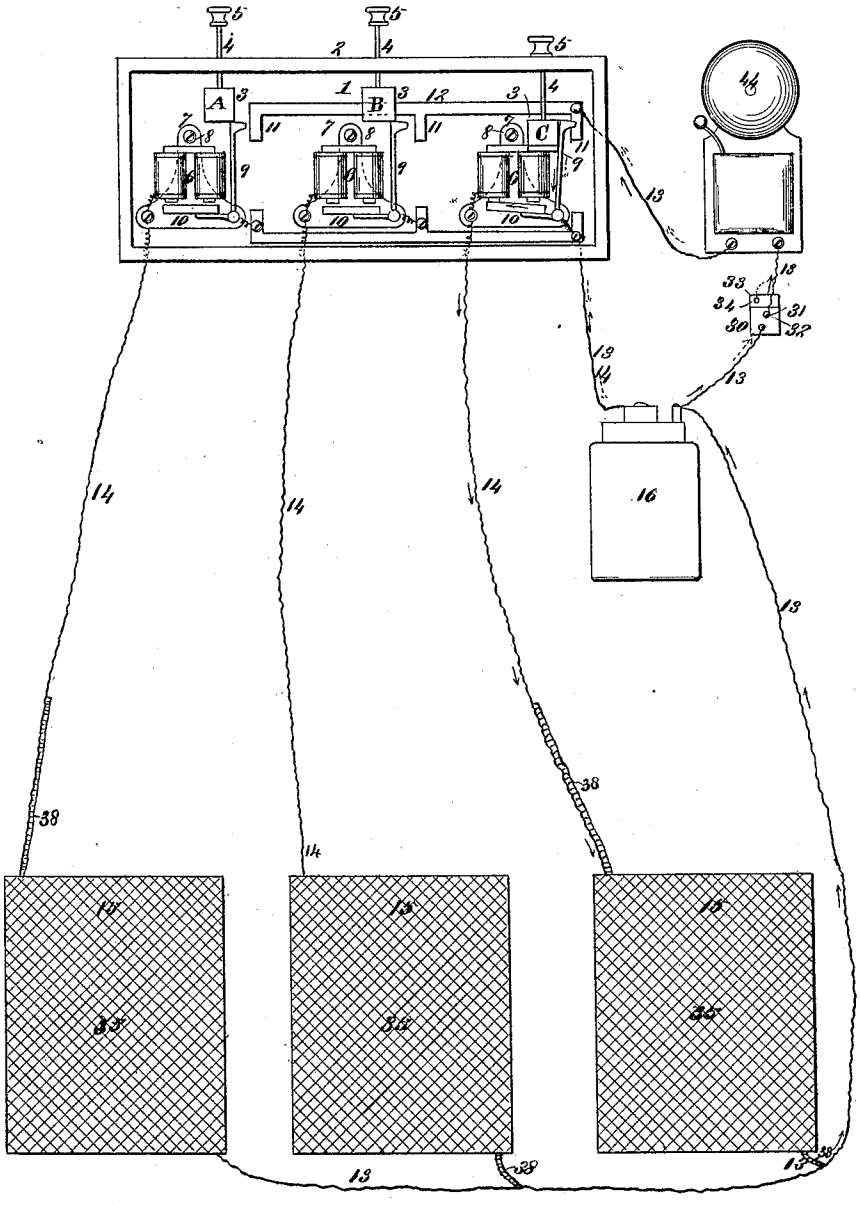
(No Model.) 2 Sheets—Sheet 1.

J. W. DAWSON.

INVISIBLE BURGLAR ALARM ELECTRIC MAT.

No. 406,709. Patented July 9, 1889.

Fig. I.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. II.

