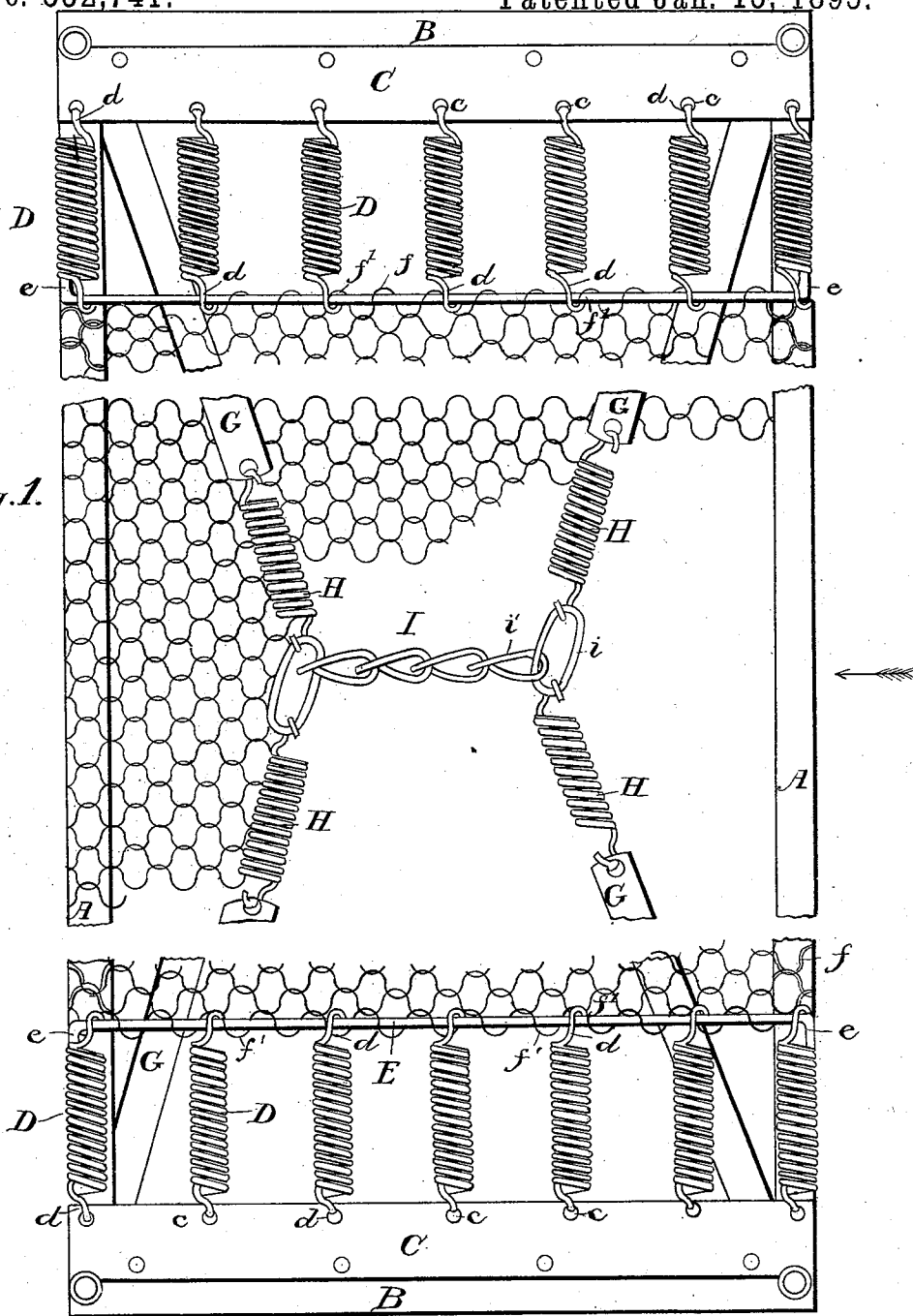


J. B. RYAN.
BED.

No. 532,741.

Patented Jan. 15, 1895.

Fig. 1.



Witnesses
Louis Wieser
Ludy Wieser

Inventor
James B Ryan
G. P. B. Doubleday
Attorney.

