

No. 753,248.

PATENTED MAR. 1, 1904.

J. T. DUFF.
METHOD OF MAKING BELLS.
APPLICATION FILED JUNE 22, 1903.

NO MODEL.

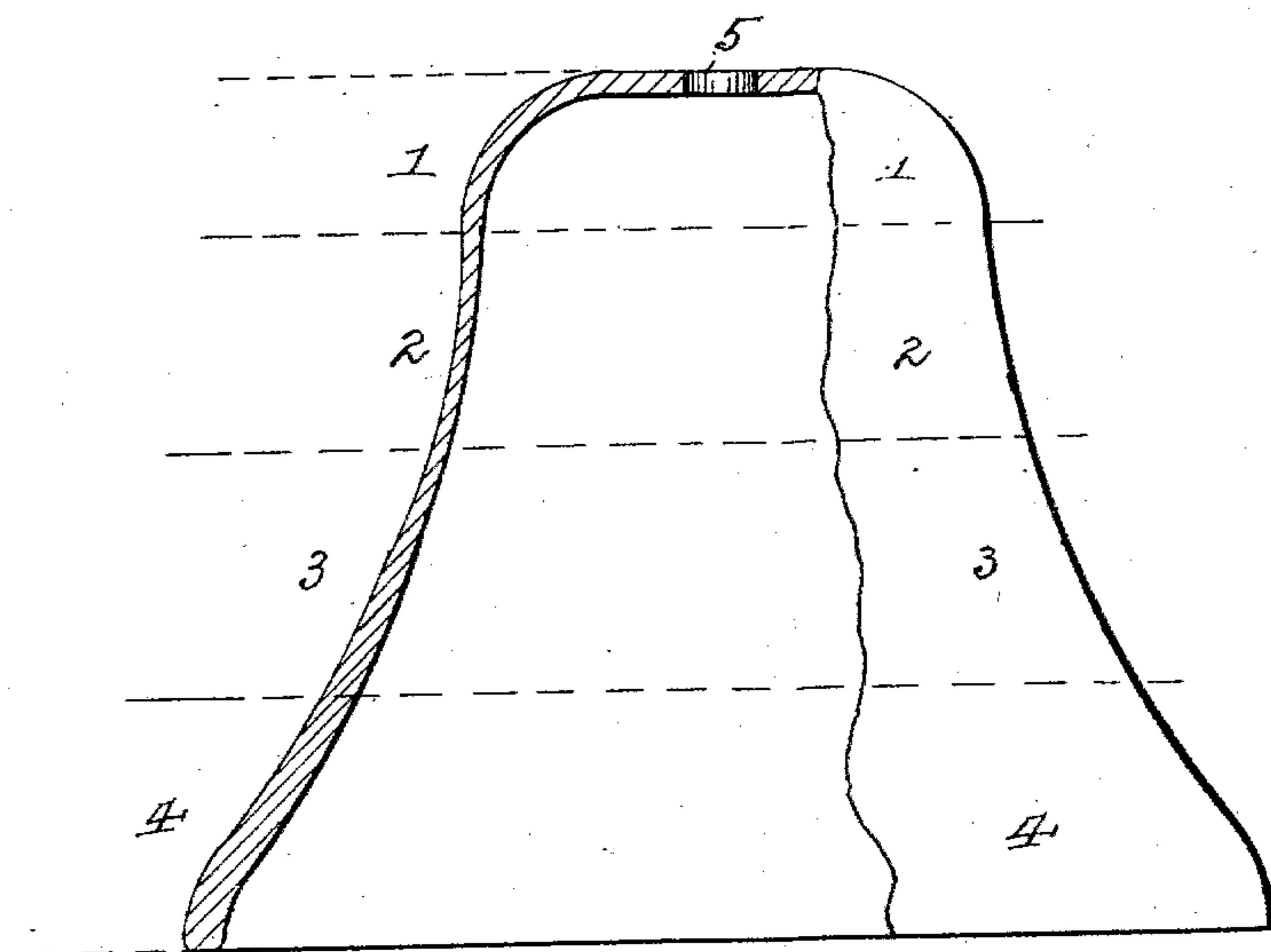


