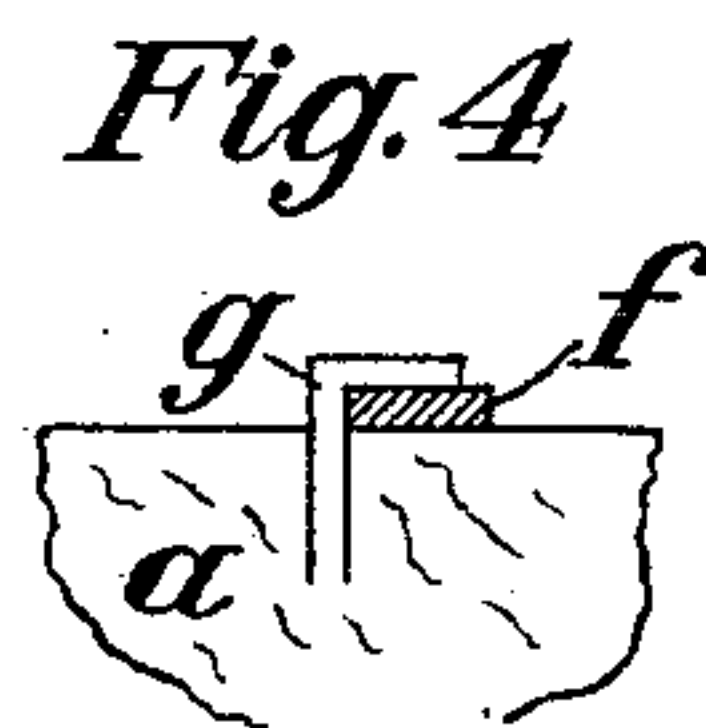
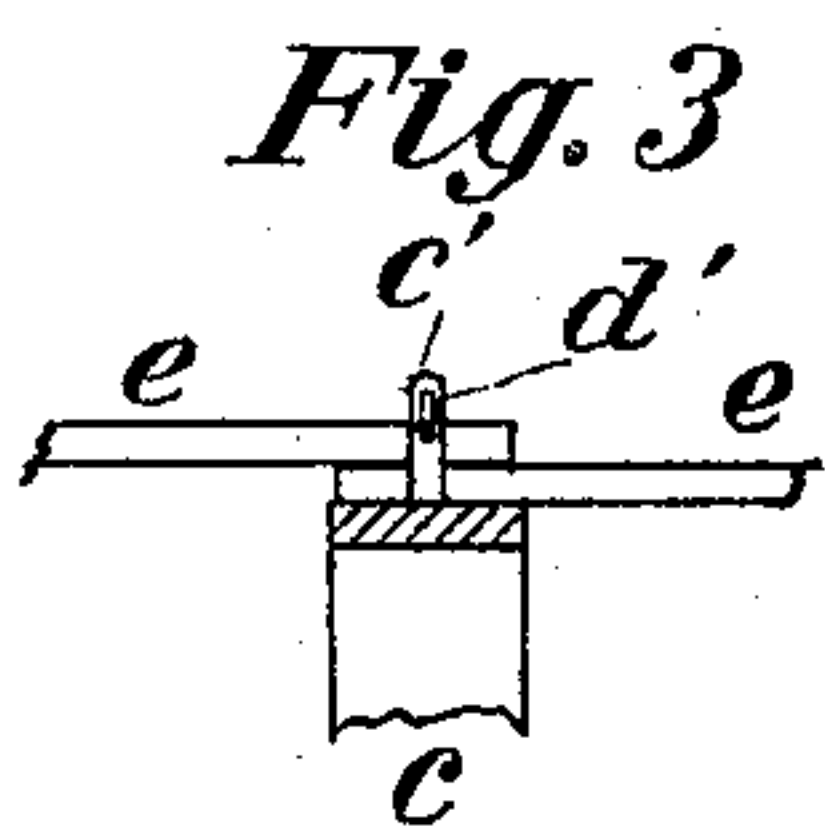