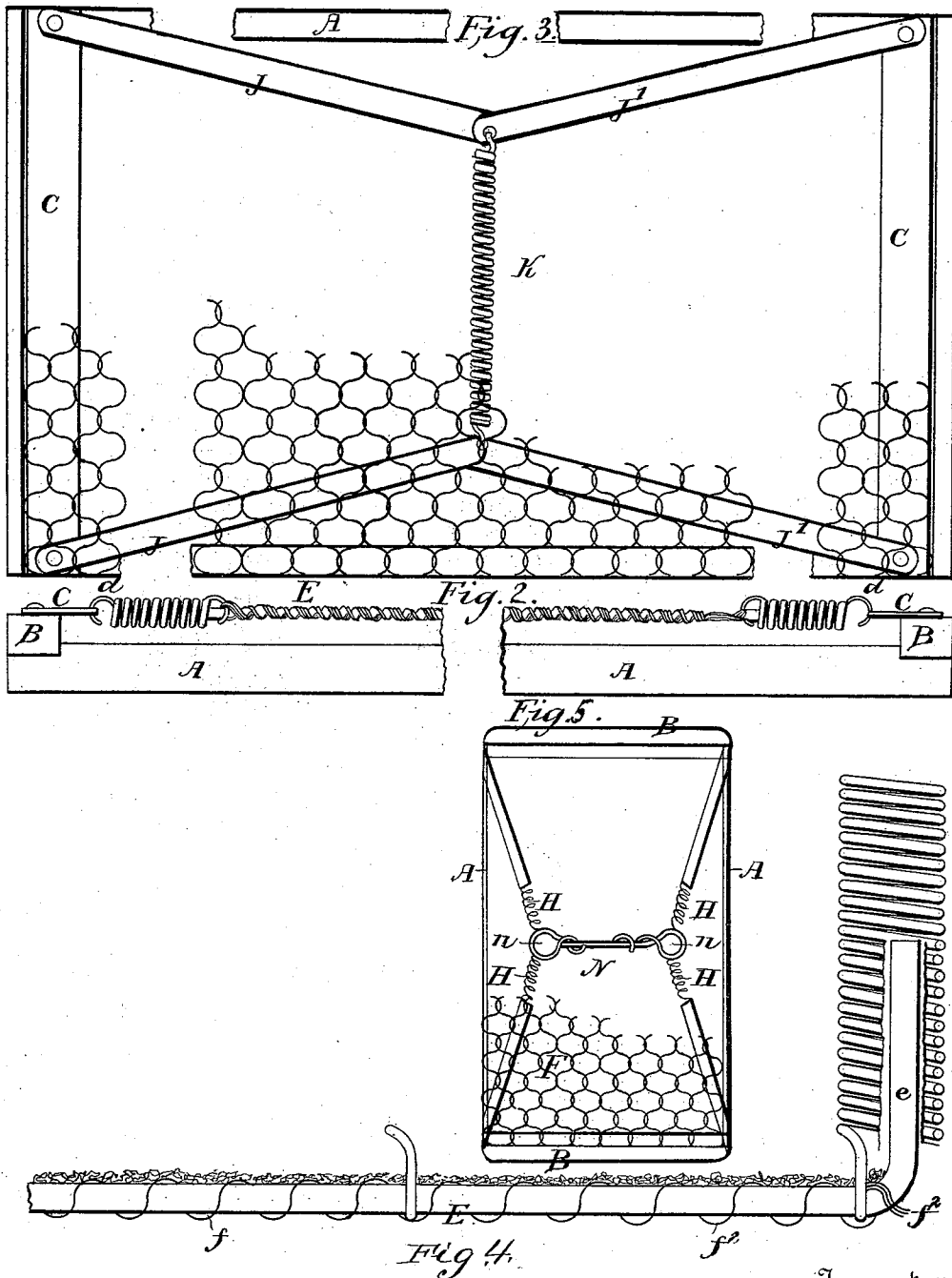
(No Model.)

2 Sheets—Sheet 2.

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Louis Wieser
Ludy Wieser.

Inventor
James B Ryan
By P. M. Darblow
Attorney

UNITED STATES PATENT OFFICE.

JAMES B. RYAN, OF NEW YORK, N. Y.

BED.

SPECIFICATION forming part of Letters Patent No. 532,741, dated January 15, 1895.

Application filed April 14, 1894. Serial No. 507,600. (No model.)

To all whom it may concern:

Be it known that I, JAMES B. RYAN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Beds, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1, is a top or plan view of my improved bed. Fig. 2, is an edge view, looking in the direction of the arrow Fig. 1. Fig. 3, is a top or plan view of a modification of one part of my invention. Fig. 4, shows the suspension rods detached, and enlarged. Fig. 5 is a modification upon a reduced scale.

Like reference letters are applied to similar parts in all the drawings.

Referring particularly to Figs. 1 and 2, A A are the side rails and B B, the end rails of a rectangular frame, such as is ordinarily used in woven wire mattresses; these parts being bolted together in the usual way.

C C, are metal plates or strips, each secured at one end edge to the upper side of one of the end rails and projecting inward therefrom. Each of these metal plates is provided near its inner edge with a series of holes, *c, c*.

