No. 681,196. Patented Aug. 27, 1901.

E. D. CLARK.

TUBULAR METALLIC FRAME.

(Application filed Nov. 5, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

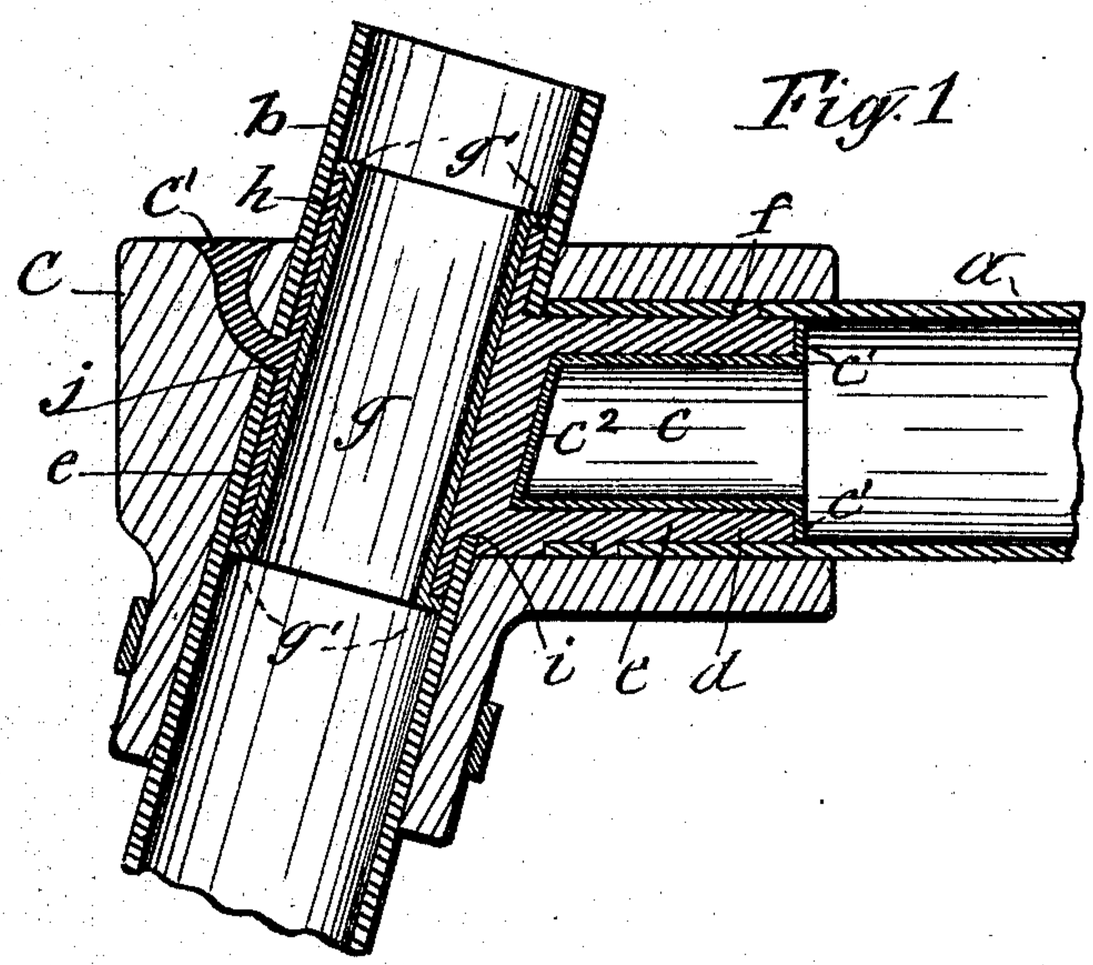

Fig. 2

