(No Model.) 3 Sheets—Sheet 1.

H. C. STIFEL.

JOINT OF MAST COMPOSED OF PIPES OR TUBES.

No. 420,023. Patented Jan. 21, 1890.

Fig. 1.

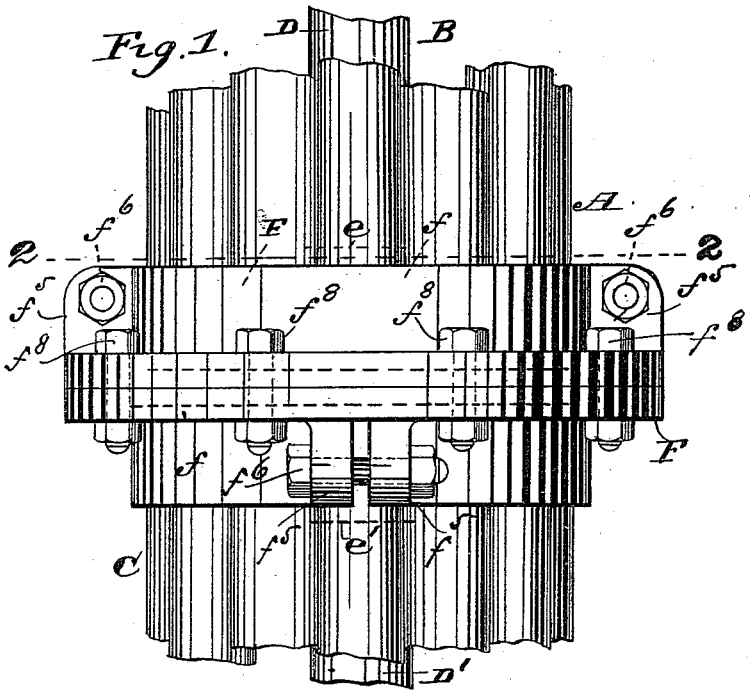

Fig 2.

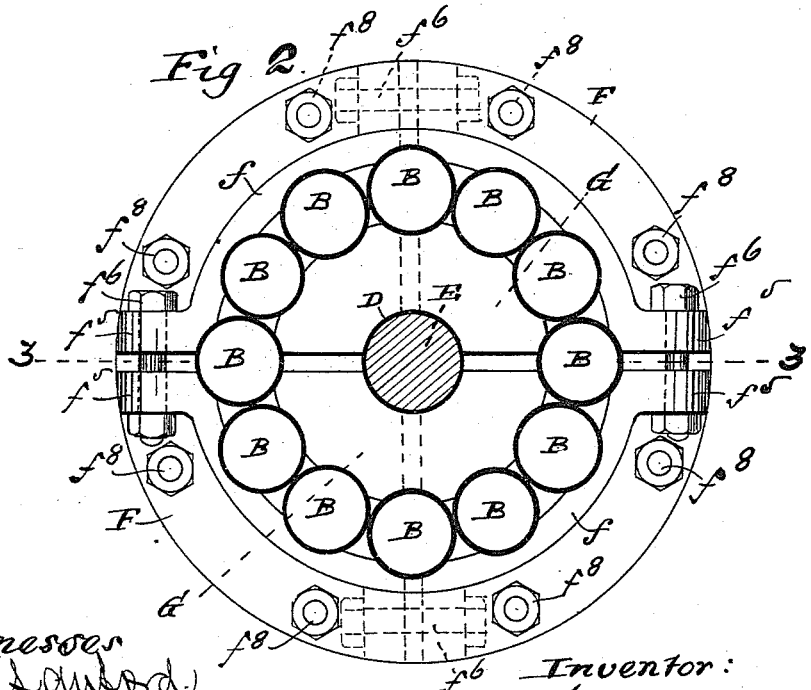

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Fig. 3.