Fig. 1

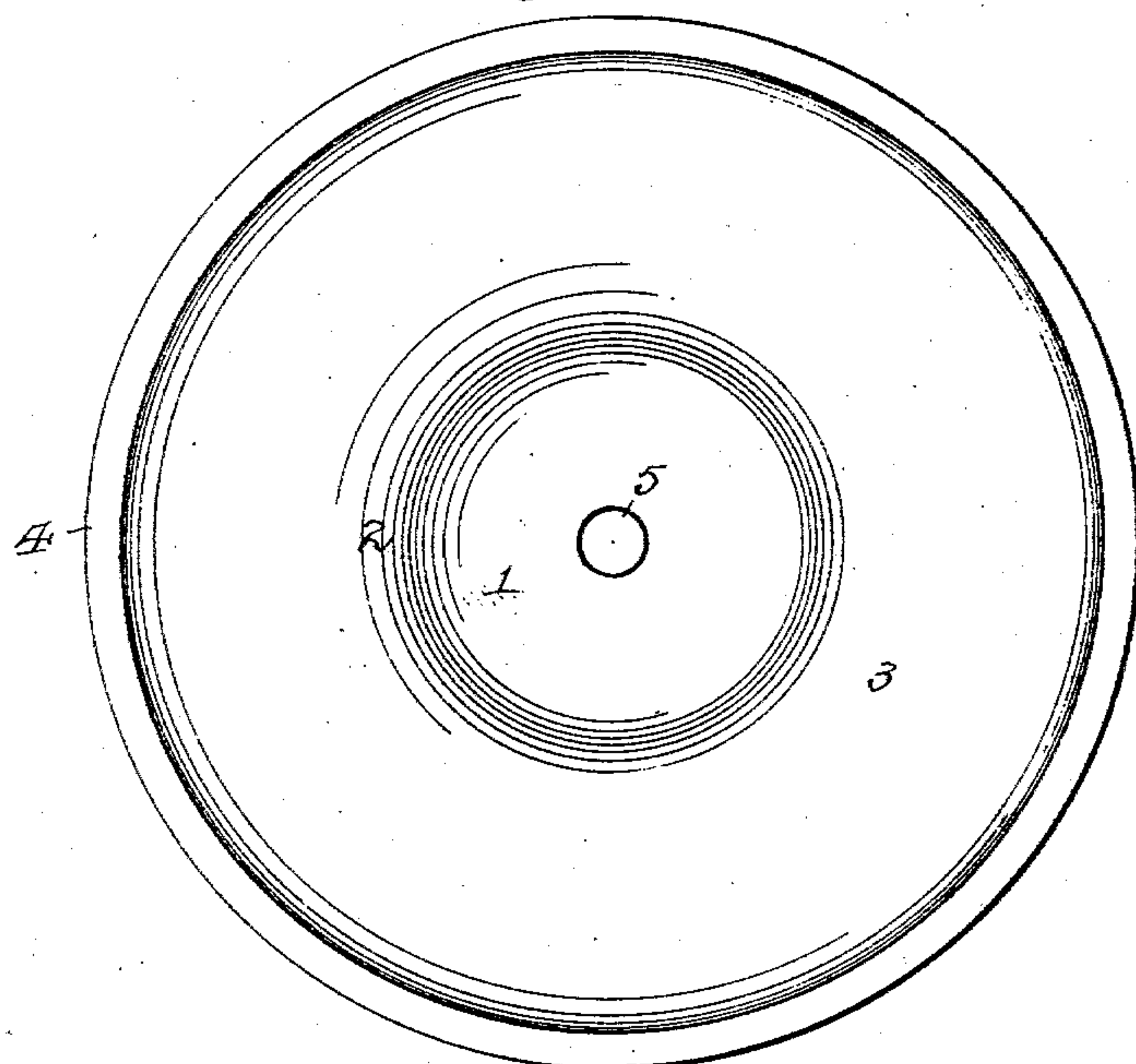


Fig. 2

Witnesses
Wm. Weibel
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UNITED STATES PATENT OFFICE.