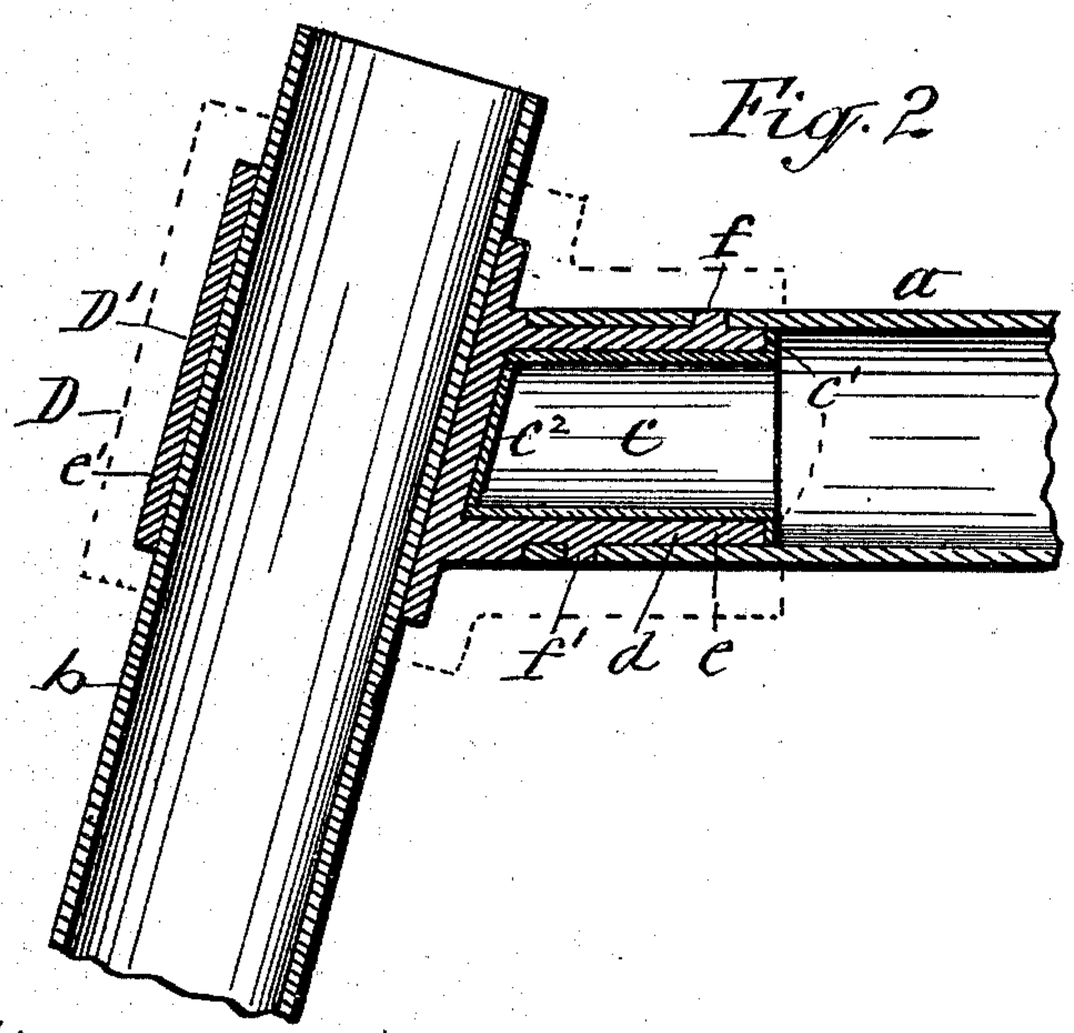

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Fig. 3

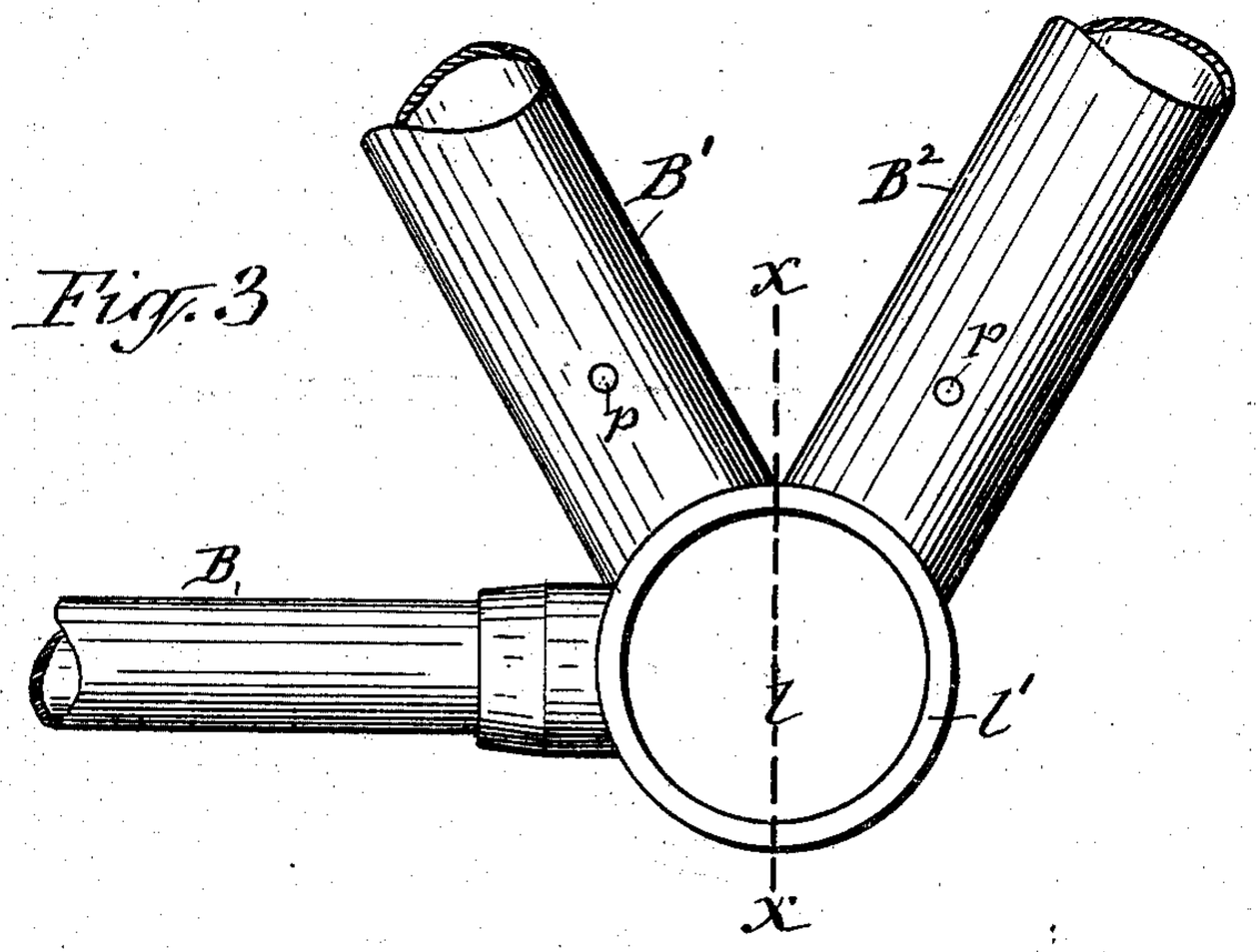