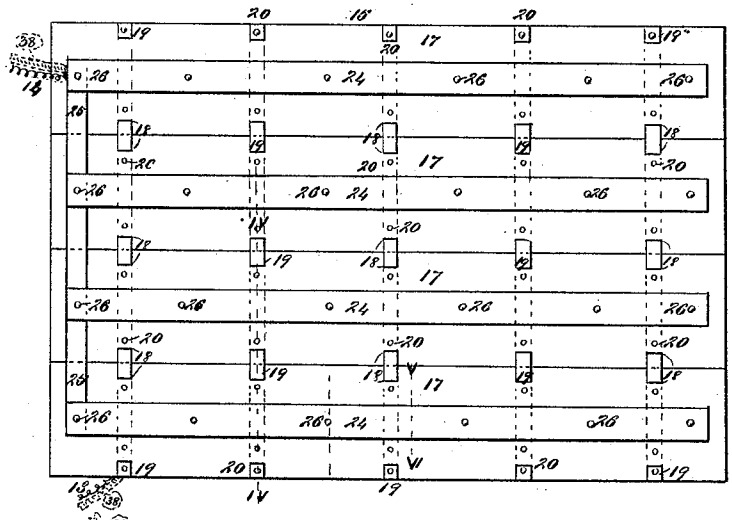


Fig. III.

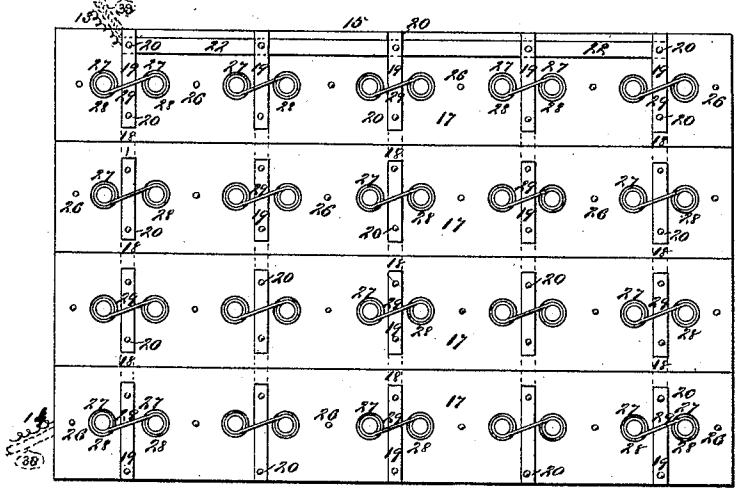


Fig. IV.

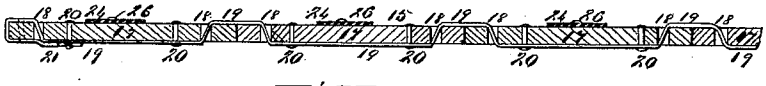


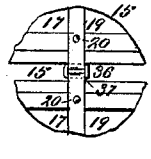
Fig. V.



Fig. VI.



Fig. VII.



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UNITED STATES PATENT OFFICE.

JAMES W. DAWSON, OF ST. LOUIS, MISSOURI.

INVISIBLE BURGLAR-ALARM ELECTRIC MAT.

SPECIFICATION forming part of Letters Patent No. 406,709, dated July 9, 1889.

Application filed April 19, 1889. Serial No. 307,637. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. DAWSON, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Invisible Burglar-Alarm Electric Mats, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to a perforated pasteboard or papier-maché sectional electric-alarm mat for insertion beneath the carpet of a room, the sections of which mat are connected by tin or other metal strips that form electric conductors, which have connections with a battery and with an alarm-bell to alarm the household, when, by the pressure of the burglar's foot, the spiral springs in the perforate chambers of said mat are compressed and their connecting-loops or coupling-wires come in contact with said metal strip and thereby close the electric circuit; and the invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a plan view and shows the mats, which may be placed beneath the carpets, adjacent to the windows and doors in different rooms, and also shows their electric connection with the battery, the annunciator, and the alarm-bell. Fig. II is a top view of the electric-alarm mat, and shows the metallic conductor-frame to which the spirals of the circuit-closing springs are secured in constant electric affinity. Fig. III is a bottom view of the electric mat, and shows the spirals of the circuit-closing springs seated in their perforate housings within the mat and their connecting loops or wires adjacent to the metallic strips with which, when the mat is pressed by the burglar's foot, they come in contact, thus closing the circuit and giving the electric alarm. Fig. IV is an enlarged detail transverse section taken on line IV IV, Fig. II, and shows the interlacing of the metal strips through the mat and the longitudinal metal bars of the circuit-connecting conductor-frame on top of said mat. Fig. V is an enlarged detail transverse section taken on line V VI, Fig. II, and shows the coupling-wires of the spiral springs sprung out from the metal interlacing strips. Fig. VI is a like view taken on the same line, and shows said coupling-wire in contact with the strips when the mat is pressed down by the burglar's foot, so that the circuit is thereby closed and the electric alarm rung; and Fig. VII is an enlarged detail of a modification, in which each double section of the mat is attached to its adjoining double section by loop-hinges that connect the metallic interlacing straps, to constitute it a folding mat.