D D, are helical springs, each provided at its ends with hooks or open eyes, *d d*; but as the above referred to parts may be of any usual or approved construction they need not be more specifically described.

E, *e e*, represent suspension rods, each of a length corresponding closely to the width of the bed. These rods are made preferably of round bar iron or wire of such diameter as will insure sufficient strength; and, preferably, of such size and quality as will permit their ends *e e* being bent at right angles to the intermediate main portions E without heating. To provide against rusting I usually prefer to make these suspension rods of brass wire or nickel plate them. Between the suspension rods I hang a support for the mattress; and for this purpose I employ some of the well-known wire work, canvas, or such other materials as may be deemed appropriate and useful.

In the drawings I have represented an ordinary woven wire fabric *F f f'*, which, at its ends is connected to the suspension rods,

preferably, by means of one or more strands of wire *f, f'* which is wound around the rods and interwoven or interlaced with the terminal convolutions of the fabric; or the fabric may be bent around the rods, or secured thereto by winding its separate strands each around the rods, as shall be found most convenient.

By examining Figs. 1 and 4, it will be seen that when the parts are properly arranged in working position the bent over ends *e, e*, of the suspension rods are surrounded by the adjacent helical springs into which they project practically their entire length. The springs thus act as stops to restrict the movement of the rods endwise; and it will also be seen that by making these rods of suitable length the hooks of the springs are prevented from slipping away from the angles of the rods by reason of the engagement therewith of the wire convolutions with the bent ends of the rods when the shanks of the hooks are about in line with said convolutions, as indicated in Fig. 4; but to avoid the necessity of so much accuracy in shaping the hooks I prefer to wind the wire with a turn or two around the rod outside of the hook and through the fabric inside of the hook as shown at *f²* Fig. 4. It will also be understood that a proper spacing of the hooks of the intermediate springs is also maintained by the engagement of the wire at *f'*; this being the case with any of the above referred to modes of connecting the wire fabric with the rods. Thus the combination of the hooks, the suspension rods, and the wire co-operates to perform a number of functions. Thus, for instance, the engagement of the outwardly bent ends of the wire rods with the edge strands of the fabric and the inner surfaces of the adjacent helical springs effectually prevents all possibility of the fabric slipping off from the ends of the wires; or, of the endwise displacement of the wires relative to the fabric; while the engagement of the spring hooks with the wires and the convolutions of the fabric prevent lateral displacement of the said hooks along the wire. One advantage which is incident to this part of my invention is the avoidance of objectionable angular corners or projections at the places where these three members engage

with each other, thus avoiding all danger of tearing the superimposed mattress or other bedding at these points.

Prior to this invention it was customary, as, for instance in said Patent No. 241,321, granted to C. H. Dunks and myself, to connect the wire fabric with the spiral springs by means of an interposed transverse bar which was of such thickness and width that it was practically rigid and unyielding in the direction of the pull of the fabric, so that in case said fabric became stretched or weakened in some particular place it was impossible to take up the resulting slack by increasing the tension of one or more of the springs at points opposite the defective place or places; but by the use of a wire rod *E e e* such as I have described, the tension upon any particular portion of the wire fabric can be regulated at will, for the purpose of taking up slack or otherwise; as will be readily understood without further explanation. It is evident that such regulation of the tension upon the wire fabric cannot be accomplished in a bed where the springs at one end of the bed are each connected with its opposite spring by means of one or more longitudinal non-extensible metallic attachments as is common in some bed bottoms.

As a further support for the fabric I propose to combine therewith, and arrange below it, a series of diagonal strap metal braces, as they are sometimes called, *G, G*, each secured at one end by one of the corner bolts passing through it; and each having attached to its inner end one of the helical springs *H, H*, and instead of so arranging the braces that if they were prolonged they would intersect at the center of the bed, I so dispose them that each side pair would, if prolonged, converge at a relatively short distance from one of the side rails *A*, and then attach to the inner end of each brace one transverse connection of a sort which will insure an equal tension upon all the braces under all the circumstances of ordinary use. In my Patent No. 411,302, I employ a central rectangular metal plate so combined with the braces and springs that the braces running from diagonally opposite corners are about in line with each other and with the center of the plate, which is arranged with its longer sides running lengthwise of the bed; but in this invention I connect the inner ends of the springs and braces with each other by means of a transversely arranged link or tie, so that the braces which run from diagonally opposite corners of the bed are not in line with each other nor with the center of the transverse connecting link or tie. The inner ends of these springs are all connected with each other through a short piece of chain, *I*; one pair of springs being connected to one of the end links, *z*, of the chain; the other pair being connected to a link at the opposite end of the chain; the result of this combination and arrangement of parts being a practically uniform tension upon all of the springs and

strap braces. Another advantage which is incident to this last referred to combination of parts is that the tension of the springs can be regulated at will by hooking them into different links of the chain without disturbing the uniformity of this tension. Thus, if it be desired to increase the tension one pair of springs *H*, may be hooked into the chain link *z'* adjacent to link *z*, to which, in the drawings, they are now attached.