Fig. 4

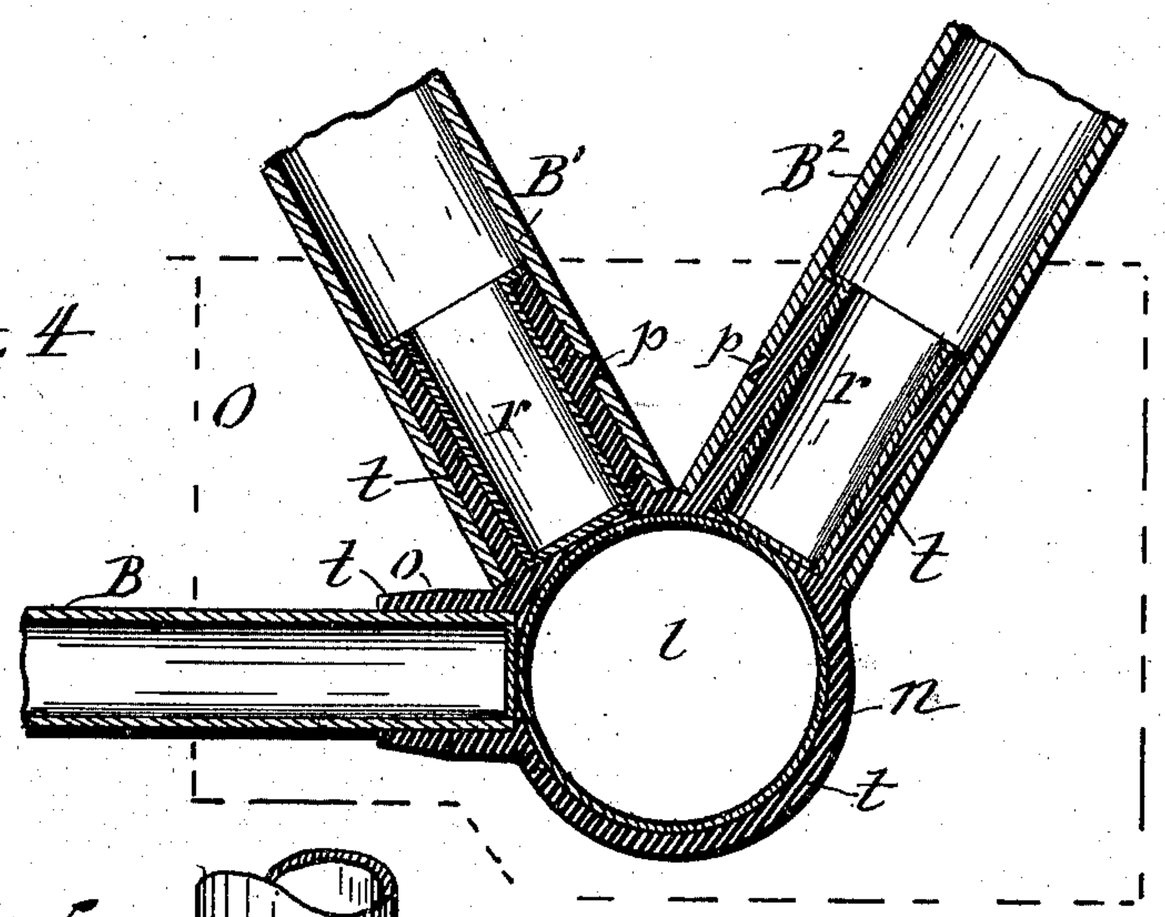
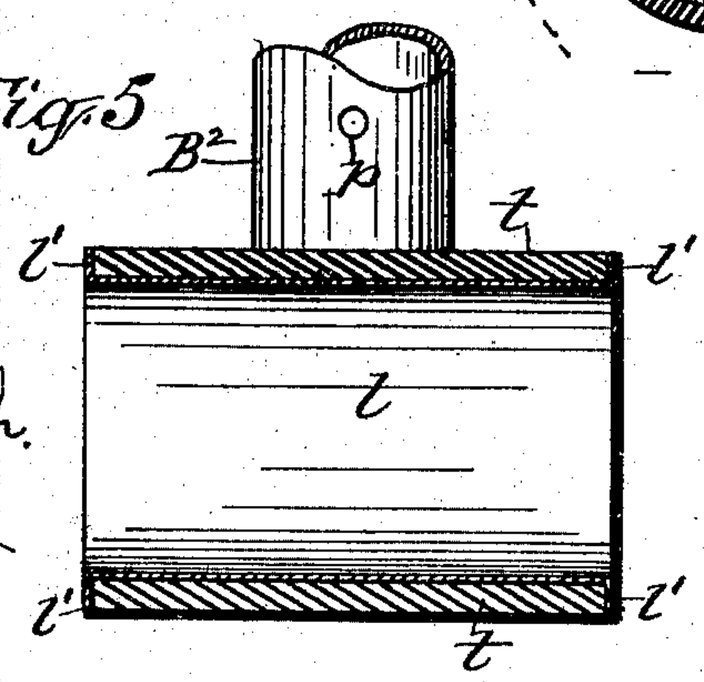


