

J. Hobart,

Making Springs,

No 80,628,

Fig. 1. Patented Aug. 4, 1868.



Fig. 2.

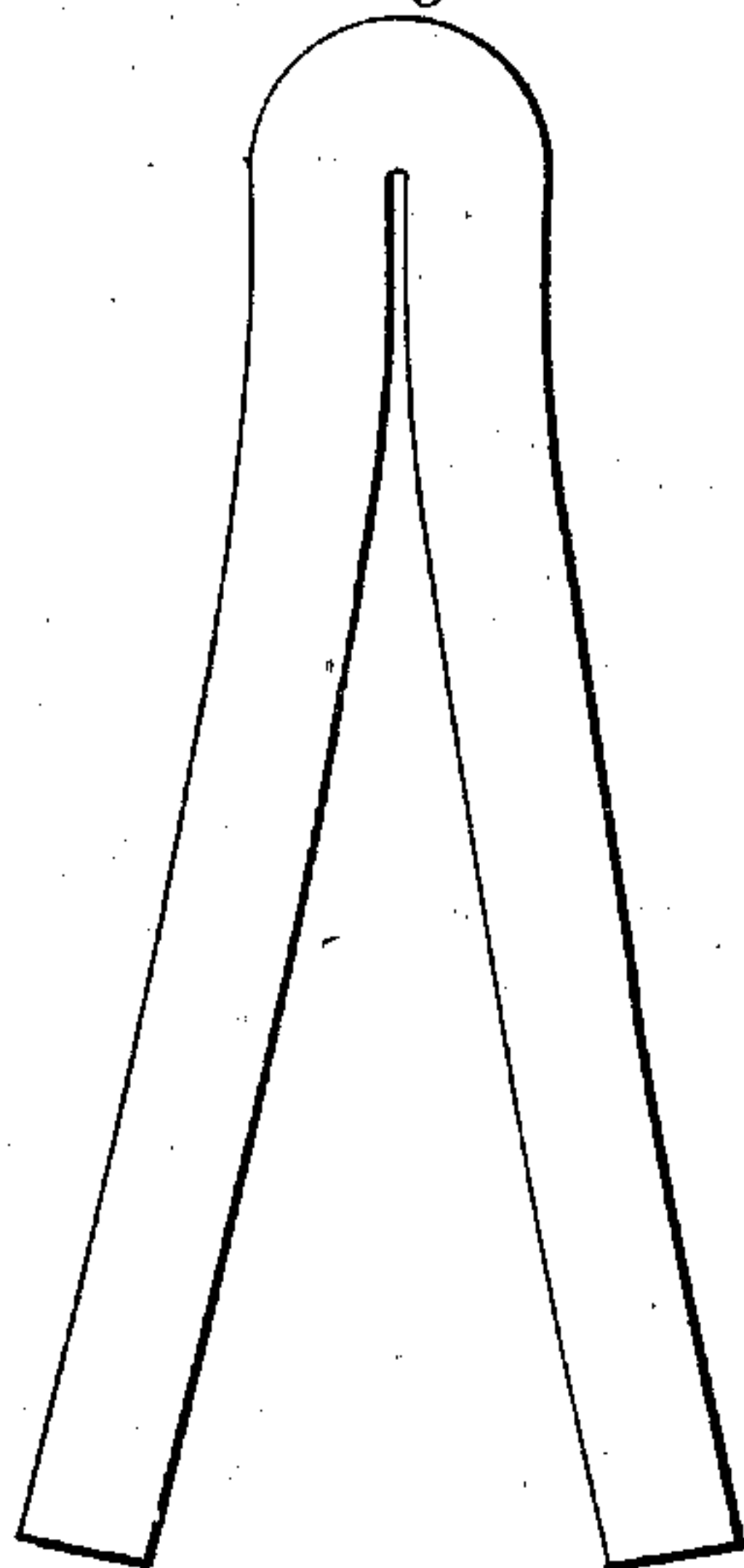


Fig. 3.

