(No Model.) 3 Sheets—Sheet 1.

J. G. SMITH.

SPRING BED BOTTOM.

No. 572,577. Patented Dec. 8, 1896.

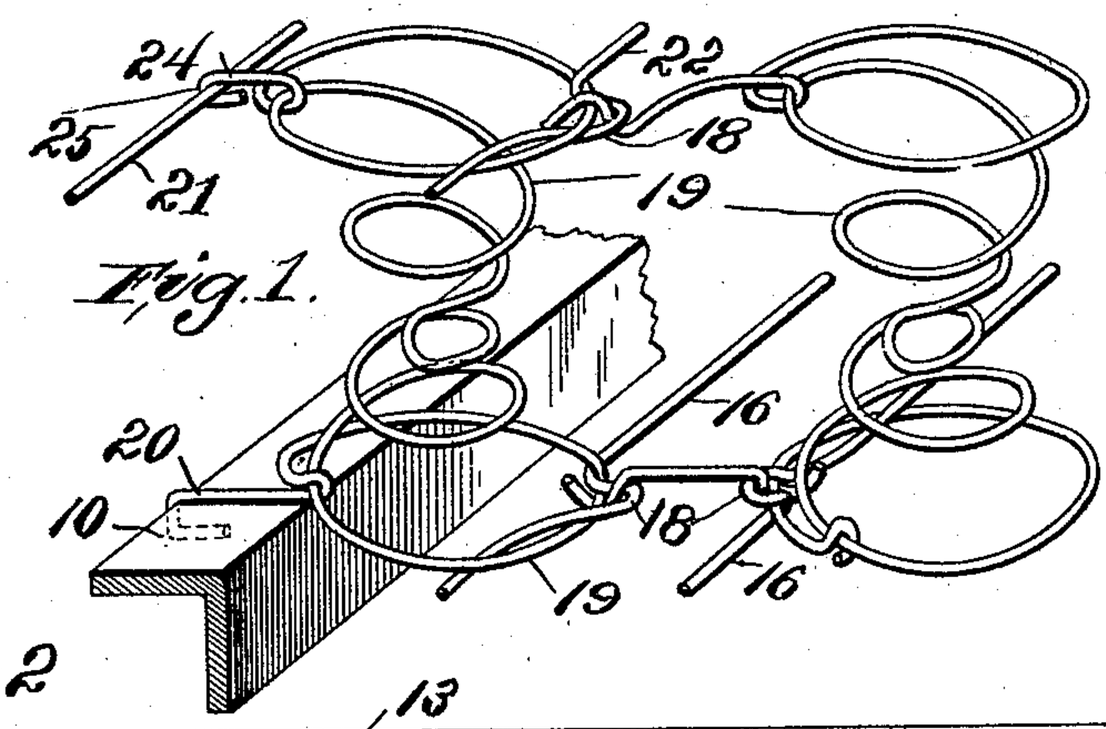


Fig. 1.

