W. R. SMITH.

SPRING CONSTRUCTION.

APPLICATION FILED NOV. 16, 1907.

985,710.

Patented Feb. 28, 1911.

2 SHEETS—SHEET 1.

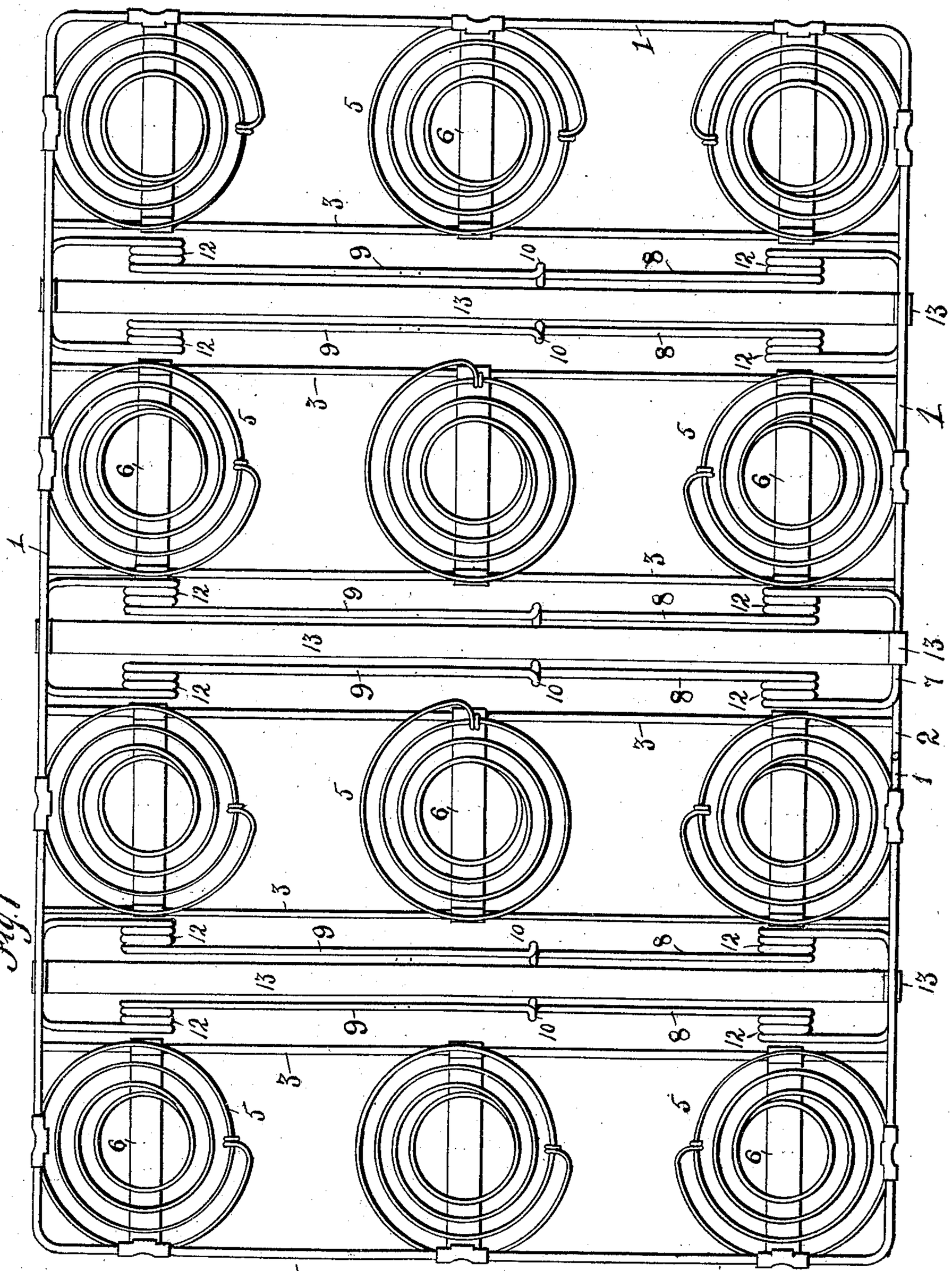

Fig. 1

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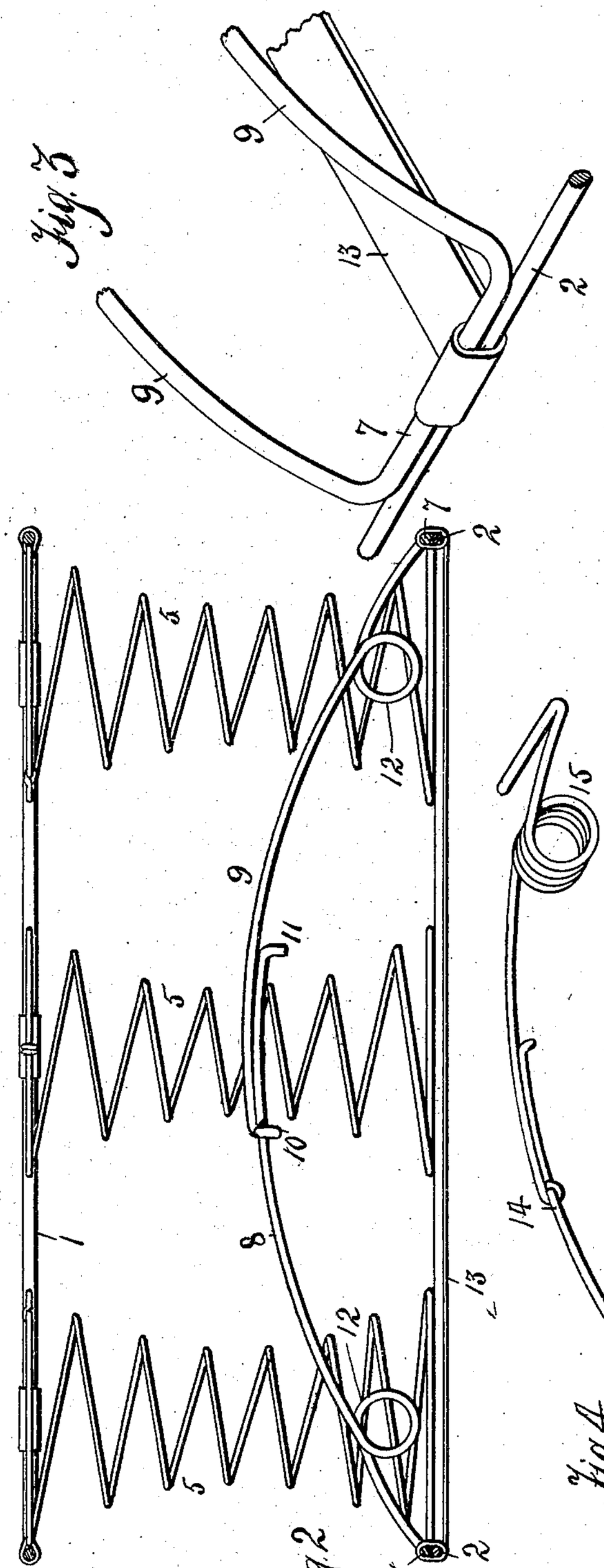

