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PATENTED AUG. 28, 1906.

S. FRANK.  
METAL BAR LINKS, AND BANDS, &c, FORMED OF THEM.  
APPLICATION FILED JULY 22, 1906.

Fig. 1

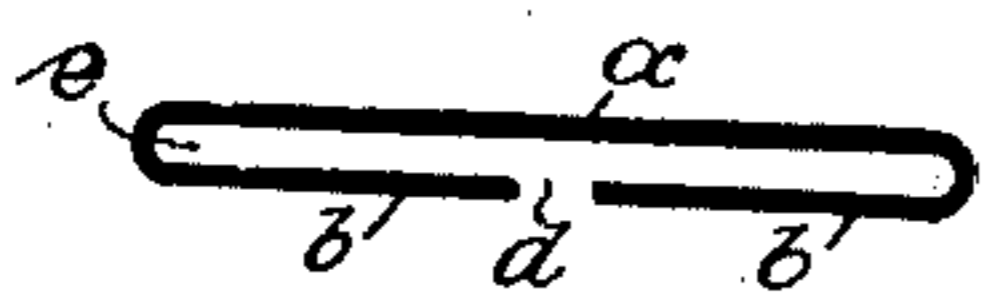


Fig. 2



Fig. 3

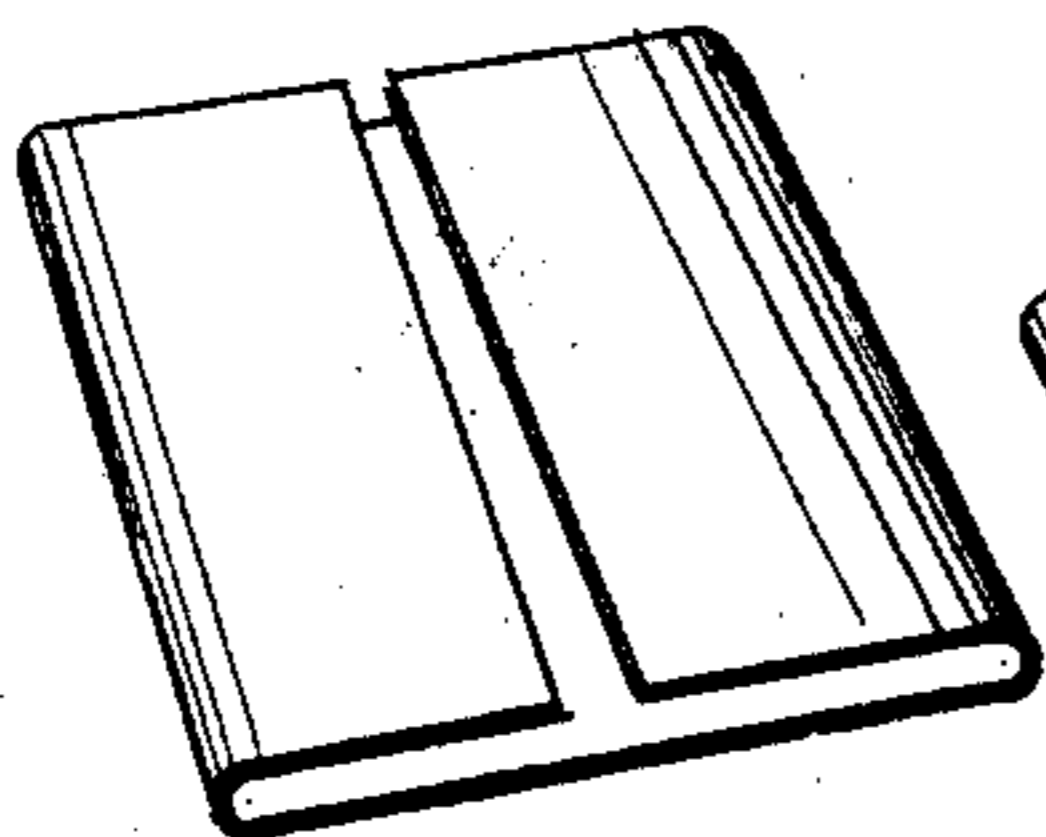


Fig. 4

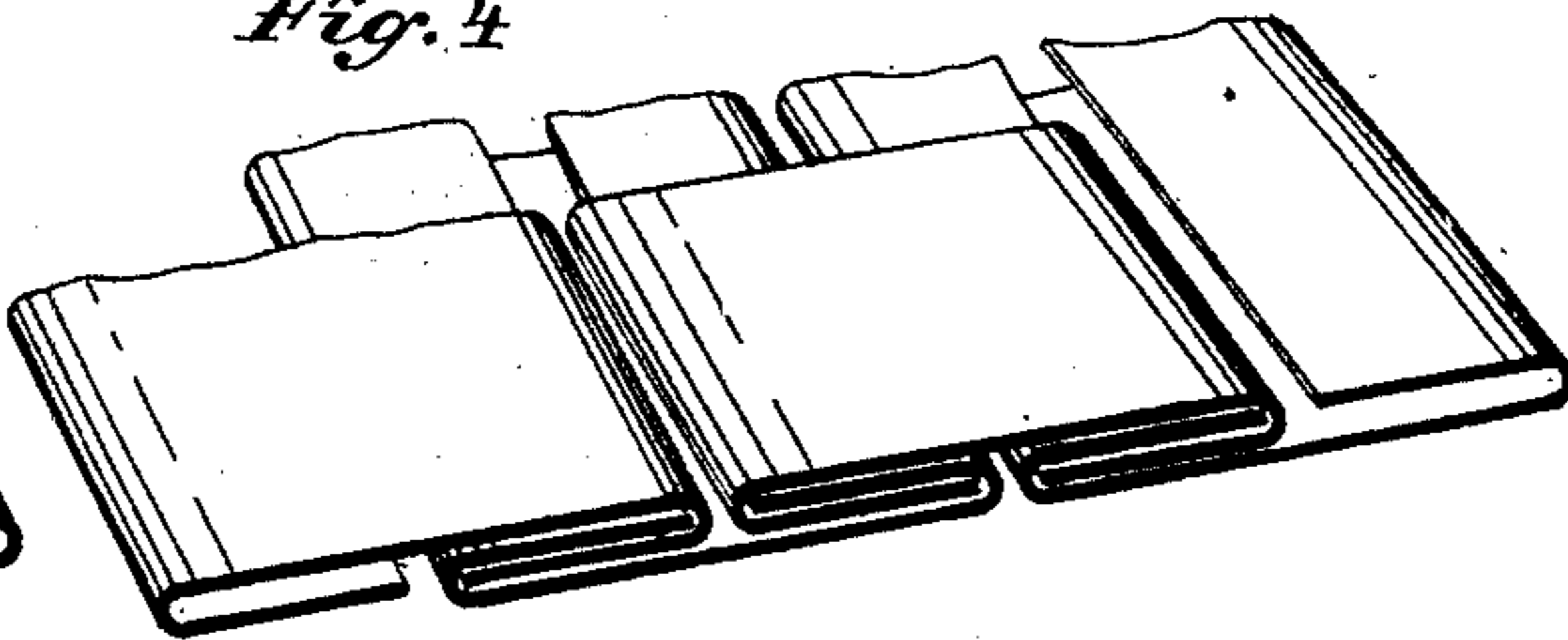


