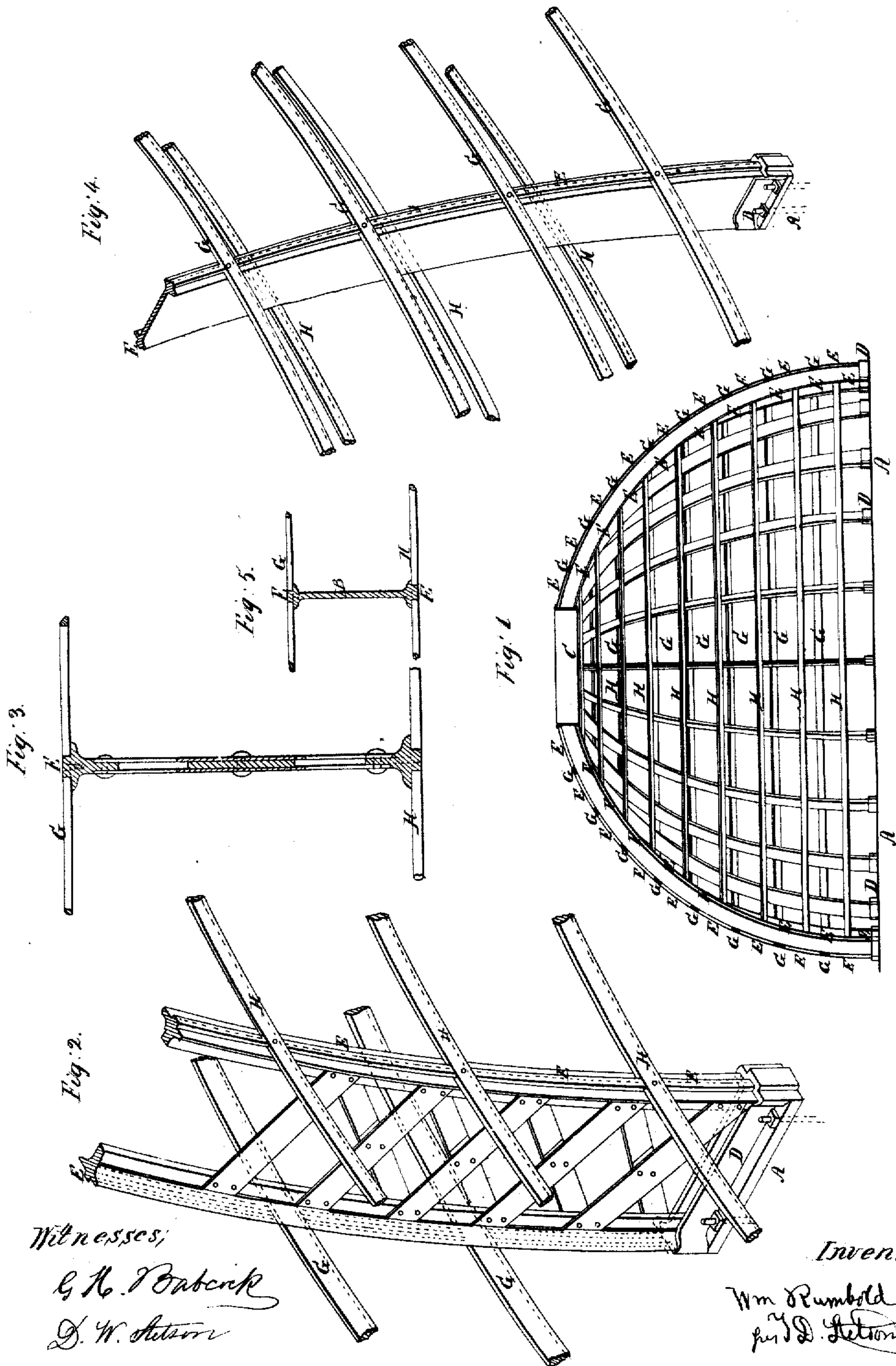


W. Rumbold.

Iron Structure.

Patented Jun. 17, 1862.

N^o 35,630.



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UNITED STATES PATENT OFFICE.

WILLIAM RUMBOLD, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN DOMES.

Specification forming part of Letters Patent No. 35,630, dated June 17, 1862.