Fig. 2

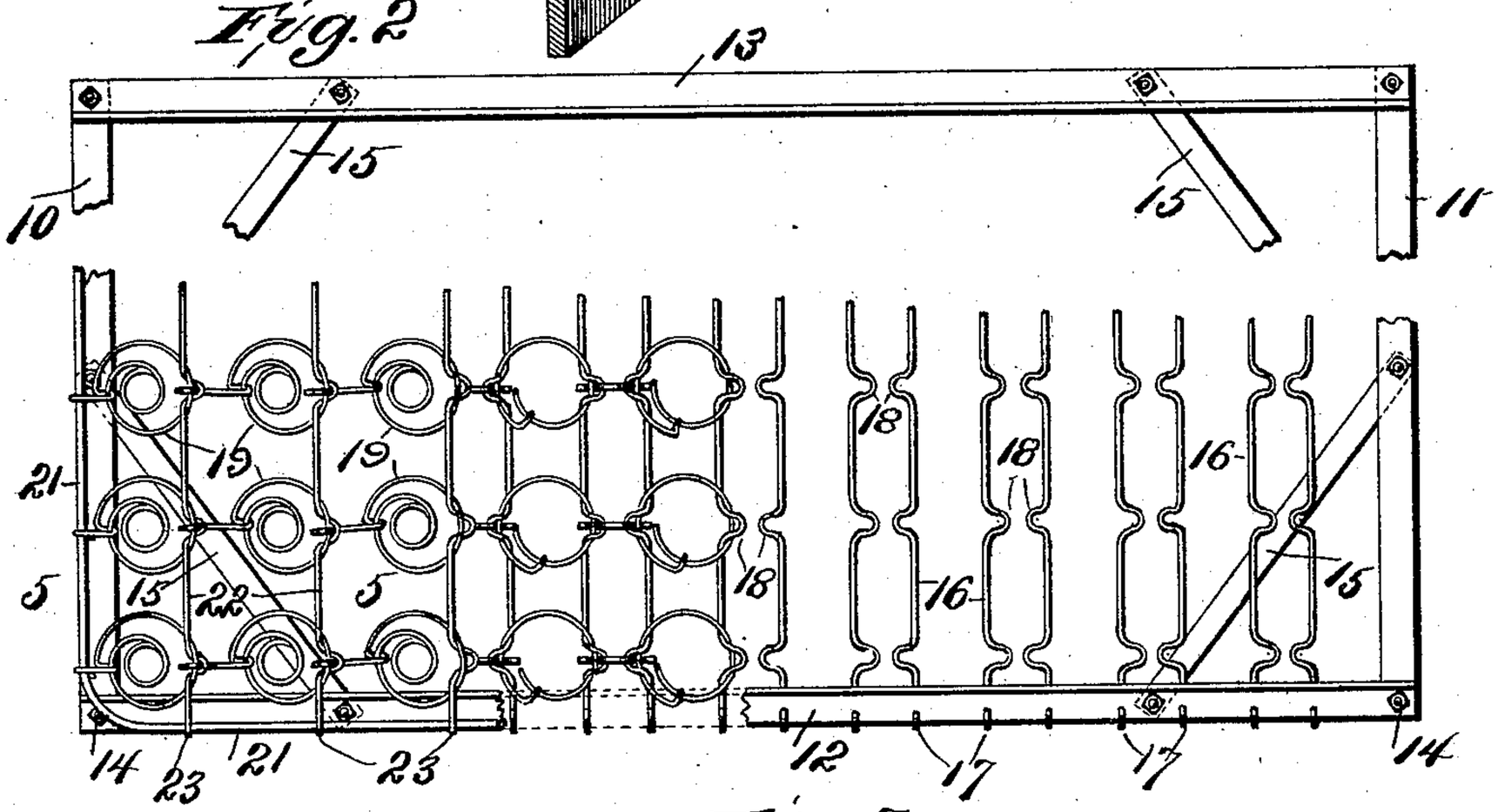


Fig. 3.

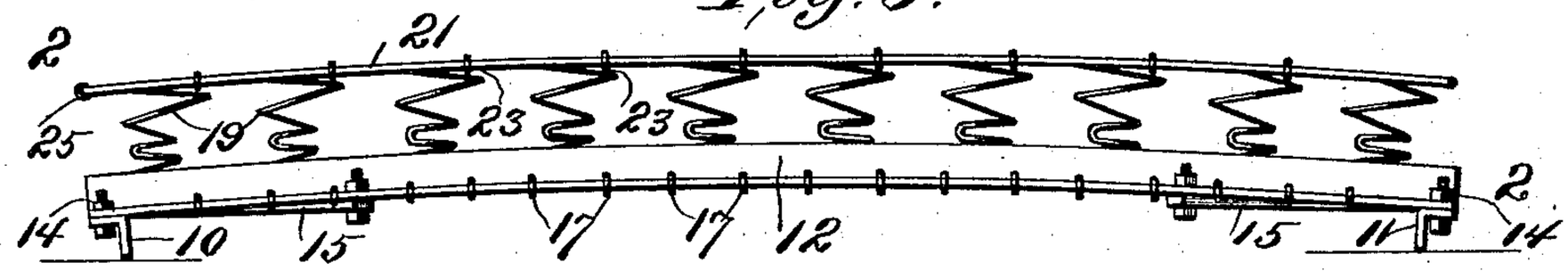


Fig. 4.

