned with a circumferential depression *c*, corresponding in shape with the rim of the hurdy-gurdy wheel. Now, then, it will be seen that the upper and lower series A and B, when assembled, will constitute of their depression *a b c* an inclosed space corresponding in shape and size with the hub, the spokes, and the rim of the hurdy-gurdy wheel to be cast.

Passing now to the outer series of segments, and referring particularly to Figs. 4 and 5, it will be seen that these segments C each have a pocket *d* and a boss *e* with a recess or incision *f*. This pocket *d* receives this boss *e;* but the boss being somewhat smaller than the pocket a space is left between them, and it is this space that constitutes the mold-cavity for the bucket of the wheel. The incision or recess *f* constitutes a space which corresponds with what is known as the "dividing-wall" in the bucket of the hurdy-gurdy wheel of the type I have selected for illustration in this case. From Fig. 2 the shape of this bucket with its dividing-wall is clearly seen in dotted lines, the bucket being a double bucket or in effect two buckets. I do not describe the operation of these buckets and how the water enters them and operates upon them with impulse and reactionary effects, as these things belong to the wheel itself after it is made and not to my invention, which

has reference to the making of the wheel. In wheels where such dividing-wall will not be used the incision or recess *f* will be omitted, and this may be done without materially departing from my apparatus.

The inner faces D of the outer segments C are placed against the peripheral surfaces E of the upper and lower segments A and B when the parts are assembled, as shown in Figs. 1 and 2. Now from Fig. 2 it will be seen that when these outer segments are brought into juxtaposition with the upper and lower segments the space between the pocket *d* and the boss *e* communicates with the space formed by the depressions *c* in the upper and lower segments. At F sprue-holes are provided, and when the metal is poured in it finds its way through all of the spaces formed by the depressions and configurations above set forth, which together constitute the exact shape of the hurdy-gurdy wheel to be cast, and hence such a wheel is formed by this my process of fashioning the segments described and the assembling of them in the relation stated.

Fig. 6 shows a modification which may be employed in the construction of the segments A and B. In this case the division-line between the segments instead of being horizontal is vertical, and A′ designates the innermost segment in which the spoke and a part of the hub are formed, and B′ the next segment in which a part of the rim only is formed.

After a wheel is cast the molding apparatus is "knocked down" or taken apart by withdrawing the segments C in an outward direction and by lifting off the upper series of segments A in the main form, or by radially withdrawing the segments B′ in the modified form.

The material of which I construct my melting apparatus is preferably sand mixed with an adhesive material, such as rosin or flour, so that the several segments described may be made and baked until they acquire the proper hardness to withstand their uses.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

A mold, consisting of an inner series of segments divided into an upper set A and a lower set B adapted to fit together in substantially a horizontal plane, all of said segments being also adapted to fit together edge to edge, and thereby form a disk, and each segment provided with depressions *a*, *b*, and *c*, and an outer series of segments C adapted to fit together edge to edge and also to fit against the periphery of the disk so formed, and each provided with a pocket *d*, and a boss *e* with a recess or incision *f*.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY CROFT, JR.

Witnesses:
A. W. GRANT,
W. W. WITMEYER.