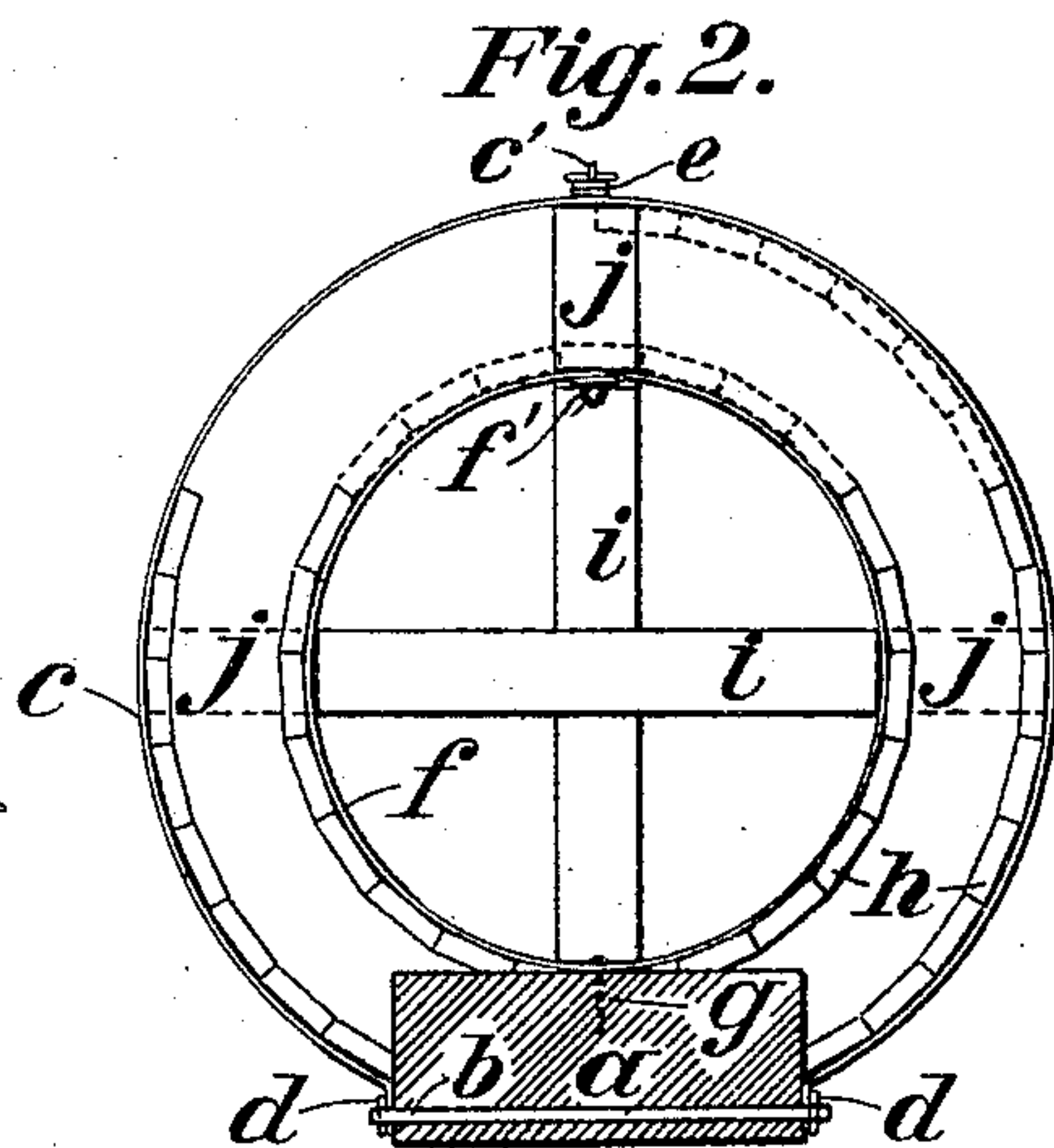
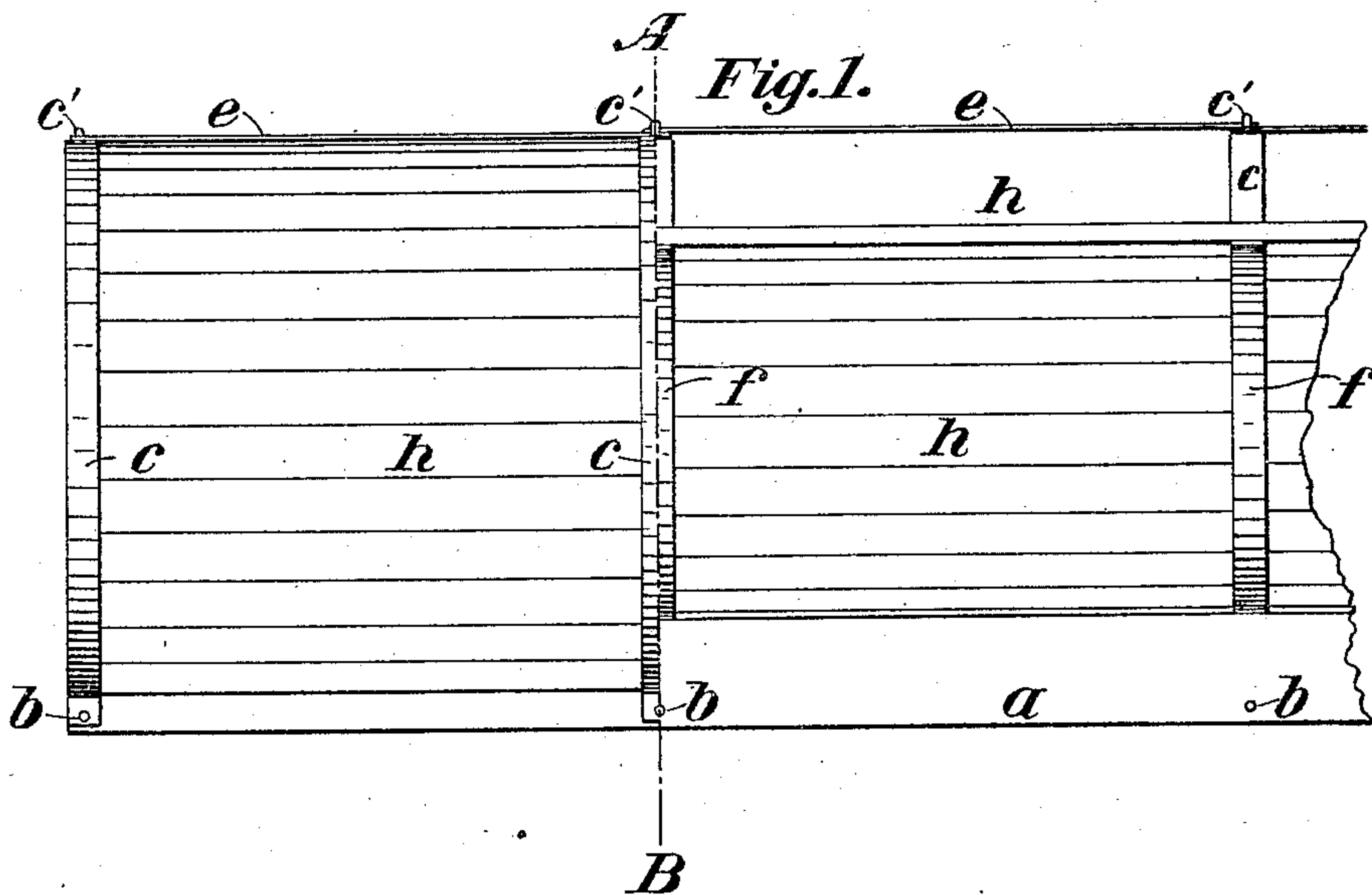