Fig. 5



Fig. 6

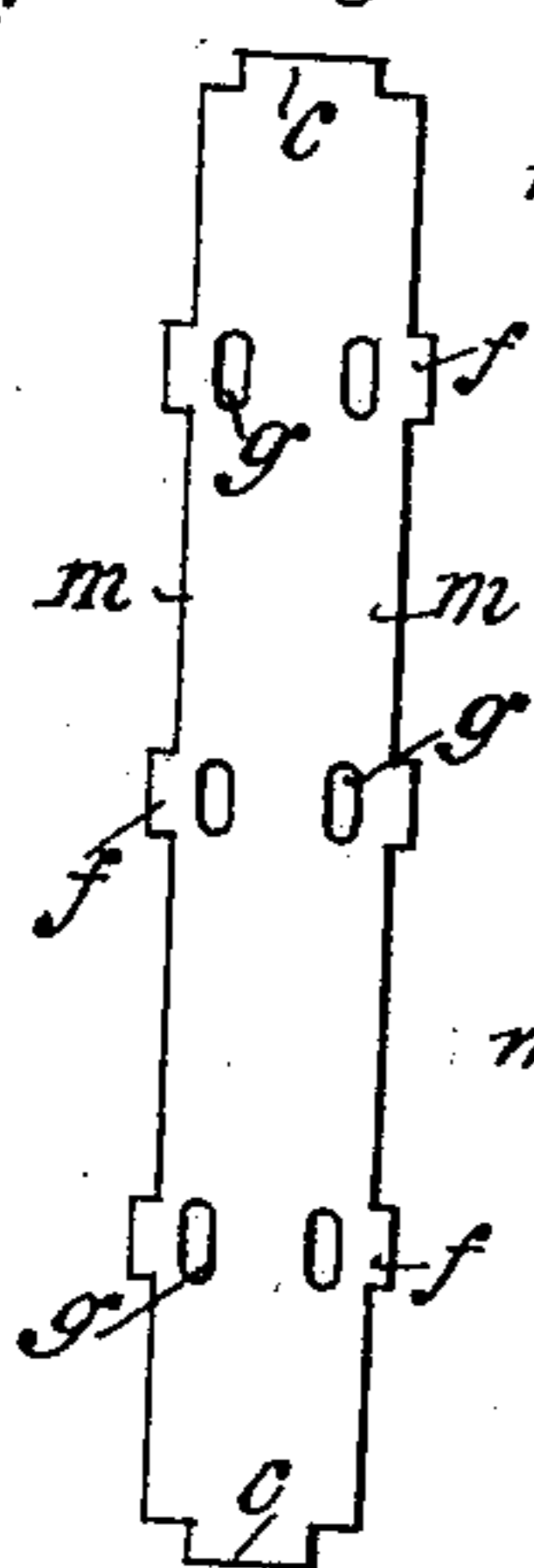


Fig. 7

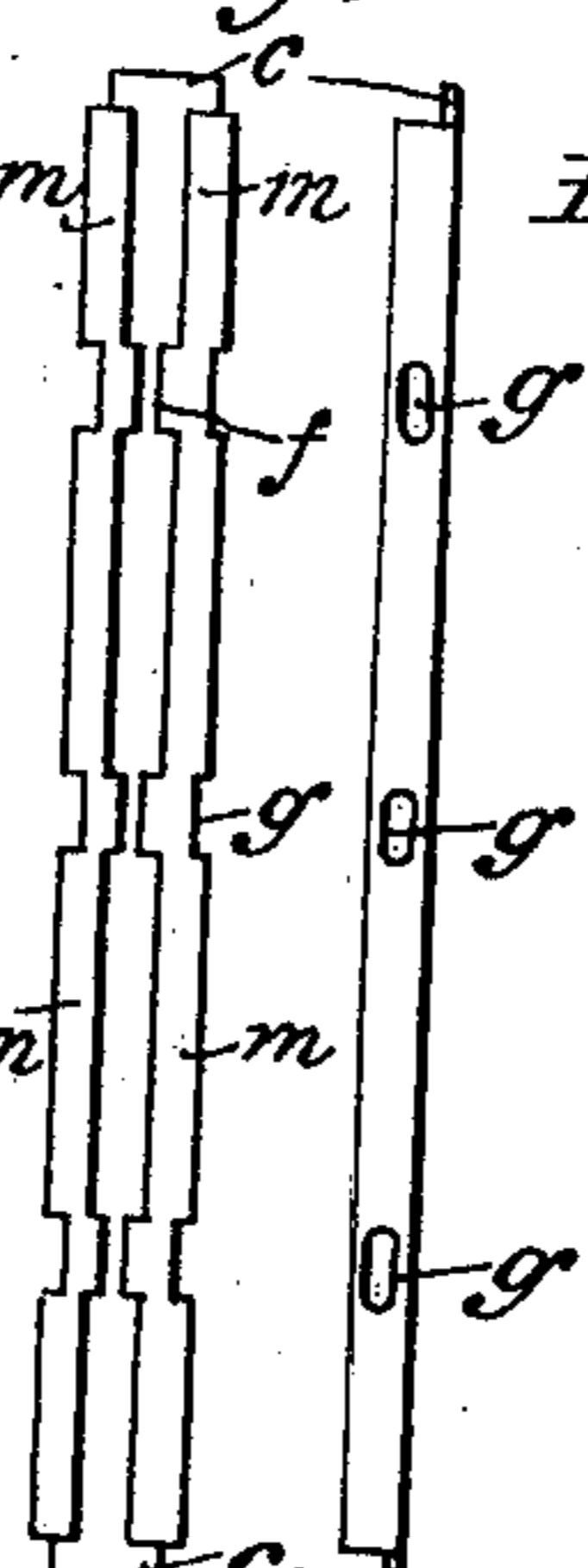


Fig. 8

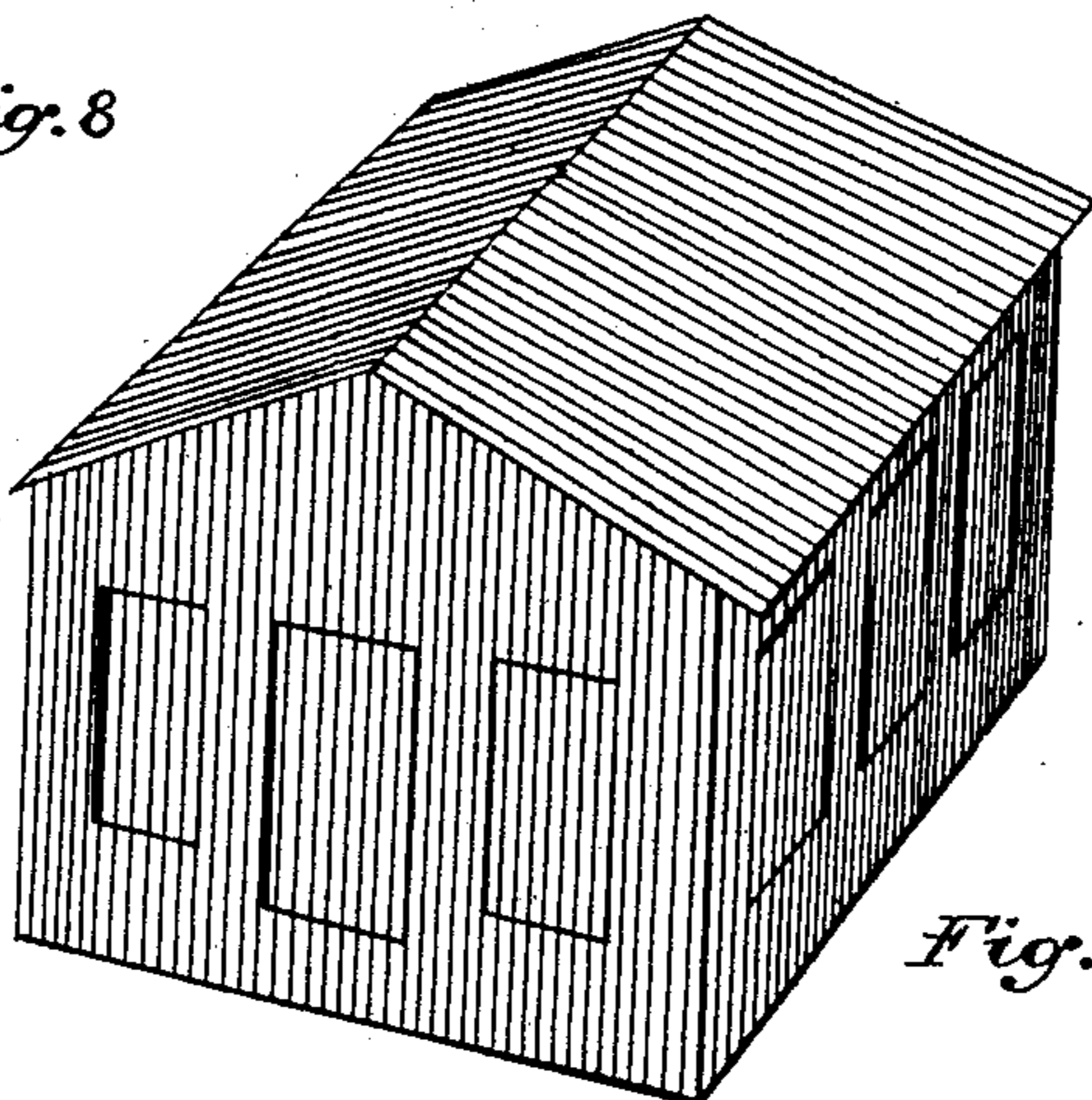


Fig. 11

Fig. 9



Fig. 10



Witnesses:  
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# UNITED STATES PATENT OFFICE.

SALOMON FRANK, OF FRANKFORT-ON-THE-MAIN, GERMANY.