Referring to the drawings, 1 represents the magnetic annunciator, which, with the battery, electric bell, and the positive and negative conducting-wires, may be of any suitable construction capable of coadjutary work with my burglar-alarm mat. 2 is the box-frame in which the annunciator is housed, and 3 are the announcing-tablets on which are respectively recorded the various rooms with which the burglar-alarm communicates. The same tablets are secured to rods 4, which work through perforations in the top of the annunciator-box frame, and which rods hang pendent from the hand-knobs 5, which, when said tablets are announcing, rest on top of the box-frame.

6 represents the usual electric magnets, with their positive and negative poles common to such devices, whose attachment-frames 7 are secured by screws 8 to the back of the box-frame, and 9 are pivoted brush-switches secured to the frames that carry the magnets. Connecting with the bell-crank foot of the brush-switch is the armature 10, which affiliates with the magnet when the circuit is closed, thereby throwing the brush of the switch in contact with one of the pendent arms 11, that hang from and are integral with the conducting-bar 12, which, with one section of the positive electric wires 13, connect with the electric bell 44, which being of any suitable usual construction its individual parts need not be here particularly described. 14 are the sections of the negative electric wires.

It will be seen that when the circuit is closed by means hereinafter to be described, and the armature in consequence affiliates with the magnet and the brush of the switch 9 with the arm 11 of the conducting-bar 12, one of the announcing-tablets 3, which, when the circuit is open, is seated on the top of that respective brush, falls down behind the switch until the hand-knob 5 rests on the top of the box-frame, and in that position holds the brush

of the switch against said arm 11, so that the electric current is switched around *via* the bell, which incessantly sounds the alarm, while the then pendent announcing-tablet indicates the room that the burglar has entered and trodden on the alarm tell-tale mat 15, as will be hereinafter more fully described.

16 represents the battery in which the zinc and copper or other metallic plates are inserted to take their acidulated bath and thereby generate electro-magnetic energy. The said battery, the jar in which it is inclosed, the metallic plates, and the acidulated bath that it contains, as also the positive and negative electric wires that connect with the burglar-alarm mat, the magnetic annunciator, and the electric bell, are all in electro-magnetic affiliation with my invisible tell-tale burglar-alarm mat, which I will now describe.

The body of the mat is preferably constructed of pasteboard, mill-board, or papier-maché, which, being of a soft and springy material and of thin construction, is of no detriment either to the carpet under which it is hidden or to walkers thereon throughout the daily use of the rooms. The said body of the mat is preferably constructed in longitudinal sections 17, that are each provided with a number or series of narrow slots 18. I have in Figs. II and III shown five of said series; but the number may be either increased or diminished. Interlaced through the said slots, and thus connecting the sections of the mat and constituting conductors of the electric current, as will be hereinafter more fully explained, are thin metal straps 19, which are preferably made of tin, but may be of any other suitable metal, and which straps pass transversely across and connect the sections of the mat. It will be seen that these metallic straps, being flat and thin, are unobtrusively seated closely to the mat, both above and below, to which mat they are secured by the rivets 20, and they form flexible interlacings of the parallel sections of said mat. The terminals of the straps pass around the outer marginal edges on the sides of the mat, and, folding back, their overlaps 21, as shown in Fig. IV, are secured by the aforesaid rivets 20, which are preferably of copper.

22 represents a metallic strap that runs longitudinally of the mat and connects all the series of parallel metal conducting-straps 19, so as to provide a community and continuity of conductive electric action of all said metal straps, to which straps it is severally attached by some of the aforesaid rivets 20, that also secure the straps 19 to the mat.