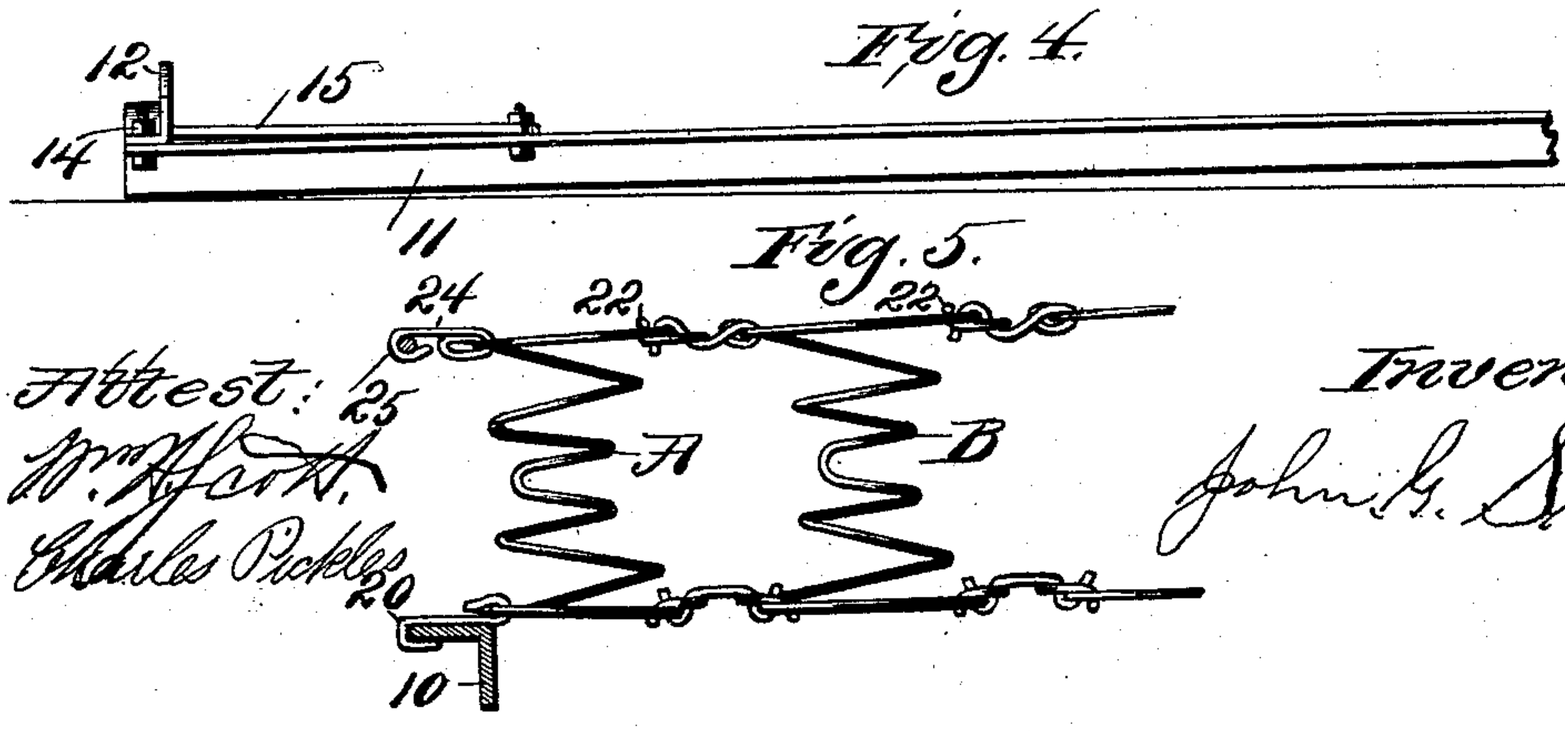


Fig. 5.

Attest:
W. H. Park.
Charles Pickles

Inventor:
John G. Smith

(No Model.) 3 Sheets—Sheet 2.

J. G. SMITH.

SPRING BED BOTTOM.

No. 572,577. Patented Dec. 8, 1896.

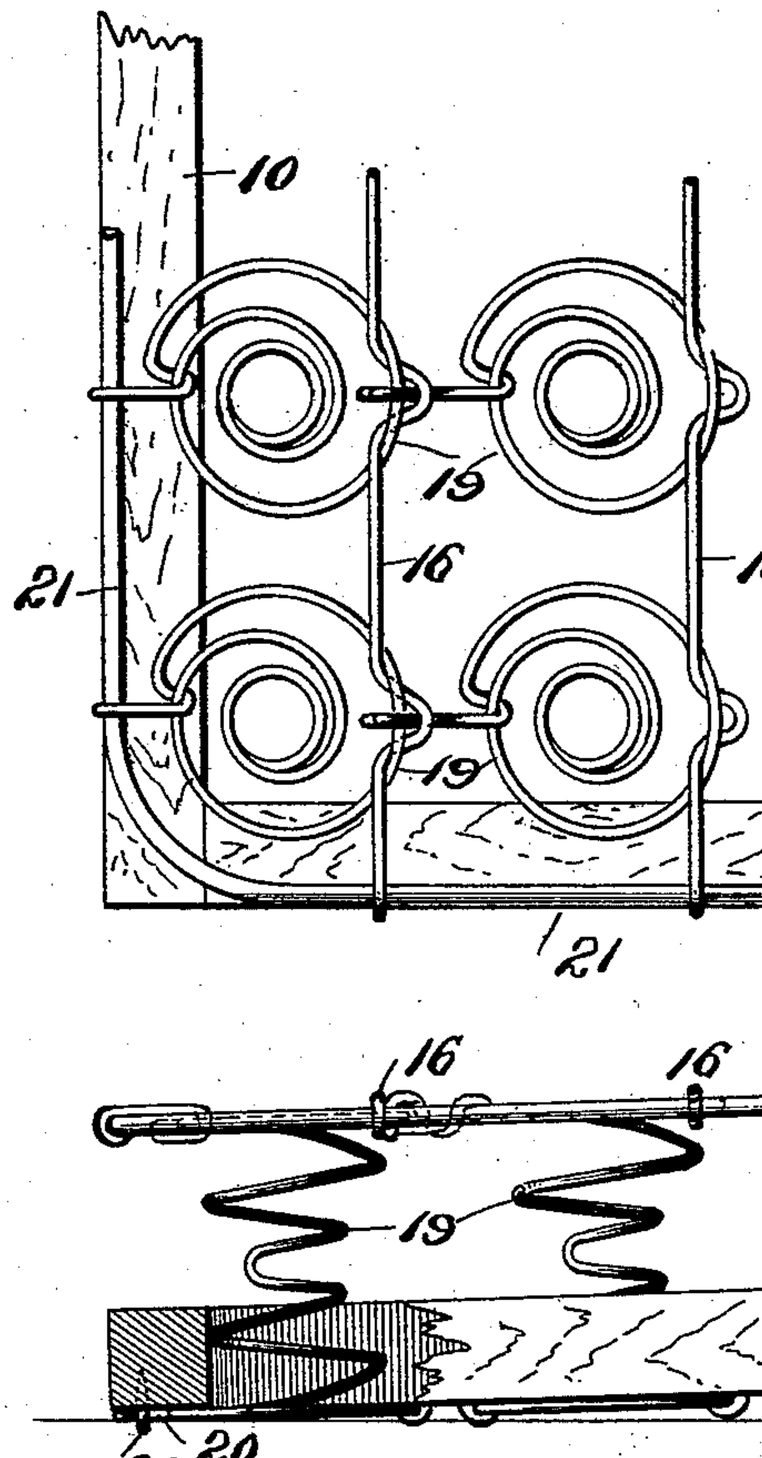


Fig. 7.

Fig. 6.