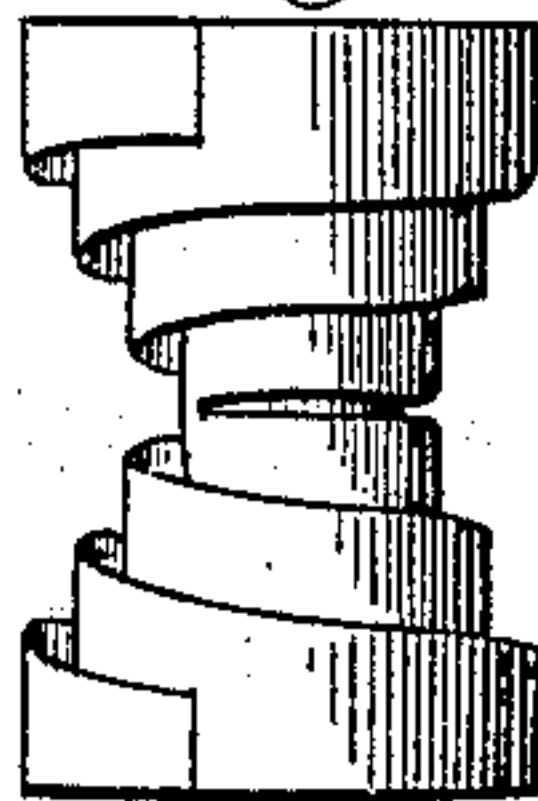


Fig. 4.

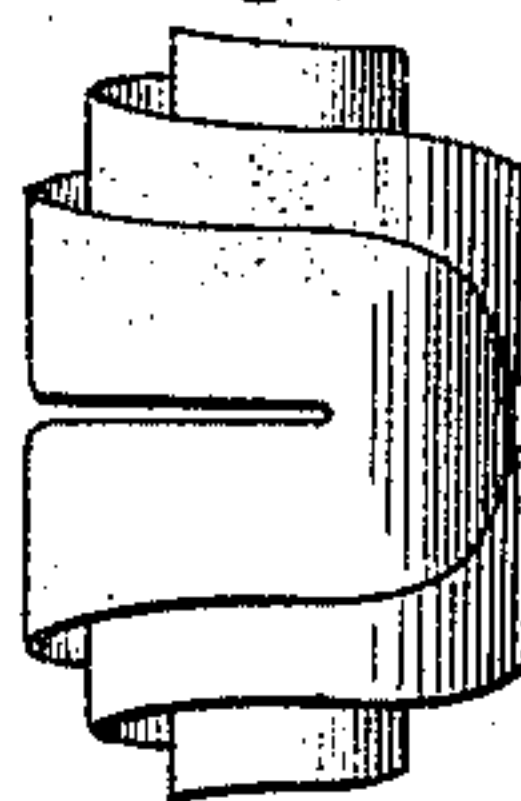
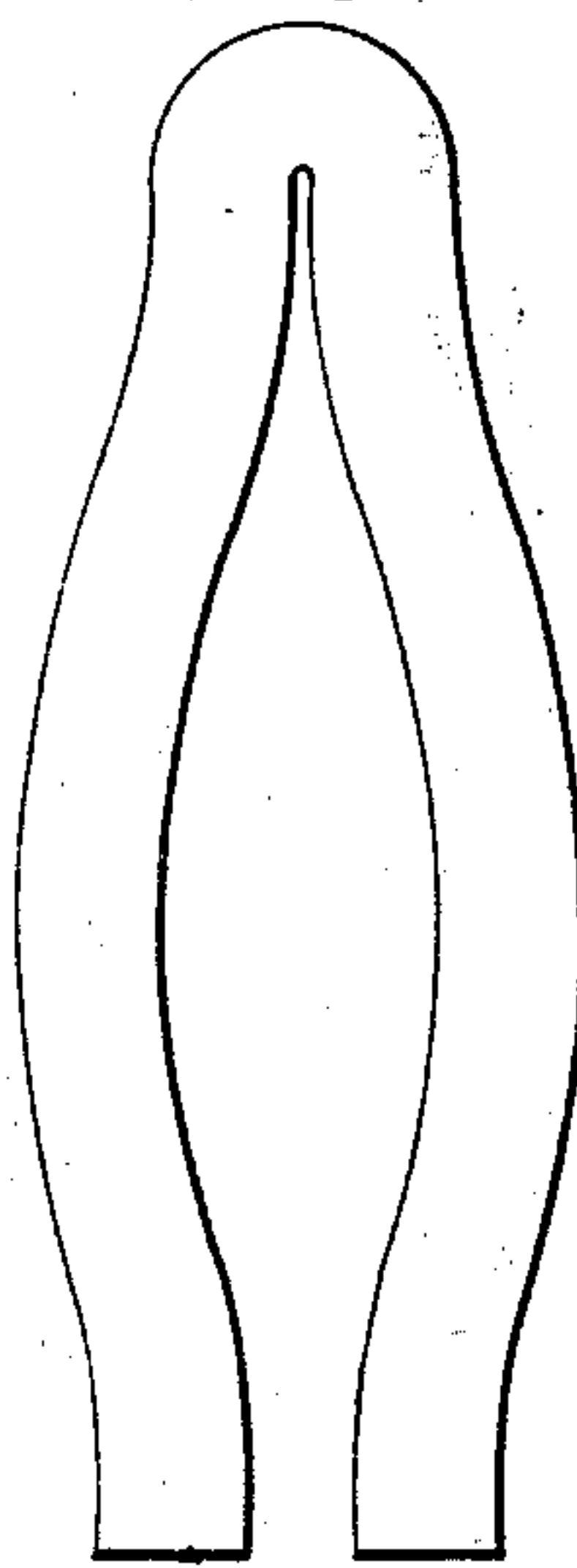