23 represents a metallic gate-frame, in which the series of wide longitudinally-located straps 24 and the narrow connecting transversely-located head-strap 25 are secured together and to the mat by the rivets 26.

27 represent twin perforate spiral-spring housings that pass through the mat on line with the wide metal straps 24 and on each side of the interlacing narrow metal straps 19.

28 represent twin spiral springs that individually are seated in said housings, one on each side of said narrow strap, under which strap straddles the coupling bow-wire which connects the individual spirals of the twin springs. The spirals of the twin springs, when seated in their individual housings, come in contact with the under sides of the wide metal straps 24, to which they are secured by solder or by other suitable means.

The positive and negative electric wires 13 and 14 are respectively attached to the metal cross-strap 22, that connects the series of narrow conducting metal straps 19 beneath the mat, and to the metal cross-strap 25, that connects the series of wide metal straps 24 on top of the mat.

30 represents a switch-box for tripping the electric continuity of the positive wire 13 adjacent to its attachment to the electric bell, the lower electrically-active section of which switch-box is permanently attached to said section of the wire 13. The pin 31 at the lower end of the upper division of said section of wire, when the line is in order for conveying the electric alarm, is placed in its perforate seat 32 in said boxing, making that part of the circuit complete. When, however, through the day it is desired to switch off the alarm, the pin 31, carrying the end of the wire, is transferred from its seat 32 to its trip-seat 33, to which the wire shown in broken lines points in the neutral division 34 of the switch-boxing, which neutral section is isolated to break the current.

35 represents a covering of twilled canvas or any other suitable material by which the alarm-mat is preferably covered.

In Fig. VII is shown a modification in which the double sections of the mat, or, if preferred, each single section is secured to the adjoining section or sections by the metal loop-hinges 36, in which the loop ends 37 of the corresponding metal straps 19 engage. Now it will be seen that by thus hinging together the sections of the alarm-mat the continuity of the electric current is still maintained, while at the same time folding mats are provided that are more conveniently moved from place to place; also, the junction of the sections of the mats are still more flexible than when laced together by the straps 19, as previously described, and each section in consequence is still more readily responsive under the influence of the pressure of the burglar's foot.

The operation of the device is as follows: The mats are inserted under the carpet of any or all of the rooms of the house or building, (so as to be invisible,) and are preferably located, respectively, at the threshold of doorways or adjacent to the windows, where, in either case, the burglar's feet would alight on them at his first entrance into the room. Now it will be seen that as the spirals of the twin springs are soldered or otherwise metallically secured to the metal straps 24 they have con-

stant conductive affinity therewith, and, further, *via* the cross-head connecting strap 25 with the negative sections 14 of the electric wires that connect with the magnets of the annunciator, and thus is completed the negative track of the electric circuit.

We will now follow the course of the electric current through the positive track of the circuit from the point or points at which the circuit has been closed under the pressure of the burglar's foot on the carpet above the alarm-mat.

29 represents the coupling bow-wires that connect the spirals of the twin springs, which coupling-wires in their normal position, as shown in Fig. V, maintain a projected pendent position beneath the mat, free from contact with the metallic strap 19, so that the non-contact of the coupling bow-wires of said springs, when thus projected and not subject to the pressure of a person's foot on the mat, provide an open cut-off of the electric circuit at the dividing-point between the positive and negative tracks of said circuit. The numerous springs also provide an elastic bearing for the mat that they support.

Now we will suppose the burglar entering either by the door or window through which he has broken. Of necessity he has to step on the carpet immediately above the alarm-mat, which act compresses one or more of the twin springs and their coupling bow-wire into the position shown in Fig. VI, in which position the bow-wire 29 comes in contact with the strap 19, which closes the circuit, and the electric current occupies and travels along the whole of the positive and negative tracks of said circuit. Instantaneously, on the alighting of the burglar's foot on the mat, one of the armatures 10 of the annunciator (according to the room into which the burglar has broken) is brought into affiliation with the magnet, which throws the brush of its connecting-switch in contact with the pendent arm 11 of the bar 12, to which is attached a section of the side-track circuit-wire that operates the electric bell. Now, when the said switch is thrown to side-track the electric current around *via* the bell and thus sound the alarm, the announcing-tablet, which previously has rested on the brush-head of the switch, drops down back of the switch-bar, as shown in one of the switches in Fig. I, and holds it in continuous contact with said arm 11, thus providing a continuous closure of the side-track circuit and consequent continuous sounding of the alarm. At the same time the dropped tablet of the annunciator, with the mark it carries, indicates the room which the burglar has entered.