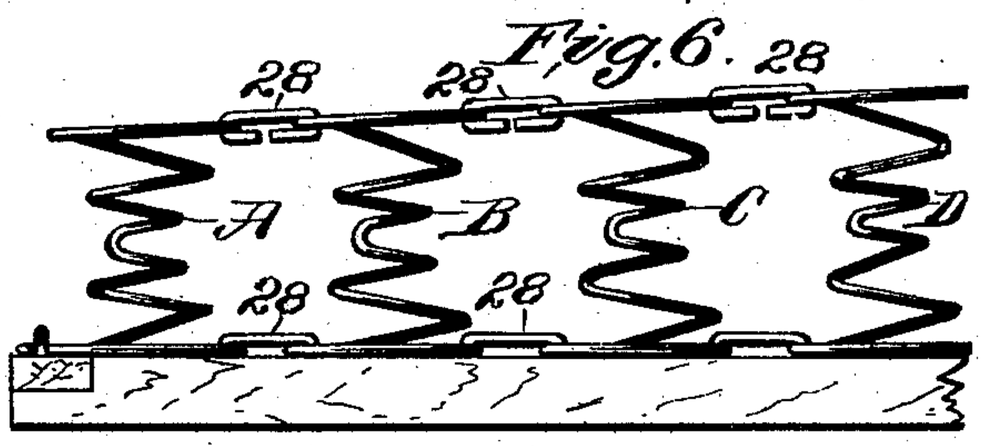


Fig. 8.

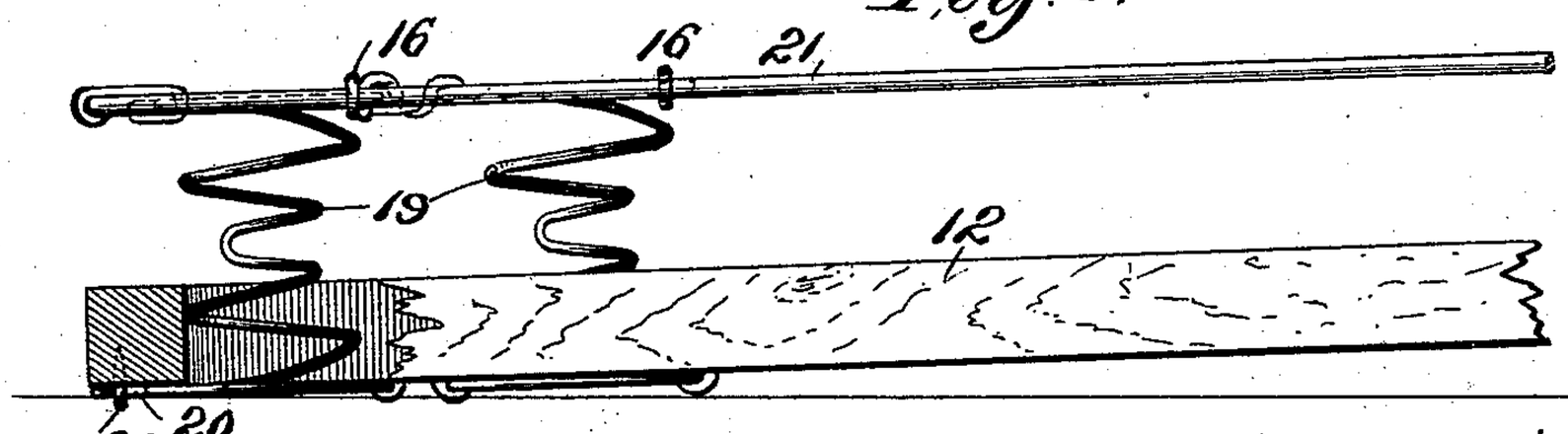


Fig. 9.

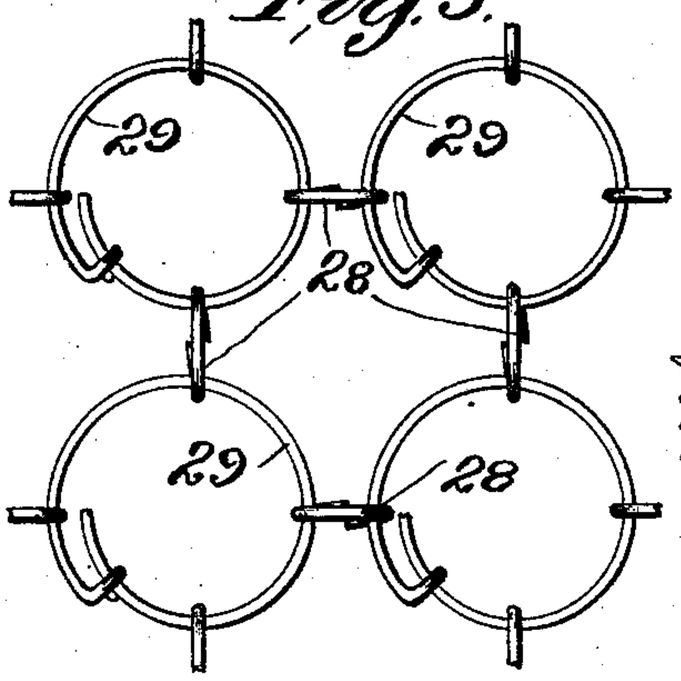


Fig. 10.