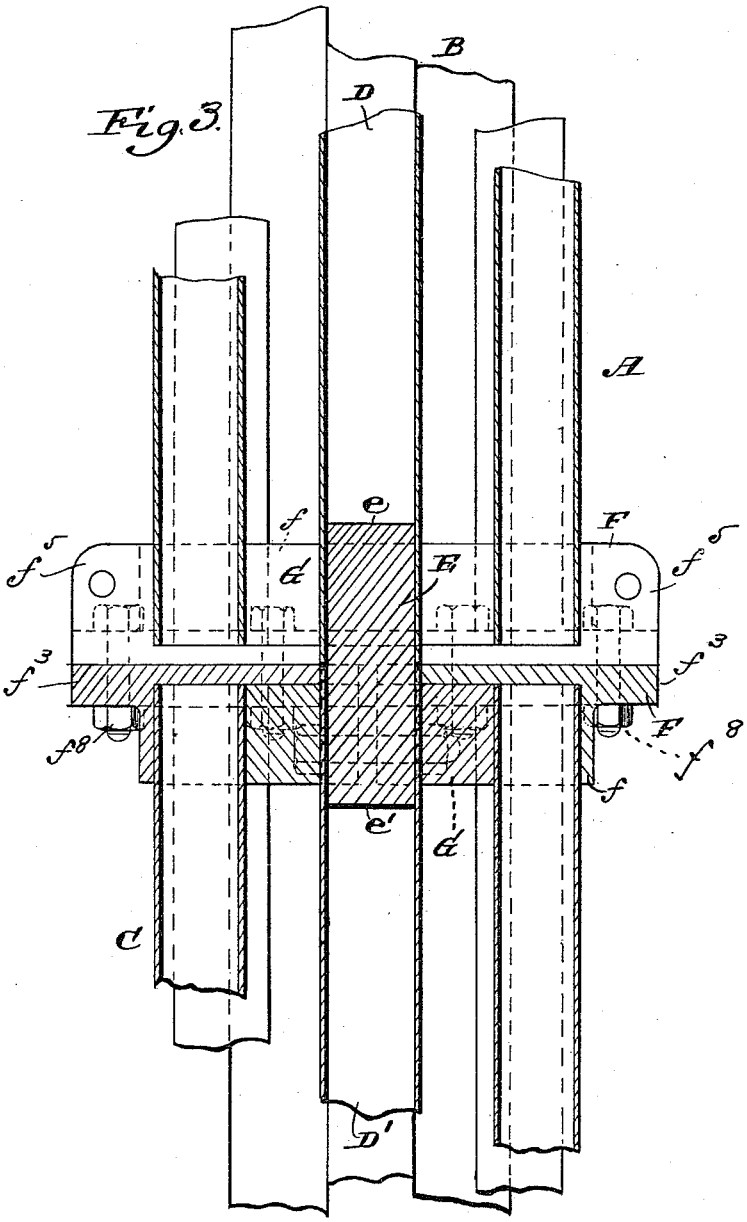

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Fig. 4.

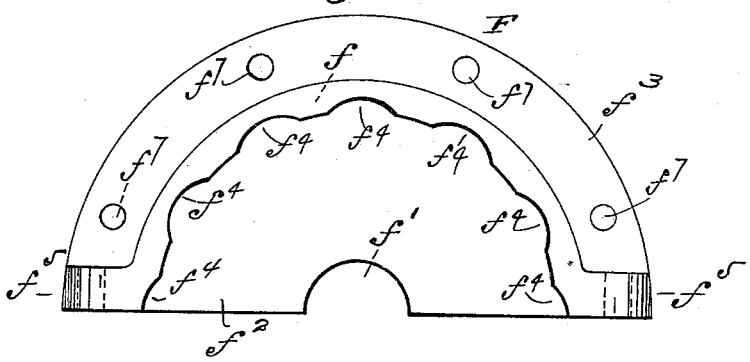


Fig. 5.

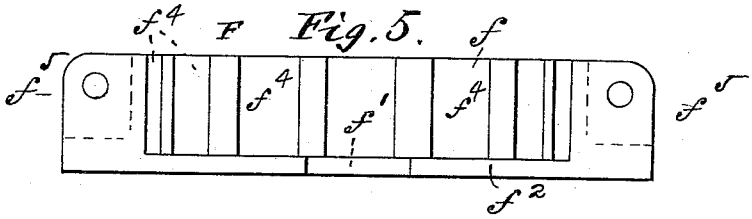


Fig. 6.

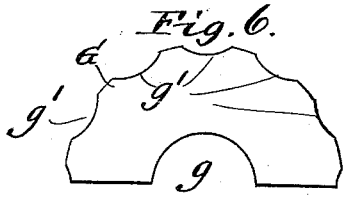


Fig. 7.

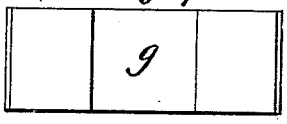
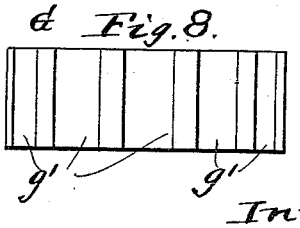


Fig. 8.