Fig. 5.



Fig. 6.



Attest:

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Inventor:

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United States Patent Office.

JOSEPH HOBART, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 80,628, dated August 4, 1868.

IMPROVED DOUBLE VOLUTE SPRING.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOSEPH HOBART, of Boston, in the county of Suffolk, and State of Massachusetts, have invented a new and useful Improvement in Double Volute Springs; and I do hereby declare that the following is a full, clear, and exact description of the construction of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a view of a flat, straight bar, rolled and cut to the proper dimensions for forming a spring.

Figure 2 is a view of the same bar, doubled together in preparation for coiling.

Figure 3 is a view of the completed spring, with the double end in the centre.

Figure 4 is a view of the completed spring, as sometimes coiled, with the double end on the outside.

Figures 5 and 6 represent variations in the form of the bar prepared for coiling.

A double volute spring, composed of a single bar, was patented by D. G. Rollin, February 23, 1858, and reissued, October 15, 1867, to the present applicant.

A mode of forming such a spring has been patented by Freeland & Ward, in which a wide bar is split and spread at one end, preparatory to coiling.

My improvement differs mainly from these, as well as from all others known to me, in bending and doubling the bar to the required angle, in the plane of the spring, whereby I secure increased strength and elasticity and durability, as well as economy of metal.

In the drawings, fig. 2 represents a bar of metal, of the requisite breadth and thickness, in the same condition as when received from the steel-works, bent to the required angle in the plane of the spring.

I take a flat strip of metal, of the requisite size, and heat it as near the centre as practicable, and then, placing or holding the two ends so that they preserve the same plane, I bend the bar at its centre over any fixed rod or bar or resting-bed, upon which the edge of the metal rests, until the two ends of the strip approach each other enough to cause something of a crimp at the point of bending.

I then hammer down the bight or bend to flatten it, and the effect of this is not only to refine the metal, but to preserve the original fibre or texture, to keep the selvedge or edge intact, and to render the metal more compact and tough at that portion where strength is required.

The bar is then heated anew, and further bent and hammered as before, until the whole is brought to the form and condition required; every such bending and hammering serving to increase still further the strength and quality of the metal at its bend.