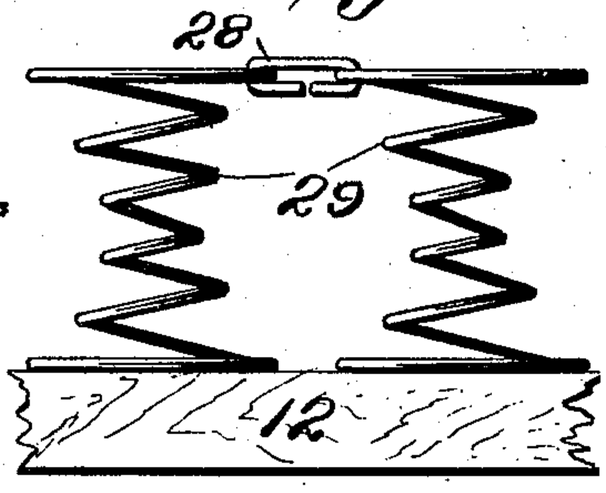


Fig. 11.

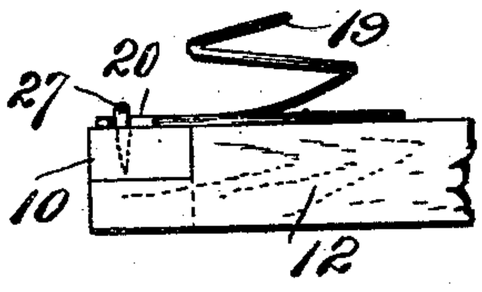


Fig. 13.

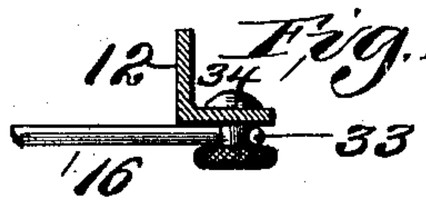
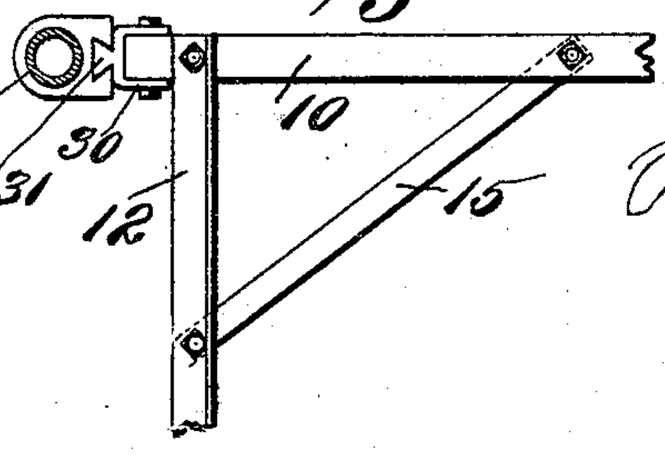


Fig. 12.



Attest:
Wm. H. Gerhardt.
Charles Pickles

Inventor:
John G. Smith

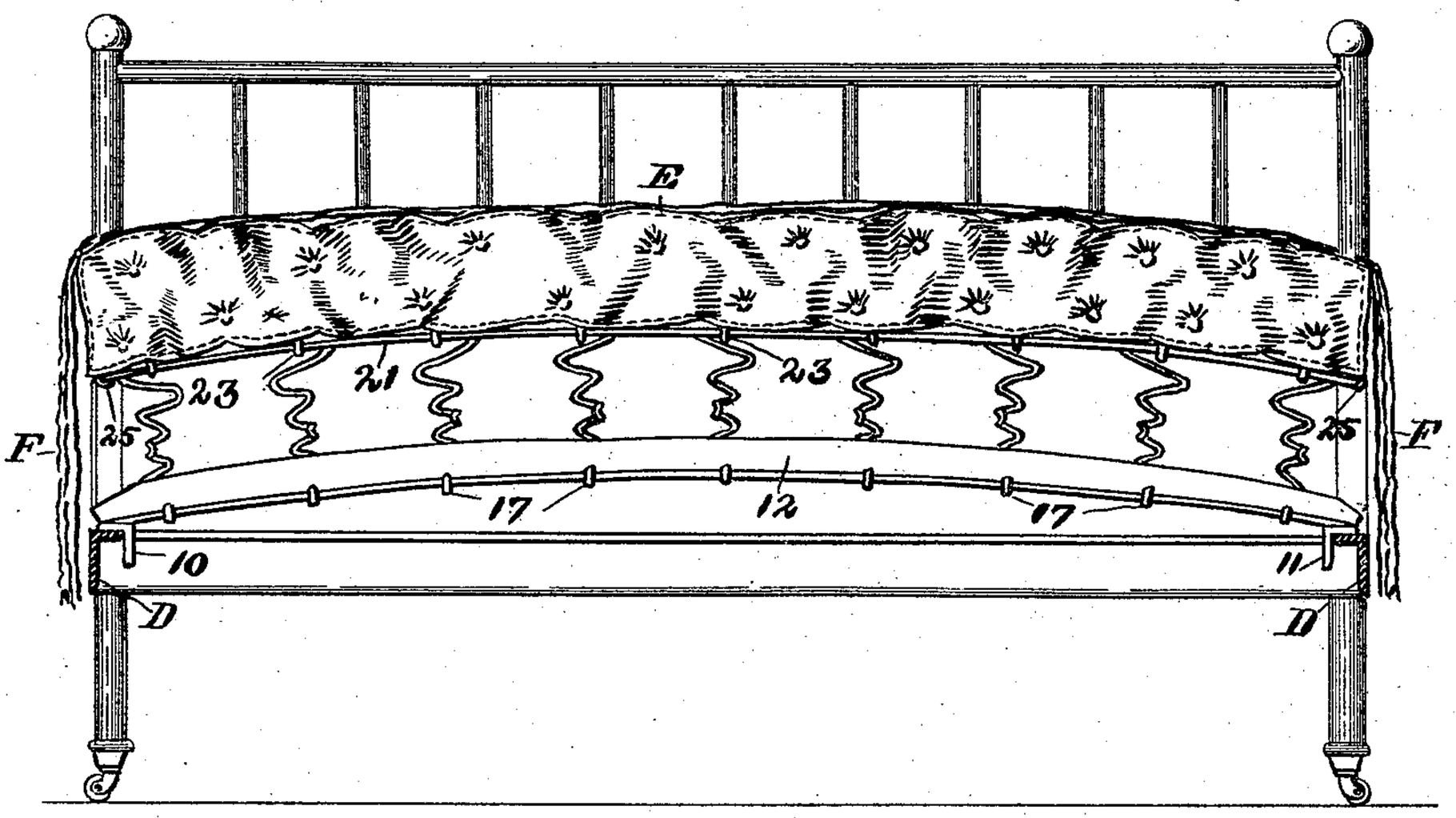
(No Model.) 3 Sheets—Sheet 3.

