

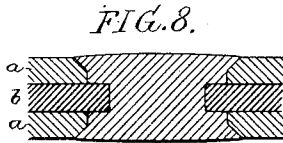
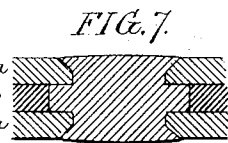
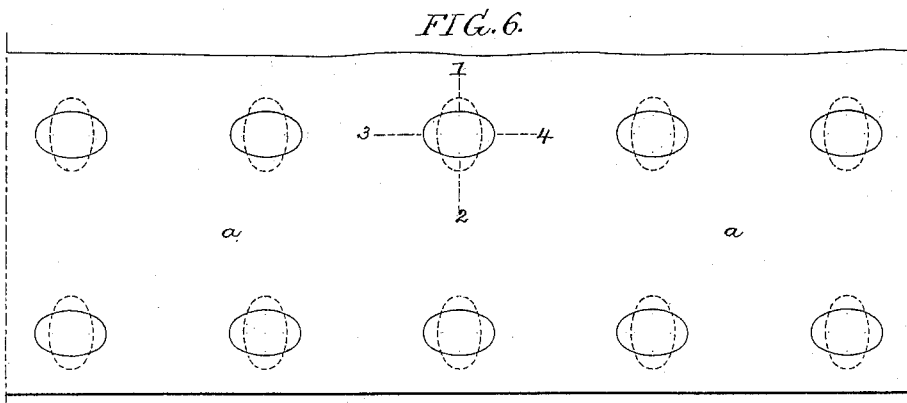
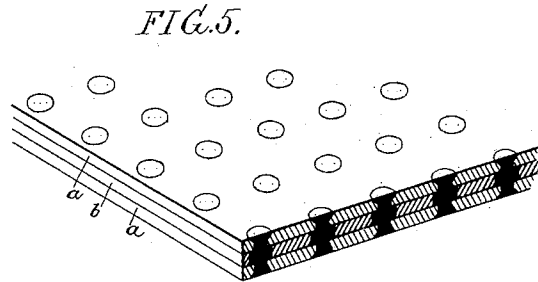
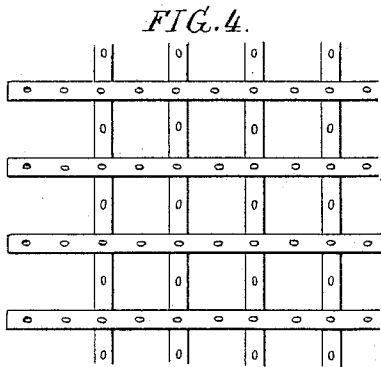
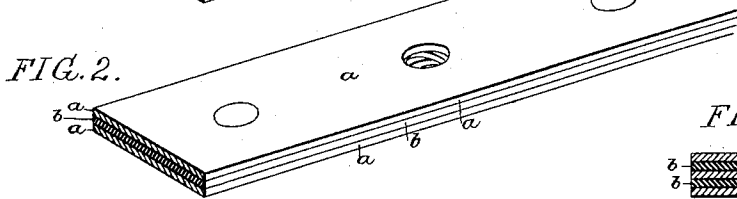
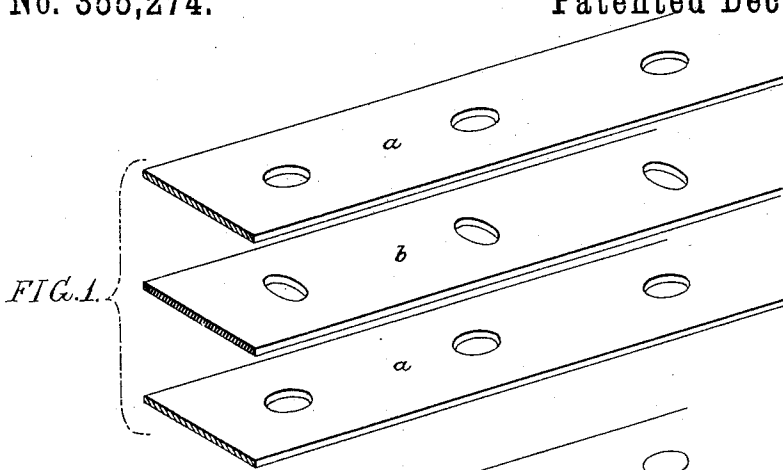
(No Model.)

R. P. MANLY & F. H. TAYLOR.

MANUFACTURE OF COMPOUND PLATES.

No. 355,274.

Patented Dec. 28, 1886.



Witnesses:
David S. Williams
John E. Parker

Inventors:
R. P. Manly &
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UNITED STATES PATENT OFFICE.

ROBERT P. MANLY, OF RADNOR, AND FRANK H. TAYLOR, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE MANLY & COOPER MANUFACTURING COMPANY, OF PENNSYLVANIA.

MANUFACTURE OF COMPOUND PLATES.

SPECIFICATION forming part of Letters Patent No. 355,274, dated December 28, 1886.

Application filed October 22, 1886. Serial No. 217,064. (No model.)

To all whom it may concern:

Be it known that we, ROBERT P. MANLY and FRANK H. TAYLOR, citizens of the United States, the said ROBERT P. MANLY residing in Radnor, Delaware county, Pennsylvania, and the said FRANK H. TAYLOR residing in Philadelphia, Pennsylvania, have invented certain Improvements in the Manufacture of Compound Plates or Bars for Jails and Safes, of which the following is a specification.