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UNITED STATES PATENT OFFICE.

HERMAN C. STIFEL, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE N. O. NELSON MANUFACTURING COMPANY, OF SAME PLACE.

JOINT OF MAST COMPOSED OF PIPES OR TUBES.

SPECIFICATION forming part of Letters Patent No. 420,023, dated January 21, 1890.

Application filed September 6, 1889. Serial No. 323,122. (No model.)

To all whom it may concern:

Be it known that I, HERMAN C. STIFEL, a citizen of the United States of America, and a resident of St. Louis, in the State of Missouri, have made a new and useful Improvement in Joints of Masts Composed of Pipes or Tubes, of which the following is a full, clear, and exact description.

The improvement relates to that class of masts, staffs, or poles which are constructed by first forming the pipe into clusters by binding together parallel or nearly parallel to each other a number of pieces or sections of pipe, and then joining said clusters of pipe end to end and in line, respectively.

It has for its object an improved means for binding said pipes into clusters, and also for uniting said clusters end to end; and it consists, substantially, of the device hereinafter described and claimed, aided by the annexed drawings, forming part of this specification, and of which—

Figure 1 represents a view in elevation of a portion of a mast including the herein-described joint. Fig. 2 is a horizontal section on the line 2 2, Fig. 1. Fig. 3 is a vertical central section of the same portion of the mast on the line 3 3, Fig. 2. Fig. 4 is a plan view of a hoop-piece; Fig. 5, an inner edge elevation of the same; Fig. 6, a plan view of a central piece; Fig. 7, an inner edge elevation of the same, and Fig. 8 an outer edge elevation of the same.

The same letters of reference applied to the various figures denote the same parts.

A, Figs. 1 and 3, represents the improved joint, B the cluster of pipes above the union, and C the cluster below the union; D, the upper central pipe, D′ the lower central pipe, and E a plug or core thereof extending, say, from *e* to *e′*, Figs. 1 and 3.

Each joint includes four semicircular or annular and, preferably, integral pieces F, of which a plan is shown in Fig. 4, and a central edge elevation in Fig. 5. Those pieces are shown also in the joints in Figs. 1, 2, and 3. They may properly be designated the "hoop-pieces," for they each consist of the hoop part *f*, projecting from the face of a plate which, extending inwardly to the semicircular central opening *f′*, forms the web f^2, and, extending outwardly from the hoop part forms the flange f^3. The indentations f^4 are formed in the hoop part adapted to receive the pipes B. At each end of each flange the hoop part is continued around, as it were, on the end of the flange and forms a lug f^5. Said lugs are adapted to receive the screw-bolts f^6, whereby two of the semicircular hoop-pieces, having their straight edges applied to each other, as shown in Fig. 2, may be drawn together and made to form a circular piece the back whereof is smooth and the face having the hoop *f* projecting therefrom. The flanges are also provided with holes f^7, Fig. 4, adapted to receive screw-bolts f^8, whereby two of the described circular hoop-pieces placed back to back may be bolted together. The object of the central pieces G is to form inside of the cluster of pipes a central abutment, between which and the hoop part *f* the pipes may be tightly gripped and held, and also to form a grip for tightly holding the central pipe D in the central circular space formed by the union of the said two semicircular pieces G, the said tightening and gripping being produced by screwing up the screw-bolts f^6 in the lugs f^5, and thereby drawing the two semicircular hoop-pieces together.

The gripping of the pipes B is assisted and increased by having them respectively in contact with each other in the circle.

The masts are formed by first binding pipes arranged parallel to each other together in clusters and sections and then joining together end to end and in line the sections of pipe formed as above. The following is a desirable way of forming said sections of clusters of pipe: Two semicircular hoop-pieces F are placed with their respective straight edges facing each other, so as to form when united a circular hoop-piece. Then the screw-bolts f^6 are placed in the holes in the lugs f^5 and the bolts screwed up slightly, not tightly. The central pieces G are placed in their designated places. One end of the

central pipe D is placed in its designated place, as shown, with the end thereof flush with the back of the hoop-pieces, and the pipes B, forming the circle or cluster, are then placed in their designated positions, with their ends square against the webs f^2. Then the screw-bolts f^6 are tightly screwed up, whereby all the described pieces of pipe are strongly gripped and held in their respective places. The center pipe D is gripped between the two center pieces G, and the pipes B are gripped between the center pieces G and the hoop parts f. The other ends of the same pipes are arranged in the manner as above described, and thus one section of the mast is formed. One or more other sections are formed in the same manner.