J. G. SMITH.

SPRING BED BOTTOM.

No. 572,577. Patented Dec. 8, 1896.

Fig. 14.



WITNESSES:
Wm. H. Edwards.
Frank Blair Rives.

INVENTOR:
John G. Smith
By H. H. Bliss
Atty.

UNITED STATES PATENT OFFICE.

JOHN G. SMITH, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE UNION WIRE MATTRESS COMPANY, OF SAME PLACE.

SPRING BED-BOTTOM.

SPECIFICATION forming part of Letters Patent No. 572,577, dated December 8, 1896.

Application filed October 23, 1894. Serial No. 526,729. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. SMITH, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Spring Bed-Bottom, of which the following is a specification.

The object of my invention is to provide a spring bed-bottom especially adapted for use in conjunction with a metallic bedstead and supported from the bedstead at its opposite ends, sides, or both, which bed-bottom is adapted for expansion and contraction longitudinally and transversely and flexure vertically, and is retained against abnormal sagging and depression in use.

A further object of my invention is to provide means for supporting elastically and connecting a bank of hour-glass helical, double helical, or spiral springs in such a manner as to prevent the said bank of springs from assuming a sagged or depressed condition when not in use.

My invention consists in the construction of a bed-bottom, comprising a series of spiral or analogous springs, and a frame, such as below described, whereby abnormal sagging or depressing of the central portion of the bottom is avoided and prevented while in use.

My invention consists, further, in a bed constructed of a bank of spiral or analogous springs so formed and connected as to prevent set sagging of the central portion of the top portion bed-bottom.

My invention consists, further, in the bed-bottom comprising a resilient frame, a bank of spiral or analogous springs located above and connected to said resilient frame, and a tie-frame secured to and inclosing said springs above said resilient frame.

My invention consists in the combination, in a bed-bottom, of a resilient frame adapted for support, a bank of spiral or analogous springs supported on said frame, longitudinally-positioned continuous stringers connected to said frame and to the bottoms of said springs, a series of cross-ties transversely connecting said springs and stringers, a tie-frame surrounding said springs and connecting the top thereof at the margin of the bed-bottom, and longitudinal stringers and transverse cross-ties fixed to said tie-frame and the springs at the top thereof.

My invention consists, further, in the construction, arrangement, and combination of parts hereinafter set forth, pointed out in my claims, and illustrated by the accompanying drawings, in which—

Figure 1 is a perspective of a portion of the bed-bottom. Fig. 2 is a plan on the line 2 2 of Fig. 3. Fig. 3 is an end elevation of the bed-bottom. Fig. 4 is a detail elevation of one corner of the supporting resilient frame. Fig. 5 is a detail sectional elevation on the indicated line 5 5 of Fig. 2, showing a graduated plane upper surface for the bed-bottom. Fig. 6 is a detail elevation of one corner of the bed-bottom, showing a graduated plane upper surface constructed in a modified form. Fig. 7 is a plan of a portion of the bed-bottom of modified construction. Fig. 8 is an elevation, partly in section, of Fig. 7. Fig. 9 is a plan of four springs, showing a modified form of connecting the same. Fig. 10 is an elevation of Fig. 9. Fig. 11 is a detail elevation of a spring and corner of frame, showing a modified connection between the same. Fig. 12 is a horizontal view, partly in section, showing a means of connecting the frame and a bed-post. Fig. 13 is a transverse sectional elevation showing a modified manner of securing the ends of the stringers to the frame-bars. Fig. 14 is a vertical sectional view through the side bars of a metallic bedstead, showing my improved bed-bottom in end elevation thereon.

Referring to Figs. 1, 2, 3, and 4, the numerals 10 11 designate side bars, and 12 13 the end bars, of a frame, which I have designated a "spring-frame." The bars 10 11 are made of angle-iron and may be arched, as indicated in Fig. 4, or not arched, as desired. The end bars 12 13 are made of angle-iron and are preferably arched, as shown in Fig. 3, the plates forming the greatest transverse horizontal dimensions of the bars 10 11 and 12 13, being contracted at their ends and connected by bolts 14.

Braces 15 are fixed to the bars of the frame and extend obliquely across the corners thereof, whereby the relative angles of the said bars are maintained.