Fig. 5



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ERVING D. CLARK, OF SYRACUSE, NEW YORK.

TUBULAR METALLIC FRAME.

SPECIFICATION forming part of Letters Patent No. 681,196, dated August 27, 1901.

Application filed November 5, 1900. Serial No. 35,459. (No model.)

To all whom it may concern:

Be it known that I, ERVING D. CLARK, a citizen of the United States, and a resident of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Tubular Metallic Frames, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

The object of this invention is to more securely and permanently unite in their requisite relative positions the members of a metallic tubular frame, more especially members of bicycle-frames or other vehicle-frames; and to that end the invention consists in the novel means for uniting said members, as hereinafter described, and set forth in the claims.

In the accompanying drawings, Figures 1 and 2 are vertical longitudinal sections of two frame members united by my invention and showing said invention embodied in the so-called "flush joint" and "lap-joint" of said members. Fig. 3 is a fragmentary side view of the connection of the crank-hanger tube of a bicycle-frame. Fig. 4 is a vertical longitudinal section of said part of the frame, and Fig. 5 is a vertical transverse section on line X X in Fig. 3.

Referring to Figs. 1 and 2, *a* and *b* designate two steel tubes or tubular frame members disposed with one to extend laterally from the side of the other. To rigidly and permanently unite said members, I employ a tubular dam *c*, which I insert into the end of the tube *a* adjacent to the tube *b*, which dam is of sufficient smaller diameter than the interior of the tube *a* to form around the said dam a cavity *d*, extending lengthwise thereof and closed at its inner end by an outward flange *c'* or a suitable outward flare of the inner end of the dam. The outer end of said dam is formed or provided with a transverse wall c^2, which closes the interior of the dam. Into the cavity *d* I insert a core *e*, formed by casting therein a molten metal, which I specially prepare for that purpose and which readily amalgamates with the cold steel of which the tubes *a* and *b* are formed. The metal of the core effectually fills the cavity *d*, and in order to further anchor the core in the tube *a* I provide the latter with an orifice *f* through its side or with some other suitable key-seat extending laterally from the interior of the tube. The cavity *d* extends beyond said orifice and allows the molten metal of the core to run into and completely fill the orifice or key-seat. The outer end of the core is formed with a suitable brace, by which the member *b* is firmly tied to the member *a*. When said members are to be united by the so-called "flush joint," as shown in Fig. 1 of the drawings, I provide the side of the tube *b* adjacent to the tube *a* with an opening *i* and insert into the member *b* a tubular dam or bushing *g*, which is flanged at its ends, as shown at *g'*, to closely fit to the interior of the tube *b*. The main portion of the dam *g* is of a smaller diameter than the interior of the tube to form a cavity *h* between them. This cavity is directly opposite and communicates with the cavity *d*, formed between the dam *c* and tube *a*, as hereinbefore described, and thus the molten metal of the core is allowed to flow into and fill both cavities *h* and *d*. For introducing said molten metal into said cavities I provide the side of the tube *b* with an aperture *j* and place the two members *a* and *b* in a suitable mold C, provided with the necessary gate C', communicating with the aperture *j*. The mold embraces a sufficient portion of the member *a* to cover the orifice *f* and prevent the molten metal from escaping from said orifice. The molten metal is poured into the gate C', from whence it flows through the aperture *j* into the cavity *h* and thence into the cavity *d*, and by completely filling the two cavities it forms the core *e*, which rigidly and permanently unites the two members *a* and *b*.