The object of our invention is to manufacture compound bars or plates for jail and safe construction more economically than such bars have heretofore been produced.

In making compound bars or plates of iron and steel for use in the construction of jails and safes it has been customary to weld the bars or plates of iron and steel together by rolling or otherwise; but this method is very expensive and not always effective for the purpose, and, moreover, the rivet-holes necessary for uniting the bars and plates together in making the structure have to be punched through the completed compound bars or plates after welding, and this operation is a very difficult one and is destructive of the punching-machine.

To produce these compound plates more economically, we dispense entirely with the welding process, and we punch the rivet-holes in these separate leaves of iron and steel (which are to form the compound plate) before uniting them. We then unite the leaves of iron and steel to form the compound bar or plate by riveting, then heat the bar to a hardening-heat, and subject it to a hardening-bath to give the proper hardness to the layer or leaves of steel in the bar; and we also prefer to run the riveted bar through straightening-rolls, either before or after subjecting them to hardening, as more fully described hereinafter.

In the accompanying drawings, Figure 1 is a perspective view showing three leaves of iron and steel after they have been punched, but before they are united. Fig. 2 is a perspective view of the same after the leaves have been united by riveting to form the compound bar. Fig. 3 is a transverse section of another form of compound bar, in which five leaves are used instead of three. Fig. 4 is a view, drawn

to a reduced scale, illustrating the manner of making lattice-work for jail or safe construction from these compound bars. Fig. 5 is a perspective view of a portion of a compound plate riveted up in accordance with our invention. Fig. 6 is a plan view drawn to an enlarged scale. Fig. 7 is a section on the line 1 2, Fig. 6; and Fig. 8 is a section on the line 3 4, Fig. 6.

In making compound bars or plates in accordance with our invention, we prefer to use three or five leaves for each plate or bar, although these numbers are not essential. In making the compound bar or plate of three leaves, the two outer leaves are of iron and the center one of steel, and in making a five-leaved compound bar we use iron for the central and the two outside leaves and steel for the intermediate second and fourth leaves.

In making the compound bar, we take the separate leaves A and B, of the desired width, and punch holes *a* in them at suitable intervals, preferably by a gang-punch. The bars are then laid on each other in the desired way, and rivets *b* are passed through every second set of holes, and the bars are united by means of these rivets, preferably by drop-riveting, although a pneumatic, hydraulic, or any other riveting-machine may be used.

The reason for using only every other set of rivet-holes in the bar to unite the leaves is to provide rivet-holes for uniting the cross-bars D to these riveted bars for convenience in construction, as will be understood on reference to Fig. 4.

In the transverse section, Fig. 3, we have illustrated a compound bar made of five leaves, the central and outside leaves, A A, being of iron, while the two intermediate leaves, B B, are of steel. In this compound bar also, as in the three-leaved bar, the rivet-holes (not only for uniting the separate leaves together, but also for uniting the bars in the final structure) are punched in the separate leaves before they are united.

The punching operation is thus rendered comparatively easy, and can be done on a comparatively light class of machinery.

The compound bar or plate, consisting of the riveted leaves, as above described, is then put in a heating-furnace and brought to a

bright-red or hardening heat, and it is then subjected to a hardening-bath to harden the steel, and we prefer, also, in order to obtain a uniform product, to pass the bar through straightening-rolls. In practice, we prefer to run the bar through the straightening-rolls as soon as it comes out of the furnace, and then to drop it into the hardening-bath; but the order of these operations is not material.

In order to insure such a uniting of the leaves of each compound bar as to prevent their separation by some evil-disposed person cutting off the heads of the rivets in the finished structure, we so form or arrange the rivet-holes in the several leaves that the corresponding rivet-holes in the several plates are slightly out of coincidence. This want of coincidence may be obtained by making the corresponding holes of slightly-different shapes or slightly-different sizes, or in slightly-different positions. We prefer, however, to make the holes oval, as illustrated in Fig. 6, and to arrange those in the two outer plates so far out of coincidence with the holes in the central plate or plates as to be practically at right angles, as shown in Fig. 6, so that when the rivet is forced through, in a hot or cold state, into the holes, and hammered so as to fill them up, it not only unites the plates together, as the common rivet would, but it so unites them that, even if the top or head of the rivet were to be cut away, it would still hold the plates together, as will be understood on reference to Figs. 5, 7, and 8.

We claim as our invention—

1. The mode herein described of making compound bars or plates of iron and steel for jail and safe construction, said mode consist-

ing in first punching the rivet-holes in the separate leaves, riveting the leaves together, and then hardening the compound bar or plate thus formed, substantially as set forth.

2. The mode herein described of making compound bars or plates of iron and steel for jail and safe construction, said mode consisting in first punching the holes in the separate leaves, riveting the leaves together through every other set of holes, and then hardening and straightening the compound bar or plate thus formed.

3. The mode herein described of making compound bars or plates of iron and steel for jail and safe construction, said mode consisting in first punching the separate leaves, riveting the punched leaves, heating the compound bar or plate, and subjecting it to a hardening-bath and passing it through strightening-rolls, all substantially as specified.

4. The mode herein described of making compound bars or plates for jail and safe construction, said mode consisting in punching the separate leaves which form the bar or plate with corresponding holes slightly out of coincidence, and then riveting the said leaves together through said holes, substantially as specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ROBT. P. MANLY.
FRANK H. TAYLOR.

Witnesses:

ALBERT POPKINS,
HARRY SMITH.