The natural effect of thus bending the metal edgewise over a rod is to round that part where the two arms meet, and to cause the two inner edges, in proximity thereto, slightly to approach each other for a short distance before they commence to diverge; and out of this special feature also results another advantage hereinafter stated.

The bar being made and coiled in proper shape for use, it is to be submitted to a hardening-bath.

By reason of the close proximity of the point where the arms meet to the end of the bar, and of the openness of the space at that point, the oil of the bath has free access to the inner edges, and there is nothing to offer any obstruction to their becoming properly tempered, as well as all other parts of the spring.

Growing out of the above construction are the following additional advantages:

When the coiled spring is in use, and under the pressure of an imposed weight, as the two free ends approach each other, the two arms come in contact with each other at a short distance from their junction, leaving a free space between this point of contact and the junction.

I sometimes curve the two arms of the spring gradually away from each other, making the angle gradually increase from the point of juncture for a greater or less distance.

Now, when the pressure is increased, this point of contact shifts outwards, towards the free ends, and thus is constantly changing as the pressure or weight is varied; and hence the point of leverage, when the pressure is gradually increased, is steadily shifted forward from the bend, and the danger of breaking is lessened, at the

same time that the stiffness is increased by the angles being kept greater than they would be if the point of bearing remained stationary.

In this last-named curved form of arm, I may also have the above-described feature of the approach of the arms towards each other near their bight or bend; and, from these two features combined, I secure a further increase of strength and elasticity, resulting from the fact that that portion of the spring lying back of the point where, for the time being, the two arms of the spring touch each other, operates, by reason of the open space, as a reversed spring against the leverage of the pressure.

Another form which I have used is represented in fig. 5, in which there is a double curve in the angle of the spring.

From this construction I attain the following result, viz, that the spring, under any pressure to which it will be subjected, can never be entirely closed, but, under the heaviest pressure that it can bear, will always retain a certain degree of elasticity, even when both ends of the spring come to a dead bearing.

Still another modification is represented in fig. 6, in which the two free ends of the spring are brought near together in the manufacture, leaving an opening somewhat elliptical in form.

The result obtained from this form of construction is that the spring is easy and free under a light weight, but, under a heavy weight, both ends come to a bearing, and the power and strength of the spring are then, when most needed, greatly increased.

It may be more convenient, in the manufacture of my improved spring, to bend a square or round bar instead of a flat one, and afterwards roll it to the required thickness or flatness for a spring, thus arriving at the same result; the leading characteristic in each case, however, being that the flat bent spring is doubled in the plane of the piece of metal, and not in a direction at right angles thereto, and that the two arms are not formed by cutting or slitting the metal.

It will be evident, therefore, that the fibre or grain and the metal are preserved intact, and not destroyed or weakened by slitting; that the edges or selvages of the bar or spring, which are usually the hardest and toughest parts as compared with the centre portion, retain their hardness; that I avoid the making of sharp, cutting, fragmentary, or bent-over or curled edges, which are incident to cutting the strip with a shears, and which require afterwards to be hammered or filed, or otherwise to be treated, in order to be again brought to a smooth and even condition.

I also avoid the very considerable expense of shears for this slitting, or dies for stamping out or slitting the blank, as none are required.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A double volute spring, composed of a single bar of metal, and made by bending said bar at the middle, doubling it upon itself, and coiling the same around a mandrel, or otherwise, substantially as described.

2. In making double volute springs, in the manner set forth in the foregoing clause, I claim so bending the limbs that the edges thereof shall describe lines of unequal curvature, but so that the curvature, commencing at or near the point of junction of said limbs, shall increase from thence outward towards the extremities thereof, substantially as described.

3. In making a double volute spring, in the manner set forth in the first clause, I claim bringing the two free ends near together, leaving an opening between the limbs, which narrows towards the ends, substantially as described.

JOSEPH HOBART.

Witnesses:

J. H. SHEDD,

BENJN. WORCESTER.