W. P. NICHOLS.  
FORM FOR MAKING CONTINUOUS CONCRETE CULVERTS.  
APPLICATION FILED FEB. 14, 1910.

966,044.

Patented Aug. 2, 1910.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

WILLIAM P. NICHOLS, OF TUCSON, ARIZONA TERRITORY.

FORM FOR MAKING CONTINUOUS CONCRETE CULVERTS.

966,044.

Specification of Letters Patent.

Patented Aug. 2, 1910.

Application filed February 14, 1910. Serial No. 543,677.

To all whom it may concern:

Be it known that I, WILLIAM PERRY NICHOLS, a citizen of the United States of America, and a resident of Tucson, Pima county, in the Territory of Arizona, have invented a new and useful Improvement in Forms for Making Continuous Concrete Culverts, of which the following is specification.

This invention relates to means for molding concrete culverts; and it consists in certain novel combinations of parts, and in a "form" for that use embodying such combinations or any of them, as hereinafter particularly described and claimed.

The leading objects of the present invention are to facilitate making such culverts in one or more sections, especially making them continuous, with center line straight, curved or angular, as required, and to provide for so making them on the ground in the place where they are required for drainage purposes, or under railroads or wagon roads, or for sewers or other like engineering works.

Another object is to adapt certain portable and temporary form members to interact with a longitudinal base that is adapted to form a permanent part of the culvert—and to which said form members are directly attached.

Other objects will be set forth in the general description which follows.

A sheet of drawings accompanies this specification as part thereof.

Figure 1 is a side elevation of the improved form with portions broken away and removed; Fig. 2 is a cross section on the line A—B, Fig. 1, showing some of the movable boards in dotted lines; and Figs. 3 and 4 are fragmentary sectional views on a larger scale, showing details hereinafter referred to.

Like reference characters refer to like parts in all the figures.