Fig. 2

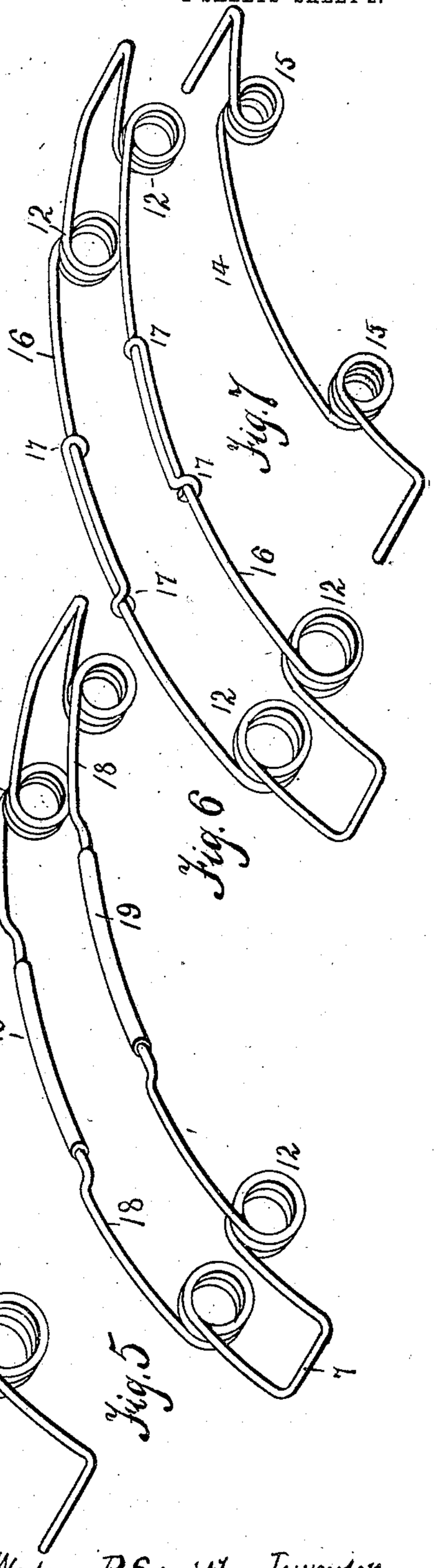

Fig. 3

Fig. 7

Fig. 6

Fig. 5

Fig. 4

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UNITED STATES PATENT OFFICE.

WATSON R. SMITH, OF JACKSON, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO VENTILATED CUSHION AND SPRING CO., OF JACKSON, MICHIGAN.

SPRING CONSTRUCTION.

985,710. Specification of Letters Patent. Patented Feb. 28, 1911.

Application filed November 16, 1907. Serial No. 402,557.

To all whom it may concern:

Be it known that I, WATSON R. SMITH, a citizen of the United States, residing at Jackson, in the county of Jackson and State of Michigan, have invented certain new and useful Improvements in Spring Constructions, of which the following is a specification.

This invention relates to spring constructions.

In the spring constructions now in general use for seats, the upper convolutions of the springs are frequently forced into engagement with the lower convolutions thereof, thereby causing more or less inconvenience to the rider or occupant of the seats of carriages, automobiles and other vehicles. This undue compression may occur in the event of a heavy rider on the seat or as the result of an uneven road or when the vehicle contacts with stones or similar obstructions in the roadway. If the springs are of a cone shape with the apexes at the top, the apexes are subject to passage by compression through and beneath the lower or base convolutions of the springs. In any event, these defects or disadvantages not only inconvenience the rider incident to contact with the bottom of the seat or the support upon which the seat is mounted, but subjects the structure to unnecessary strain and possibly, in some instances, to derangement of certain of the elements embodied in the structure, especially the fastening devices.

It is therefore one object of my invention to overcome such disadvantages or defects as have been stated above by incorporating in the structure one or more arch or auxiliary springs for coöperation with the main springs to take or assist in any undue compression in the event that the main springs are compressed suddenly or by unusual weight to more than their maximum resistance.

With the above and other objects in view the present invention consists in the combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims.

In the drawings: Figure 1 is a plan view of my invention. Fig. 2 is a transverse sectional view. Fig. 3 is a perspective view of one part of the arch or auxiliary spring. Fig. 4 is a similar view illustrating a modified form of arch or auxiliary spring. Fig. 5 is another modification of the arch spring. Figs. 6 and 7 illustrate other modifications of the arch spring.