## METAL BAR-LINKS AND BANDS, &c., FORMED OF THEM.

No. 829,581.

Specification of Letters Patent.

Patented Aug. 28, 1906.

Application filed July 22, 1905. Serial No. 270,859.

*To all whom it may concern:*

Be it known that I, SALOMON FRANK, a subject of the King of England, and a resident of Frankfort-on-the-Main, Germany, have invented certain new and useful Improvements in Metal Bar-Links and Bands, Plates, &c., Formed of Them, of which the following is a specification.

My invention relates to metal bar-links and to bands, plates, &c., formed of them. The metal bar-links are of such a uniform shape that they can be easily put together to form a belt, band, plate, &c. From the plates so composed buildings and other structures, also boats, pontoons, &c., may be made. The several metal bar-links may be united by inserting one into the other in the longitudinal direction.

My invention also relates to special constructions of these metal bar-links whereby they are prevented from longitudinally shifting, and thereby detaching from each other, after they have been composed to a belt, band, plate, &c. The new metal bar-links are made of sheet metal and bear a certain resemblance to those well-known detachable links which can be put together to form a chain.

I will now proceed to describe my invention, reference being had to the accompanying drawings, in which—

Figure 1 is a cross-section through a single metal bar-link according to my invention. Fig. 2 is a cross-section through several single metal bar-links, which are put together to form a belt, band, or plate. Fig. 3 is a perspective view of a part of the single metal bar-link shown at Fig. 1. Fig. 4 is a perspective view of parts of the several interlinked metal bar-links shown at Fig. 2. Fig. 5 is an elevation, on a reduced scale, of a metal bar-link provided with ears at both ends. Fig. 6 shows on the same scale the blank of a modified bar-link before the bending operation. Fig. 7 is an elevation of the same in its finished state. Fig. 8 is a side view of the same. Fig. 9 is a cross-section, on an enlarged scale, through a double metal bar-link—that is to say, two single bar-links fastened on each other with their rear sides. Fig. 10 is a cross-section through several interlinked single and double metal bar-links. Fig. 11 is a perspective view, on a reduced

scale, of a cottage the walls and roof of which are formed of interlinked metal bar-links.

The metal bar-link according to my invention is in general made of a strip of sheet metal which is doubled in two parallel longitudinal lines, so that the bar-link presents a plain rear part *a* (see Fig. 1) and two plain front parts *b b*, which latter leave between them in the middle a longitudinal slit *d* and remain at a uniform distance from the rear part *a*. The thickness of the internal space *e* is made slightly larger than the thickness of the sheet metal, and the width of the longitudinal slit *d* is made slightly larger than double the thickness of the sheet metal and less than the width of either front part. Fig. 3 clearly shows the shape of the finished metal bar-link. Two bar-links of the same length and having their longitudinal slits on alternating sides can be at once connected or interlinked by introducing the end of the one front part *b* of the one bar-link into the space *e* of the other bar-link, the doubled edge of the former bar-link engaging in the longitudinal slit *d* of the latter bar-link, and by longitudinally moving either bar-link in the other one until their ends are in the same planes. A third metal bar-link may be in the same manner connected with the second bar-link, and equally a fourth bar-link with the third bar-link, and so on, as is clearly shown at Figs. 2 and 4. Thus a band or a plate may be formed of a plurality of metal bar-links without any fastening means or soldering. In general it is desirable that the several members of the band or plate should be prevented from longitudinally shifting. For this purpose the several metal bar-links may be each provided with two rectangular ears *c c* at both ends, (see Fig. 5,) which after the connecting or interlinking operation are so bent as to rest on the end edges of the front parts *b b*. Of course, where so preferred, the ears *c c* may be made so short as to merely close the space *e* without resting on the end edges of the front parts *b b*. The so-bent ears *c c* will then secure the front parts *b b* of the two neighboring bar-links against longitudinally shifting.