By making the lower spring-frame as described several advantages in construction and action are secured. In the first place a frame of sufficient strength and stiffness is produced to be mounted and supported directly upon the side bars of a bedstead instead of requiring the use of cross supporting-slats, and in Fig. 14 D D represent the side bars of a metallic bedstead upon which the angle-iron side bars 10 11 of my bed-bottom rest. The vertical flanges of the side bars of the bed-bottom being arranged along their inner edges, they may be set in between the side rails of the bed, while the bed-bottom is supported directly upon the upper edges of the rails instead of upon slats arranged between or on the inner sides or faces of the rails. This permits the outer edges of the upper surface of the mattress E, while having full bearing upon the bed-bottom, to project outward as far as the outer edges of the side rails, so that the bedclothes F fall down smoothly from the mattress over the edges of the bed-bottom and the side rails of the bedstead instead of being thrown outward by the side rails of the bedstead, as is the case when the bed-bottom is supported inside of the side rai's, thus improving the appearance of the bed when made.

A series of stringers 16 are arranged in parallel pairs extending longitudinally of the frame, each of which stringers is provided with a hook 17 on each end, the hooks 17 being adapted for engagement with the horizontal plates of the bars 12 13, whereby the stringers are detachably connected with a rigid lower frame. The stringers 16 are each provided with transverse horizontal bends 18, the bends of one stringer in the pair approximating to the bends in the remaining stringer of the pair.

The stringers 16 are resilient and are normally under a certain amount of tension when applied to the tension-spring frame, so that they offer a considerable resistance to the downward deflection of the springs, which are supported thereon. These stringers are, however, resilient and elastic, so that whenever the springs are deflected or depressed by reason of a weight placed upon them they restore the springs to their normal positions as soon as such weight is removed. The angle-iron supporting-frame, as has been described, is rigid and is not distorted in shape whenever a weight is applied to the bank of springs and the supporting-stringers put under an extra amount of tension. As before stated, these stringers are arranged in pairs, as represented in the right-hand portion of Fig. 2, and the springs 19, except the side marginal rows of springs, are each mounted upon two of these stringers, as is represented by the two rows of springs in the middle portion of Fig. 2. This manner of mounting the springs has at least two important advantages. In the first place the springs, by being supported upon their opposite sides and having the interlocking engagement with the stringers, as shown, are prevented from having any twisting or rotary movements upon their supports, which has been found to take place to a greater or less extent where the springs are supported upon a single stringer arranged along one side or edge only of the spring or of the row of springs. Another advantage is that the springs, being supported upon opposite sides, are better sustained, and therefore the upper surface of the spring bed-bottom has a more nearly uniform surface and such surface has a more nearly uniform tension in all its parts than when but a single row of stringers is arranged beneath each row of springs.

The springs 19 are secured to the stringers and also to each other in any usual or approved manner, there being shown in my earlier patent, No. 269,243, dated December 19, 1882, one manner of connecting the springs to each other and to the supporting-stringers, and the same method may be adopted in connection with my present invention. The form of springs shown in most of the figures of the present drawings is that described and claimed in my Patent No. 544,597, dated August 13, 1895, and in which the end portions of each spring are coiled in opposite directions, the inner ends of the oppositely-coiled parts of the spring being connected by a return-bend, this construction of spring being clearly illustrated in Fig. 1 of the drawings and having the advantage over the ordinary spring, which is coiled continuously from end to end in one direction, that the wire of which the spring is composed may expand longitudinally without distorting the spring.

In the manufacture of spring bed-bottoms in which the principal parts are constructed of steel, that is, the springs, the stringers, and the tie-frames, great difficulty has been experienced by reason of the mattress being distorted because of the expansion of the springs when they are heated for the purpose of being tempered or japanned, and it has heretofore been considered necessary to employ supporting or tie frames which are not rigid, but will yield somewhat, so that the expansion of the springs may be distributed and taken up by both the top frame and the bottom frame, in which the springs are mounted, thus reducing as far as possible the distortion in any one part of the mattress. By the use of a spring such as I have described, however, I am enabled to use a rigid frame for supporting the lower ends of the springs, without the danger, which has heretofore been incident to such an arrangement, of having the entire expansion of the springs transmitted to the lighter and less rigid frame, which would thereby be distorted.

A tie-frame 21, preferably formed of endless wire, is located in the vertical plane of the frame and surrounds the bank of springs in the plane of the upper convolutions of said springs. Stringers 22, identical in construction with the stringers 16, more or less in

number, are arranged in vertical alinement with the stringers 16 longitudinally of the tie-frame, hooks 23 on the opposite ends of the said stringers 22 engaging the end bars of the tie-frame.

I prefer that there should be but a single top stringer 22 employed for each row of springs, as illustrated at the left-hand portion of Fig. 2.

The springs 19 support and are fixed at their upper convolutions to the stringers 22 and are also connected to each other, the marginal side rows of said springs having arms 24 and their upper convolutions, which arms are provided with downwardly-turned hooks 25, adapted to engage the side bars of the tie-frame 21.

It will be observed that the springs 19 are arranged in rows transversely of the bed-bottom, the several rows being connected by the stringers and frames.

In Fig. 5 it will be seen that the springs A B are of different heights, having their lower convolutions in the same horizontal plane and their upper convolutions in an inclined plane. Spring A is one of the marginal side springs, and B the spring adjacent thereto, and the difference in their heights is secured and maintained either by forming B of larger-sized wire, stronger, less compressible wire, or more wire than A, the desideratum being to render the marginal springs more compressible and less resilient than the interior springs, thus providing for greater resilient force in the central portion of the bed-bottom and insuring the maintenance of a convexed upper surface or contour of the bank of springs and obviating the sagging of the central portion when not in use or the fixed "setting" of the springs in the position assumed thereby in use.