To all whom it may concern:

Be it known that I, WILLIAM RUMBOLD, of St. Louis, in the State of Missouri, have invented a new and useful Improvement in the Construction of Metal Domes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of the frame or skeleton of a dome constructed according to my invention. Fig. 2 is an enlarged perspective view of the same. Fig. 3 is a horizontal or cross section of the same. Fig. 4 is a view similar to Fig. 2, but showing a solid beam. Fig. 5 is a horizontal or cross section of Fig. 4.

Large metal domes have commonly been constructed of sectional beams and with an auxiliary supporting-cone or frame-work, and in no instance have such domes been sustained simply by the thrust braces or beams and the bands tying them together—that is, no practical demonstration of a dome thus sustained has ever been made in this or any other country prior to the demonstration thereof by myself on the court-house in the city of St. Louis, State of Missouri, within the past two years.

The principle of construction adopted by me whereby this important result is accomplished consists in providing for the confining of the thrust upon arched ribs of domes by the construction of the arched ribs in one unbroken length and with inner and outer shoulder projections, and placing strong wrought-iron bands upon the extrados and intrados of the arched ribs, the whole being done in such manner that the skeleton dome becomes, as it were, one solid mass and constitutes a rigid structure possessing great strength in proportion to its weight, and while the bands confine the thrust of the arch beams or ribs, the ribs in turn support the bands and prevent them moving either upward or downward, and thus insure their acting to prevent or confine the thrust, and also prevent buckling or spreading and twisting of the ribs.

To enable others skilled in the art to make and use my invention, I will proceed to describe it with reference to the drawings.

B B are arched ribs of wrought-iron or other

suitable metal, and with broad inner and outer edges and a narrow solid web. They also are constructed with notched head projections E E' on their inner and outer arched edges. These ribs are made in one solid length, and not of pieces spliced together so as to form break-joints, as proposed in some works on the construction of wooden domes. The solid construction of the beams gives great strength and light weight. The ribs, of course, must taper from bottom to top gradually, so as to conform to the intended contour of the dome. In width inward or outward they may be uniform from top to bottom. The ribs thus constructed are secured by their lower ends and shoes D placed thereon to the wall-plate A of the rotunda of a building, as shown in Figs. 2 and 4, and supported at their upper ends by means of a ring, C.

Between the shoulders formed by the notched projections E E' strong wrought-iron bands G and H are placed, so as to encircle the whole series of ribs internally as well as externally, so to speak, or, in other words, bind them internally and externally. The bands G, which are placed on the extrados of the ribs, resist the tendency of the ribs to thrust outward. These bands, being supported by the shoulders of the projection E, cannot become displaced by any amount of strain which can come upon them, and therefore they resist to the full extent of their tensile strength any force tending to crush the dome.

To further strengthen the dome by preventing buckling or twisting of the ribs under crushing strains, bands H are placed upon the intrados of the ribs, securing them between the shoulders of projection E' in the same manner as the bands G, or dispensing with the shoulders at this point, as circumstances may demand, and depending upon strong bolts. The shoulders however, answer better than anything else for very heavy domes. Thus a rigid frame-work is formed and the metal therein so disposed that but little lateral strain comes upon any part, and while the thrust is vertical, or in the line of the arch, it is confined and borne by the bands to the extent of their tensile capacity.

By these means I am enabled to construct a dome which is very much lighter in propor-

tion to its span than any heretofore made, and without any aid from auxiliary internal supporting-cones or frame-work, as has been demonstrated in a dome of sixty feet diameter built according to my invention.

I would here state that a beam or rib with trellis-work wrought upon it might be employed by taking two narrow arch-ribs made in one solid length and connecting them together by diagonal pieces, as illustrated in Figs. 2 and 3. In this construction the bands G and H would be applied and would act just the same as in the construction shown in Figs. 1, 4, and 5.

I am not aware that solid arch-beams constructed as described and banded closely from

top to bottom, both internally and externally, for the purpose described and in the manner shown, have ever been employed to produce the result I have attained; nor am I aware that bands have been secured from moving vertically on arched ribs of a dome by means of shoulders, as shown.

Having now fully set forth my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

A metal dome constructed substantially as herein described, for the purpose set forth.

WILLIAM RUMBOLD.

Witnesses:

R. W. FENWICK,

DE WITT C. LAWRENCE.