A plate formed of a series of interlinked metal bar-links will prove very stiff and strong in the longitudinal direction of its members, as it possesses practically no less

than four layers of metal, as is clearly shown in the middle part of Figs. 2 and 4. The linked plate is also flexible in the cross-direction of its members, so that it may be rolled up. It does not present any spaces and does not fall to pieces, nor are its members capable of detaching themselves from each other. The plate has a uniform thickness throughout. There are known linked metal bands 5 it is true, but their members require subsidiary parts for composing them, which renders the composing operation difficult, so that these metal bands must be pronounced to be an unfavorable and uneconomical construction. In opposition to these known 10 metal bands my belts, bands, or plates present the advantage that their members are perfectly alike in shape and construction, so that they can be quickly and easily composed. 20

Where so preferred, the metal bar-links may be modified, in that their blanks are given the shape shown at Fig. 6, so that besides the two end ears *c c* they are provided 25 with several rectangular ears *ff* on their longitudinal edges and with several holes *g g*. The ears *ff* and the holes *g g* are disposed in several parallel rows in the cross-direction. The holes *g g* are arranged in the lines in 30 which the blanks are doubled to form the bar-links. These holes *g g* are each made slightly larger than the section of either longitudinal ear *f*. The opposite ears *ff* of either bar-link are to leave between them a 35 space the width of which is equal to that, *d*, of the longitudinal slit of the bar-link according to Fig. 1—that is to say, it is slightly larger than double the thickness of the sheet metal. From an examination of Figs. 7 and 40 8 it will be evident that several metal bar-links of this kind can be composed or inter-linked much in the same manner as before, either bar-link being introduced with its one front part (corresponding to *b* in Fig. 1) into 45 the space (*e* in Fig. 1) of the other bar-link through the longitudinal slit (corresponding to *d* in Fig. 1) of the latter until the ends of both bar-links are in the same planes. Afterward the band or plate so formed is 50 stretched in the cross-direction of its members, so as to cause the longitudinal ears *ff* of each bar-link to engage in the holes *g g* of the neighboring bar-links. In this case the internal faces of the doubled edges of each 55 bar-link will rest on the edges *m m* between the ears *ff* of the neighboring bar-links. Now the end ears *c c* of all bar-links are bent to prevent the neighboring bar-links from longitudinally moving, and thereby detaching from each other. Of course the band or 60 plate formed of these metal bar-links will present spaces between the members instead of the fine slits shown at Fig. 4. Also the

members of this band or plate will be at liberty to shift in their cross-direction if this 65 is permitted by their end ears *c c*, the length of which is in this case made a little shorter than before and shown in Fig. 7.

For increasing the strength and stiffness of the linked band or plate double metal bar-links, as shown at Fig. 9, may be employed. 70 Each double bar-link is formed of two single bar-links, (shown at Figs. 1 and 3,) their rear parts *a a* being fastened on each other in any known manner, be it by soldering, riveting, 75 or otherwise. Single bar-links according to Figs. 1 and 3 and double bar-links according to Fig. 9 may be alternately connected or composed in the manner described above, so that the band or plate will have a cross-section, as shown at Fig. 10. In this case it 80 may be said to consist of eight layers of metal sheet. It is evident that the so-composed band or plate will be very strong and stiff in the longitudinal direction of its members. 85 To further increase the strength and stiffness of the band or plate, double bar-links may be exclusively employed, which are then composed in a manner so obvious as to require no further explanation. In this case single 90 bar-links should be used for forming the ends of the band or plate.

The bands or plates so formed may be used for various purposes. They may be employed as driving-belts, which present the 95 advantages that they are much cheaper than other known linked belts; further, that they can be quickly and easily made longer or shorter and that they do not require any belt-fastener. The linked plates may be 100 utilized as reliable and portable screens or as walls and roofs for building cottages (see Fig. 11) or other structures. Such cottages or buildings will be found useful for military purposes, also for other purposes—as, for 105 example, agricultural sheds, barns, shelters, coach-houses, and the like.

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

1. A metal bar-link formed of a rectangular strip of sheet metal, which is doubled in 110 two parallel longitudinal lines and presents in the finished state a plain rear part and two plain front parts, the latter leaving between them in the middle a longitudinal slit of a 115 width slightly more than double the thickness of the metal and less than the width of either front part and the space between the front parts and the rear part being of a uniform thickness slightly more than that of the 120 metal.

2. A metal bar-link formed of a rectangular strip of sheet metal with two rectangular ears at the ends, which strip is doubled in two parallel longitudinal lines and presents in the 125 finished state a plain rear part and two plain

front parts, the latter leaving between them in the middle a longitudinal slit of a width slightly more than double the thickness of the metal and the space between the front parts and the rear part being of a uniform thickness slightly more than that of the metal.