In Fig. 3, I have shown a modification of the strap metal braces and the spring tension. In this figure each pair of metal braces *J J*, and *J' J'*, is connected to one end of a helical spring, *K*, which is disposed transversely of the bed as is the short piece of chain in the other figures. Of course each brace is secured at its outer end; preferably, by one of the corner bolts as in the other bed.

From an examination of Fig. 3, it will be seen that the tension is perfectly uniform upon each and every one of the four braces; and that it can be increased, or brought up to its original strength in case it becomes relaxed, by cutting off one or more convolutions of the spring and forming a hook upon the next remaining turn or coil, without in any manner disturbing the uniformity of tension upon each and every one of the four braces. In this modification of one part of my invention I have omitted the suspension rods and the helical springs which connect them to the end rails of the frame; but it will of course be understood that either combination and arrangement of the strap metal braces and their tension devices may be used at the option of the maker with either a continuous sheet of wire fabric attached at its ends to the end rails of the frame, or a fabric attached to the suspension rods as indicated in the other figures.

In an earlier patent of mine, No. 411,302, I have shown a rectangular plate of metal having holes in each corner which receive the inner ends of helical springs whose outer ends are connected by means of strap metal braces to the four corners of the mattress frame; the arrangement of parts being such that a line drawn from one corner of the bed to the diagonally opposite corner will intersect centrally and lengthwise two of the braces and springs and will cross the plate diagonally, the tension of the springs, being normally practically uniform, with the plate in the center of the bed. It is obvious that if the tension of one of the springs be materially increased, say enough to draw the plate six inches toward that corner of the bed, the additional tension will be practically equal upon that spring and the one which is diagonally opposite to it; but, there will be very little proportionate increase in the tension of the other two springs, from the fact that the above referred to displacement of the plate and the resulting disturbance in the alignment of the last mentioned two springs and their braces will but slightly increase the length of a line drawn from the outer ends of said braces centrally

through them, their springs, and the metal plate.

In Fig. 5 the inner ends of the helical springs are connected with each other by means of a transversely disposed single bar link N provided at its ends with two eyes *n*, *n*, with which the hooks are engaged; and through which a substantially uniform tension upon all of the springs and strap braces is maintained, and can be adjusted by shortening any one of the strings or its connected brace.

In each and every one of the constructions the mode of operation is substantially the same in the following respect, among others: When any spring has its tension increased at either end additional strain is imparted to the two braces which are nearest to that particular spring; but at the same time part of the increased pull is transferred to the opposite pair of braces which lie adjacent to the otherside of the bed, and tend to deflect them still more from a straight line; so that the tension is practically uniform upon all of the braces; thus operating in a manner quite different from that which is possible when the springs and braces are connected to my central rectangular metal plate.

While I have illustrated the best mode now known to me for carrying my invention into practice, I do not wish to be limited thereby; because many modifications will readily suggest themselves to any one who is familiar with the art to which it pertains.

What I claim is—

1. In a bed, the combination with a rectangular frame, of a central wire fabric, a wire

rod or bar connected to the end of the fabric and having its ends bent outward at right angles to its intermediate main portion, and a series of springs each connected at one end to the frame and at its other end to the wire rod or bar, the bent ends of the rod being within the end springs of the series, whereby the springs and the bent ends of the rods act as stops, substantially as set forth.

2. In a bed, the combination of the wire fabric, the wire rod having its ends bent outward at right angles to its intermediate main portion, a series of springs each connected at one end to the rod, the bent ends of the rod being within the end springs of the series, and a series of wire convolutions connecting the fabric with the rod outside of the hooks of the springs whereby said wire convolutions, the said springs and the bent ends of the rod act as stops, substantially as set forth.

3. In a bed the combination of a rectangular frame, a wire fabric attached thereto, a series of metal braces each attached at one end to a corner of the frame, and tension devices comprising a transverse connection located about midway between the ends of the frame, each side pair of braces being disposed on lines which intersect each other at one end of the transverse connection at a point intermediate between the center of the bed and one of the side rails, substantially as set forth.

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

JAMES B. RYAN.

Witnesses:

SAML. J. EVERITT,
SYLVESTER POPE.