The mold is obviously to be removed from the tubes *a* and *b* after the aforesaid casting of the core *e* is completed.

In uniting the members *a* and *b* by a lap-joint, as represented in Fig. 2 of the drawings, I use only the dam *c* in the tube *a* and dispense with the dam *g* and apertures *j* and *i* in the tube *b* and employ a mold D, formed with the cavity D' around the exterior of the member *b*. The end of the member *a* is sufficiently remote from the side of the member *b* to allow the molten metal to flow from the

cavity D′ to the cavity *d*, in which latter the said metal is allowed to enter the orifices *f* and *f′*, and thus form on the core integral lugs filling said orifices and forming a secure lock between the core and tube. The metal which fills the cavity C′ forms a band *e′* around the tube *b*.

In practicing my invention in fastening the usual tubular members B B′ B² to the crank-hanger tube of a bicycle-frame I employ a tube *l*, which is formed with circumferential outward flanges *l′* on its ends. I place this tube, with the tubes B B′ B² in their requisite relative positions, into a suitable mold O, as indicated by dotted lines in Fig. 4 of the drawings, which mold is formed with a cavity *n* around the tube *l* and, if desired, also with a cavity *o* around the end of the tube B. The tubes B′ and B² are provided with orifices *p* in their sides, and into the ends of said tubes I insert dams *r*, similar to the dam *c* hereinbefore described, which dams extend beyond the orifices *p*, as shown in Fig. 4 of the drawings. The orifices *p*, *f*, and *f′* are each located remote from the end of the tube to form a positive and secure lock with the metal entering the same. The ends of the tubes B′ and B² are sufficiently remote from the tube *l* to allow the molten metal to flow from the cavity *n* into the cavities surrounding the dams *r*. The mold O is provided with a suitable gate through which to introduce the molten metal, which in flowing into and completely filling the aforesaid cavities forms the tie *t*, which permanently unites the tubes B B′ B² with the tube *l*. The uniting metal being deposited on the exterior of the tube *l* forms the hanger-tube proper.

I claim—

1. In a tubular metallic frame the combination of a tube disposed to extend laterally from the side of another tube and provided with a key-seat extending laterally from the interior of the tube and remote from the end thereof, and a core inserted in said tube and formed in one piece with a key anchored in the key-seat and with a brace tying the two tubes rigidly together.

2. In a tubular metallic frame, the combination of a tube disposed to extend laterally from the side of another tube and provided in its side with an orifice located remote from the end of the tube to form a positive lock, a tubular dam inserted in said lateral tube and extending beyond the aforesaid orifice and of smaller diameter to form around the said dam a cavity extending lengthwise thereof, the outer end of said dam formed with a transverse wall closing the interior of the dam, and the inner end of said dam formed flaring to close the inner end of the aforesaid cavity, and a metallic core inserted into the said cavity and formed in one piece with a lug filling the orifice in the side of the tube and with a brace tying the tubes rigidly together.

3. In a tubular metallic frame, the combination of a tube disposed to extend laterally from the side of another tube and provided in its side with an orifice located remote from the end of the tube to form a positive lock, and a core in said lateral tube formed in one piece with a lug filling said orifice and with a sleeve on its outer end embracing the companion tubes as set forth.

4. In a tubular metallic frame, the combination of a tube disposed to extend laterally from the side of another tube, a tubular dam inserted in said lateral tube and of smaller diameter to form around said dam a cavity extending lengthwise thereof, the inner end of said dam formed flaring to close the cavity thereat and the outer end of the dam formed with a transverse wall closing the interior of the dam, and a core inserted into the aforesaid cavity and formed at its outer end with a transverse extension tying the tubes rigidly together.

5. In a tubular metallic frame, the combination of a tube disposed to extend radially from the side of another tube and provided with an orifice in its side, and two cores formed in one piece and inserted into the respective tubes and one of said cores formed with an integral lug filling the aforesaid orifice as set forth.

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Witnesses:
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