3. A metal bar-link formed of a rectangular strip of sheet metal with two rectangular ears at the ends, a plurality of rectangular ears at the longitudinal edges and a plurality of holes, which strip is doubled in two parallel longitudinal lines and presents in the finished state a plain rear part and two plain front parts, the space between them being of a uniform thickness slightly more than that of the metal and the ears at the longitudinal edges leaving between them a space of a width slightly more than double the thickness of the metal, while the holes are in the doubled edges and in the same cross-rows as the longitudinal ears and are slightly larger than their section.

4. A double metal bar-link formed of two rectangular strips of sheet metal, each of which is doubled in two parallel longitudinal lines and presents in the finished state a plain rear part and two plain front parts, the space between them being of a uniform thickness slightly more than that of the metal and the two front parts leaving between them in the middle a longitudinal slit of a width slightly more than double the thickness of the metal, the rear parts of the two finished bar-links being fastened on each other.

5. A double metal bar-link formed of two rectangular strips of sheet metal, each of which is provided with two rectangular ears at the ends and is doubled in two parallel longitudinal lines and presents in the finished state a plain rear part and two plain front parts, the space between them being of a uniform thickness slightly more than that of the metal and the two front parts leaving between them in the middle a longitudinal slit of a width slightly more than double the thickness of the metal, the rear parts of the two finished bar-links being fastened on each other.

6. A double metal bar-link formed of two rectangular strips of sheet metal, each of which is provided with two rectangular ears at the ends, a plurality of rectangular ears at the longitudinal edges and a plurality of holes, this strip being doubled in two parallel longitudinal lines and presenting in the finished state a plain rear part and two plain front parts, the space between them being of a uniform thickness slightly more than that of the metal and the ears at the longitudinal edges leaving between them a space of a width slightly more than double the thickness of the metal, while the holes are in the

doubled edges and in the same cross-rows as the longitudinal ears and are slightly larger than their section, the rear parts of the two finished bar-links being fastened on each other to form the double bar-link.

7. A linked band or plate formed of a plurality of metal bar-links, each of which is made of a rectangular strip of sheet metal that is doubled in two parallel longitudinal lines and presents in the finished state a plain rear part and two plain front parts, the space between them being of a uniform thickness slightly more than that of the metal and the two front parts leaving between them in the middle a space of a width slightly more than double the thickness of the metal, the several bar-links with their longitudinal slits on alternating sides being inserted in each other in the longitudinal direction.

8. A linked band or plate formed of a plurality of metal bar-links, each of which is made of a rectangular strip of sheet metal that is provided with two rectangular ears at the ends and is doubled in two parallel longitudinal lines and presents in the finished state a plain rear part and two plain front parts, the space between them being of a uniform thickness slightly more than that of the metal and the two front parts leaving between them in the middle a space of a width slightly more than double the thickness of the metal, the several bar-links with their longitudinal slits on alternating sides being inserted in each other in the longitudinal direction and secured against shifting by bending their end ears.

9. A linked band or plate formed of a plurality of metal bar-links, each of which is made of a rectangular strip of sheet metal that is provided with two rectangular ears at the ends, a plurality of rectangular ears at the longitudinal edges and a plurality of holes, which strip is doubled in two parallel longitudinal lines and presents in the finished state a plain rear part and two plain front parts, the space between them being of a uniform thickness slightly more than that of the metal and the ears at the longitudinal edges leaving between them a space of a width slightly more than double the thickness of the metal, while the holes are in the doubled edges and in the same cross-rows as the longitudinal ears and are slightly larger than their section, the several bar-links with their longitudinal slits on alternating sides being inserted in each other in the longitudinal direction and secured against shifting by bending their end ears.

10. A linked band or plate formed of a plurality of metal bar-links, each of which is made of a rectangular strip of sheet metal that is doubled in two parallel longitudinal lines and presents in the finished state a plain

rear part and two plain front parts, the space  
between them being of a uniform thickness  
of slightly more than that of the metal and  
the two front parts leaving between them in  
5 the middle a space of a width slightly more  
than double the thickness of the metal, a part  
of the plurality of bar-links being doubled  
by fastening their rear parts on each other  
and the double bar-links alternating with the

single bar-links and being inserted in each 10  
other in the longitudinal direction.

In testimony whereof I have signed my  
name to this specification in the presence of  
two subscribing witnesses.

SALOMON FRANK.

Witnesses:

ERWIN DEPPELY,  
MICHAEL POLK.