It will be observed that in the provision of the arched frame-bars sagging of the frame is prevented.

In Figs. 7 and 8 a frame is shown in which the bars 10 11 and 12 13 are made of wood and provided with the stringers and tie-frame heretofore described, the springs 19 being connected as heretofore described, except that the marginal springs are provided with arms 20 without hooks on their lower convolutions, which arms are secured to the lower faces of the wooden bars by staples 26 or other means.

In Fig. 11 a marginal spring 19 is represented as having an arm 20 on its lower convolution, which arm rests upon the upper face of one bar of the frame and is secured thereto by means of a staple 27.

In Fig. 6 the springs A, B, C, and D are shown connected to each other by links 28 and located above and marginally secured to the upper face of the wooden frame, the said springs having a uniformly horizontal lower surface and an inclined or convexed upper surface, as and for the purpose heretofore described in connection with springs A B, Fig. 5.

In Figs. 9 and 10 plain double helical spiral springs 29 are shown, which springs are carried in a wooden frame and connected, each to the one adjacent thereto, by links 28, engaging in horizontal planes in the top and bottom convolutions of said springs.

In Fig. 12 the corner of the frame is provided with a block 30, fixed to the bar 10 and having a dovetailed tenon 31 adapted for vertical movement and seating in a dovetailed mortise in a bed-post 32, by this means providing for the construction of a bed-frame without side rails independent of the spring bed-bottom, the side rails 10 11 serving to support the springs and bedding.

In Fig. 13 the horizontal plate of the bar 12 is vertically apertured, and horizontal eyes 33, formed on the stringers 16, are alined with said apertures and retained in position by rivets 34, seated in said eyes and apertures.

What I claim is—

1. The combination, in a bed-bottom, of a centrally open, rectangular, rigid lower spring-supporting frame formed of bars which are unyielding laterally, resilient stringers extending from side to side of the said frame and detachably connected thereto, springs supported on the said stringers, a tie-frame at the tops of the springs, and connections between the springs and the tie-frame, substantially as set forth.

2. The combination, in a bed-bottom, of a rigid lower spring-supporting frame formed of bars which are unyielding laterally, resilient stringers detachably connected with the said frame, springs supported directly upon the said stringers, a tie-frame surrounding the springs at their upper ends, the said tie-frame being, as compared with the lower frame, relatively light and non-rigid, and connections between the tie-frame and the springs, substantially as set forth.

3. The combination, in a bed-bottom, of a lower spring-supporting frame having side bars of angle-iron with the vertical flanges or members thereof inside of the outer edges of the said bars, and end bars connecting the side bars, and a bank of springs supported by the said frame, the outermost or side springs of the bank being provided with hooks which are detachably connected with the horizontal flanges or members of the side bars of the lower frame, substantially as set forth.

4. The combination, in a bed-bottom, of a lower spring-supporting frame having side bars of angle-iron with downward-turned vertical flanges or members, and end bars also of angle-iron, the horizontal portions of the end bars being turned outward and resting upon and connected to the horizontal members of the side bars, near their ends, a bank of connected springs, and supports for the said bank of springs provided with hooks turned upward and detachably connected with the horizontal members of the end bars of the lower frame, substantially as set forth.

5. The combination, in a bed-bottom, of a rigid lower spring-supporting frame consist-

ing of side bars, 12 and 13, of angle-iron, the vertical flanges or members of the said side bars extending downward and arranged along the inner edges of the horizontal members, and end bars, 10 and 11, formed also of angle-iron with their vertical members extending upward and arranged along the inner edges of the horizontal members, which latter rest directly upon and are connected to the horizontal members of the side bars, resilient stringers, 16, provided at their ends with upturned hooks which detachably catch over the edges of the horizontal members of the end bars, and a bank of springs supported upon such stringers, the outermost or side springs being provided with downturned hooks which detachably catch over the edges of the horizontal members of the side bars, substantially as set forth.

6. A bed-bottom adapted to be placed in and removed from a bedstead, and comprising a rigid frame the end bars of which are arched upward, longitudinally-arranged stringers connected with and supported solely by the said end bars, and a bank of springs supported by the said stringers, substantially as set forth.

7. A bed-bottom adapted to be placed in and removed from a bedstead, and comprising a rigid frame, the end bars of which are of angle-iron with their horizontal members or flanges turned outward, the bars being arched upward, longitudinally-arranged resilient stringers provided at their ends with hooks which engage with the edges of the horizontal members of the end bars, and a bank of springs supported upon the said stringers, substantially as set forth.

8. The combination, in a bed-bottom, of a lower, rigid, supporting-frame, a relatively light upper tie-frame, and springs supported by the said lower frame and arranged between it and the tie-frame, the said springs being formed with reversely-coiled end portions which are connected at the middle parts of the springs by reversed bends the springs being connected to each other, and to the said lower and upper frames, substantially as set forth.

9. The combination, in a bed-bottom, of a lower supporting-frame formed of angle-iron, resilient stringers supported thereby, a bank of springs supported upon the said stringers, the said springs being formed with reversely-coiled portions at their opposite ends, which portions are connected at the middle parts of the springs by reversed bends, a tie-frame, 21, formed of wire, and connections between said tie-frame and the upper ends of the springs, substantially as set forth.

Signed at St. Louis, Missouri, this 20th day of October, 1894.

JOHN G. SMITH.

In presence of—
JOHN A. GILLIAM,
JOHN W. DRABELL.