The following is a desirable mode of joining together two of the described sections of clusters of pipe. The said two sections which it is intended to join are placed near each other end to end and in line. A metal plug, say three or four of its diameters in length, is tightly inserted half its length into the end which is to be joined of the central pipe of one—say the first—of the two sections. The projecting end of said plug is adapted to fit tightly into the adjacent end of the central pipe of the other—say the second—section of pipes. The two sections are then caused to approach each other end to end, so that the projecting end of said plug enters the end of the central pipe of the second section of pipe, and the two circular hoop-pieces on the two sections of pipe come into contact back to back with the bolt-holes f^7 in the flanges f^3 of the two hoop-pieces respectively coinciding. The screw-bolts f^8 are then inserted in the said holes and screwed up tightly, and the joint is complete. In the same manner any number of sections may be joined together. In thus joining two of these hoop-pieces together, as above described, they may be placed so that when they are bolted back to back the joints and lugs of the two pieces will coincide and be opposite or against each other, respectively, or they may be placed so that the central joints of the two circular pieces will be at right angles with each other, and the two pieces "break joints," as it were—that is, the joints in the flanges of two joined semicircular hoop-pieces will come opposite the center of the semicircular pieces to which they are bolted back to back. The bolt-holes in the flanges are located so that in placing the hoop-pieces back to back the joints may be placed in either of the above-described relative positions desired. So, also, in placing the central pieces G they may be placed so that the line of junction thereof will coincide with the line of union of the semicircular hoop-pieces, or they may be placed so that the line of junction of the central pieces G will cross the line of union of the semicircular hoop-pieces F at right angles thereto, or at any other angle desired, so that in making a union, as above described, the four thicknesses of iron—that is, the two webs f^2 and the two central pieces G—may be placed so that their respective joints will form any desired angle with each other.

It is understood that the herein-described improvement is composed of iron or some other suitable metal.

Preferably the pipes employed in the application of this improvement should be without thread or crease, as any thread or crease on them has a tendency to lower the breaking strain of the pipe, and consequently to weaken the structure, and also to increase the complexity and cost of construction, so that the feasibility of dispensing with threads and creases on the pipes secured by this improvement not only adds to the strength, but also to the simplicity and cheapness of the structure to which the improvement is applied, all of which are peculiar and valuable features of the improvement under consideration. The parts should be formed and arranged so that the pipes will all be tightly gripped and held when the screw-bolts f^6 are screwed up.

The center pieces G are provided with indentations g' in their circumferences, adapted to receive the pipes of the cluster, and also with the central semicircular openings g, adapted to receive the central pipes D and D'.

I claim—

1. A mast formed by uniting together end to end sections of clusters of pipe, said clusters of pipe being bound together at the ends thereof by means of the hoop-pieces F, the central pieces G, forming inside of the cluster of pipes a central abutment, between which and the hoop part the pipes may be tightly gripped and held, and also to hold the central pipe, and the screw-bolts f^6, holding the parts together, and said sections of pipe being united together end to end by means of the central plug E and the screw-bolts f^8, all substantially as described.

2. The herein-described device, consisting of the combination of the hoop-pieces F, extending inwardly to form the web f^2 and outwardly to form the flange f^3, and indentations f^4, to receive the ends of pipes B, center piece G, to form an abutment by which the pipes may be tightly gripped, and screw-bolts f^6, for binding together a cluster of pipes, substantially as described.

3. The herein-described device for uniting end to end and in line two sections of clusters of pipes to form a mast, in combination, the hoop-pieces F, center pieces G, and screw-bolts f^6, passing through holes in lugs f^5 and f^8, passing through holes in the flanges, the bolt-holes in the flanges of the hoop-pieces being arranged as described, whereby, when the circular hoop-pieces are placed back to back to each other, they may be so placed and bolted together that the respective lines of junction

of the circular pieces will coincide or will intersect each other at right angles or at any other desired angle, substantially as described.

4. The herein-described device for gripping and holding pipes single and in cluster, consisting, in combination, of hoop-pieces F, center pieces G, and screw-bolts f^6, said hoop-pieces and center pieces having indentations formed in them adapted to receive and hold said pipe, substantially as described.

Witness my hand this 26th day of August, 1889.

HERMAN C. STIFEL.

Witnesses:
C. D. MOODY,
GEO. J. CHAPMAN.