Referring now more particularly to the accompanying drawings the reference characters 1 and 2 indicate upper and lower edge wires, respectively, and 3 pairs of supporting wires, there being a supporting wire at each end of the cushion for coöperation with the corresponding end of the lower edge wire to support the springs. The springs are indicated by the reference character 5 and it will be seen that they are secured to the supporting wires 3 by means of suitable clips 6 each of which at its ends embraces the lower convolution of the corresponding spring and also the corresponding supporting wire and arranged centrally of the springs to prevent any possibility of the intermediate or center coils being forced beneath the lower convolutions of the springs in the event that heavy weight or contact of the vehicle with obstructions should jar the occupant of the vehicle and tend to compress the springs beyond their normal resistance. However, as the result of the arch or auxiliary springs it is not likely that the springs will be subject to such compression as will force the intermediate or center coils beneath the lower convolutions of the springs, and therefore, it is contemplated in the use of the present invention to use fastenings other than those indicated by the reference character 6. The outermost springs are secured to the supporting wires at their lower ends and also to the lower edge wire in any suitable manner and also secured by any suitable means at their upper ends to the upper edge wire, as shown.

As has been stated, the essential feature of the present invention resides in the arch or auxiliary springs, and reference to the accompanying drawings will disclose that each auxiliary spring may be composed of two opposing parts, each consisting of an end 7 having upwardly directed, and preferably curved pairs of arms 8 and 9, the arms 9 having downwardly directed eyes or loops 10 designed to receive the free ends of the arms 8 which latter project beneath the arms 9 so far beyond the eyes or loops

10 as to permit of a free sliding movement of the oppositely disposed arms 8 and 9 in the event of compression. The extremity of each arm 8 may or may not be provided with a downwardly directed end 11, which latter, if used, will prevent accidental disconnection of the arms 8 and 9 and yet not interfere with a free sliding movement of one pair of arms upon the other. Each pair of arms 8 and 9 is preferably provided with a pair of oppositely disposed coils 12. The ends of the pairs of arch or auxiliary spring members may be secured to the lower edge wire 2 by means of the elongated connecting clip 13, although other suitable fastenings (not shown) could be used to effect this connection.

As illustrated in Fig. 4, I may employ a single arch composed of two arms 14 directed from opposite sides of the lower edge wire, said arms 14 each having a coil 15 similar to the coils 12 hereinbefore described and having sliding connection with each other at their inner ends as in the use of the aforesaid double arch or auxiliary spring. As a matter of fact, as shown in Fig. 7 the arms 14 which form the arch of Fig. 4 could be formed of a single piece of material.

In Fig. 6 I illustrate another form of arch or auxiliary spring very similar to the one illustrated in Figs. 1 and 2 the only material difference residing in the fact that in Fig. 6 the ends of each arm 16 is provided with a loop 17 adapted to loosely embrace the corresponding opposing arm of the spring arch.

In Fig. 5 I illustrate still another form of the arch or auxiliary spring wherein the opposing arms 18 terminate short of each other and are coupled together for sliding movement within the coupling sleeve 19.

In the use of my improved spring construction I wish it understood that I do not limit myself to the precise proportions or form of different elements and that my improved arch or auxiliary spring may be used in connection with wood or frames other than the frame herein described.

If desired my improved arch or auxiliary springs may constitute all of the resiliency required. In other words, if the construction be formed thick a complete cushion could be produced without the main springs.

What is claimed is:—

1. In a spring construction, a frame, main springs in the frame, and an auxiliary arch spring extending continuously across the structure between adjacent rows of main springs and secured to the frame and operating independently of the main springs to catch extra weight.

2. In a spring construction, a frame, main springs in the frame, and an auxiliary spring extending across the structure between adjacent rows of main springs and operating subsequent to the initial operation of the main springs for coöperation with the latter to sustain weight placed upon the structure.