A longitudinal base, *a*, of concrete, stone or brick in mortar, or other suitable material, is first laid on the ground, and is preferably and conveniently molded *in situ* of concrete with vertical sides and a horizontal top, as shown in Fig. 2, and with transverse iron rods, *b*, placed therein at suitable intervals. Outer hoops, *c*, of suitable metal, arranged transversely with reference to said base, are constructed with perforated ends to interact with the protruding ends of said rods *b*, and said perforated ends are fastened in place on the respective ends of each rod by cotter pins, *d*, Fig. 2 and thus directly attached to the sides of the base. Longitudinal bars, *e*, of suitable metal, having perforated ends, connect the outer hoops *c* at the top, being attached thereto by slotted projections, *e'*, on the hoops interacting with cotter pins, *d'*, as in Fig. 3. Inner hoops, *f*, of suitable metal, in line or parallel with said outer hoops, are directly attached to the horizontal top of the base *a* by hooks, *g*, embedded in the base, as best shown in Fig. 4, and each of these lower hoops is constructed with a lap joint, *f'*, at top which is normally fastened by a pin and staple or their equivalent. Longitudinal boards, *h*, of suitable wood are movably supported, externally and internally, by the outer hoops *c* and inner hoops *f* respectively, and the form is supported at one of its ends at least by braces, *i*, and blocks, *j*, Fig. 2, against change of shape in transverse section due to the weight of the concrete while the latter is soft.

The ends or the outer end of the form may be boarded up in customary manner to prevent the escape of concrete therethrough, and the longitudinal boards *h* may be put in position and shifted as required, as indicated by full and dotted lines in Fig. 2. The boards *h* may be of varying lengths or so inserted as to break joint to any desired extent.

Wing walls, parapet walls, etc., may be built at the ends of the culvert after the barrel is completed, in known ways.

After the concrete sets, the hoops *c* and *f* and the connecting bars *e* may be readily unfastened, and, together with the boards *h*, removed for further use. The base *a* forms a permanent part of the culvert, and is or may be permanently reinforced by the rods *b*.

Other suitable fastenings may be substituted for the cotter, hook and pin-and-staple fastenings above described; and other like modifications will suggest themselves to those skilled in the art.

It will be understood that instead of employing a series of the rods *b* to remain embedded in the cement, one and the same rod may be employed for each of the outer hoops *c*; such rods to be turned now and then while the cement is setting so as to be loose and removable endwise when the cement is set.



Having thus described said improvement, I claim as my invention and desire to patent under this specification:

1. The combination with transversely arranged outer and inner hoops, of means for removably attaching said hoops to a longitudinal base adapted to form part of a culvert, longitudinal bars connecting said outer hoops directly at top, and longitudinal boards movably supported externally and internally by said hoops respectively.
2. A form for making concrete culverts constructed to interact with a longitudinal base having vertical lateral edges and a horizontal top, said form having, in combination, outer and inner hoops adapted to be arranged transversely with reference to said base, means for removably attaching said outer hoops directly to said lateral edges and said inner hoops to said top of the base, longitudinal bars connecting said outer hoops at top, and longitudinal boards movably supported externally and internally by said hoops respectively.
3. A form for making concrete culverts, constructed to interact with a longitudinal base of concrete or the like adapted to form a permanent part of the culvert structure, said form having, in combination, outer and inner hoops adapted to be arranged transversely with reference to said base, means for removably attaching said hoops directly to said base, longitudinal bars connecting said outer hoops at top, and longitudinal boards movably supported externally and internally by said hoops respectively.
4. In a form for making concrete culverts, constructed to interact with a longitudinal base of concrete or the like adapted to form a permanent part of the culvert structure, the combination of outer and inner hoops

adapted to be arranged transversely with reference to said base, transverse metallic rods adapted to extend horizontally through said base and having fastening devices at their protruding ends for attaching said outer hoops to said base, means for attaching the inner hoops to the base, and longitudinal boards movably supported externally and internally by said hoops respectively.

5. In a form for making concrete culverts, constructed to interact with a longitudinal base of concrete or the like adapted to form a permanent part of the culvert structure, the combination of outer and inner hoops adapted to be arranged transversely with reference to said base, means for removably attaching said outer hoops directly to said base, hooks embedded in the top of the base for attaching the inner hoops thereto, and longitudinal boards movably supported externally and internally by said hoops respectively.

6. In a form for making concrete culverts constructed to interact with a longitudinal base of concrete or the like adapted to form a part of the permanent culvert structure, the combination of outer and inner hoops adapted to be arranged transversely with reference to said base, means for removably attaching said hoops directly to said base, longitudinal bars connecting said outer hoops at top, longitudinal boards movably supported externally and internally by said hoops respectively, and means for preserving the symmetry of the filled form under the weight of the concrete, substantially as hereinbefore specified.

WM. P. NICHOLS.

Witnesses:

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