JOHN T. DUFF, OF HARMARVILLE, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JOSEPH McNAUGHER, OF ALLEGHENY, PENNSYLVANIA.

METHOD OF MAKING BELLS.

SPECIFICATION forming part of Letters Patent No. 753,248, dated March 1, 1904.

Application filed June 22, 1903. Serial No. 162,688. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. DUFF, a resident of Harmarville, in the county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Methods of Making Bells; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to a method of making bells; and it consists in making a bell preferably with walls of varying thickness from a single disk of steel, as hereinafter described.

The requisites of a good bell are that it shall be so formed as to give out a sonorous and musical sound, the former relating to the volume and character and the latter to the purity of the sound.

My invention is designed more particularly to secure purity in the sound of the bell by making the bell uniform in density and thickness in corresponding portions of metal of uniform hardness and elasticity. To obtain these results by the usual process of casting has been found difficult, and even in the hands of the most skilled workmen the casting of a bell is subject to so many contingencies that the purity of the tone of the bell as well as its character and volume of the sound is ordinarily a matter of chance, and consequently the production of a set of chime-bells becomes by such ordinary casting process a matter of no little trouble and expense. To obviate these difficulties and to bring the conditions on which the tone of a bell depends within the intelligent control of the workman and to reduce the cost thereof, I have invented a method of making bells from single disks or sheets of steel by shaping the metal, while suitably heated, between dies so formed as preferably to give varying thicknesses to the walls of the bell and chilling one portion while the adjoining portion is being formed.

To enable others skilled in the art to practice my improved method, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a side elevation, partially in section, of a bell constructed in accordance with

my invention. Fig. 2 is a bottom plan view of the same.

Like symbols of reference herein indicate like parts in each of the figures of the drawings.

In constructing a bell according to my invention I take a disk of steel of suitable thickness and diameter and form in it a central opening 5 for attaching the bell in position for ringing or for connecting a handle thereto. The opening 5 may also be used as a guide for centering the plate in the dies during the several steps employed in forming the bell. The above-mentioned disk is heated and placed in the first set of dies and partially shaped and dished, starting at the periphery of the disk, and by successive sets of dies, gradually decreasing in size, the dishing is continued until the complete bell is formed having walls preferably of varying thicknesses. By reference to Fig. 1 the top portion of the bell, included in the space marked 1, is shown, preferably, as retaining the original thickness of the steel disk, the action of the dies merely bending or dishing the metal at this portion. The next section of the bell, included in the space marked 2, is preferably of less thickness than the original plate, the dies being so formed as to suitably bend the metal and at the same time stretch it and reduce its thickness. The next portion of the bell, immediately below and included in the space marked 3, preferably is of a greater thickness than the original plate, the dies being so constructed as to stave the metal or increase its thickness at this point. The bottom portion of the bell, included in the space marked 4, has preferably the greatest thickness, the dies operating in shaping this section to stave the metal about the periphery of the bell. Prior to or during the formation of each section of the bell the adjoining section or sections of the bell are, for the purpose of preventing the stretching thereof, chilled and hardened, preferably by immersion in water.

It will be understood that during the operation of forming the bell the metal will be reheated as often as is necessary and that the described operation of chilling the adjoining

portions of the bell may be followed with one or with all sections of the bell. It will be understood also that the number of operations and sets of dies required will vary, depending largely on the size of the bell to be made, and that the method herein described may be used in the manufacture of other articles.

By constructing a bell after the manner just described it will be found that a better tone and a larger volume and prolonging of the sound are obtained than is possible by the old method of casting.

I claim—

1. The method of making a bell from a steel plate, consisting in subjecting the heated plate

successively to the operations of several sets of dies, and chilling one portion while the adjoining portion is being formed.

2. The method of making a bell from a steel plate, consisting in subjecting the heated plate successively to the operation of several sets of dies; and before or during the operation of forming one portion of the bell chilling the adjoining portion.

In testimony whereof I, the said JOHN T. DUFF, have hereunto set my hand.

JOHN T. DUFF.

Witnesses:

J. N. COOKE,

WM. WEIXEL.