3. In a spring construction, a frame, main springs in the frame, and an arch spring between adjacent rows of main springs and operating independently of the main springs to catch extra weight.

4. In a spring construction, a frame, main springs in the frame, and an auxiliary arch spring in the frame between rows of main springs to catch extra weight, the arch spring including oppositely disposed arms which overlap at their inner ends and which are slidably connected together.

5. In a spring construction, a frame, main springs in the frame, and an auxiliary arch spring extending across the structure between adjacent rows of main springs and operating independently of the main springs to catch extra weight, and a coil formed in said arch spring.

6. In a spring construction, a frame, main springs in the frame, and auxiliary arch springs arranged between adjacent rows of main springs and operating independently of the main springs to catch extra weight.

7. In a spring construction, a frame, springs mounted within the frame, and arch springs coöperating with the aforesaid springs, each arch spring including oppositely disposed arms, the inner end of one arm having an eye adapted to slidably receive the opposite arm.

8. In a spring construction, a frame, main springs in the frame, and a plurality of alining arch spring elements connected directly together at their inner ends and mounted between adjacent rows of main springs to catch extra weight.

9. In a spring construction, a frame, main springs in the frame, and an auxiliary arch spring secured to the frame and disposed between the main springs and unconnected with the latter so as to operate independently of the main springs.

10. In a spring construction, a frame, main springs in the frame, and an arch spring held only at both ends to the structure and positioned so as not to be engaged by the main springs.

11. An auxiliary spring for use in spring constructions, which spring constructions have frames, and main springs mounted within the frames, said auxiliary spring consisting of a plurality of arched spring elements which contact with each other and which are slidably connected together, and means for securing the outer extremities of said spring elements to the construction.

12. In a spring construction, a frame, supporting bars, main springs upon the supporting bars, and arch springs connected to the frame between adjacent rows of main

springs and arranged for compression subsequent to the compression of the main springs and independently of the latter.

13. In a spring construction, a frame, springs mounted in the frame, and arch springs coöperating with the aforesaid springs, said arch springs each including arms slidable one upon the other.

14. In a spring construction, a frame, springs mounted within the frame, arch springs connected to opposite sides of the frame and coöperating with the aforesaid springs, said arch springs each including curved arms connected directly together.

15. In a spring construction, a frame, springs mounted within the frame, and arch springs coöperating with the aforesaid springs, each arch spring including oppositely disposed arms, the inner end of one arm having an outwardly directed end and the inner end of the opposing arm having a downwardly directed part to slidably receive the inner end of its companion arm.

16. In a spring construction, a frame, springs mounted within the frame, and arch springs coöperating with the aforesaid springs, each arch spring including oppositely disposed arms, the inner end of one arm having a downwardly directed end and the inner end of the opposing arm having a downwardly directed part to slidably receive the inner end of its companion arm, and a coil formed in the arm of each arch spring.

17. In a spring construction, a frame, and arch springs connecting opposite sides of the frame, each arch spring including oppositely disposed arms which overlap at their inner ends.

18. In a spring construction, a frame, arch springs connecting opposite sides of the frame, each arch spring having a member slidable upon another.

19. In a spring construction including upper and lower edge wires, a frame, supporting bars, springs mounted upon the supporting bars, and arch springs connecting the sides of the lower edge wire and bridging the frame between the first mentioned springs, the intermediate point of each arch spring being higher than the ends thereof and disposed in a plane substantially half way between the upper and lower edge wires and free of the other elements of the construction.

20. In a spring construction, a frame including upper and lower edge wires, springs mounted in the frame, and an arch spring bridging the frame and secured at its outer end to the lower edge wire, the intermediate portion of the arch spring being higher than the ends thereof and free of the other elements of the construction.

In testimony whereof I affix my signature, in presence of two witnesses.

WATSON R. SMITH.

Witnesses:
ETHEL M. PHELAN,
CLAUDE S. LARNED.