In some of the figures a direct connection is shown of the wires to the mats, and it may be so constructed; but I prefer the improvement shown in some of the connections in Fig. I and in broken lines in Figs. II and III, in which copper coils 38, with their usual isolating-covers, are used. This form of conductor is of especial advantage, and I prefer to use them as far as the connecting media are located beneath the carpet, which may be the case as long as the conductors follow the floor-line under the carpet, after which, when ascending or descending to other floors of the building, wires may then as advantageously be used, for they are then out of contact with the carpet, and so cannot cut the same or raise it to an inconvenient uneven surface. The said wires, after they leave their horizontal course, may be located up stairways or between partitions, &c.

It will be seen that there are certain peculiarities in the formation, location, and action of my combined twin spiral and connecting bow-wire springs that add to their reliability, durability, and ease of their closure movement, as will be now explained.

The springs, it will be seen, project and operate beneath the mat, instead of on top, which has many advantages, as follows: first, the minimum of friction in the flexion of the springs, the twin spirals contracting and expanding within their housings, and the bow-wire, which is a combined element of the spring, both working freely on the smooth floor, on which it rests, and also expanding apart the respective positions of the individual spirals to obtain its own longitudinal expansion as it straightens out to effect its contact with the metallic strips 19, and thus close the circuit; second, the spring projecting beneath the mat, instead of above, obviates the difficulties and inconveniences that would otherwise arise from the frequent and uneven elevations of the surface of the carpet, for the mat presents only its smooth surface in contact with said carpet; third, the saving in wear and tear of the carpet, as the springs, not projecting above the mat, exercise no friction in their flexible movements on the carpet; fourth, the saving to the integrity, flexibility, and durability of the springs themselves, which, not projecting above the mat, are not directly and individually tramped on by the burglar's foot, but, as the mat supervenes, it makes a number of springs co-operative workers and co-operative bearers of the pressure; fifth, the more effectual invisibility of the mat, there being no projected irregularities on the surface of the carpet from the springs that might attract the attention of wary burglars, who may know of and be on the outlook for devices that might alarm the household, and, sixth, the springs, being below the mat, are operated whether the burglar steps over a spring or not, the pressure being diffused over an area that covers a number of springs, and, also, in consequence, even if the burglar is posted in such alarm devices, he cannot pick his way without the tell-tale alarm sounding, as he could were the springs to project upward from the mat and cause inequalities in the surface of the carpet, between which the burglar could step.

The twin spiral springs, working within

their housings and connected and coadjutary with the bow-wire spring that couples them, are a brace-support to each other and avoid the adverse leverage encountered by any kind of strap-spring that has but a single attachment at one end.

My alarm-mat is preferably constructed with springs that will sustain a pressure of thirty-five pounds without effecting the closure of the circuit and the consequent alarm. It will thus be seen that cats or even house-dogs of ordinary weight can walk over the mat without causing an alarm, whereas burglars, none of whom we have on record as of so light a weight as thirty-five pounds, cannot help but give the alarm when the pressure of their feet comes upon the mat.

After the alarm has been given, and also attention given to the burglars, then the announcing-tablet may be raised by the hand-knob 5, and the switch is thus released from its enforced closure of the side-track electric-bell circuit, and, falling open, its brush-head again supports the tablet, for the armature also is no longer held to its magnet, the major circuit being also cut by the removal of the pressure of the burglar's feet from the mat. The mats are thus reset, ready for the next burglar, if one happens along. Now, as the mats still remain in their position throughout the day as well as night, and may frequently be walked on by residents of the household, I have provided a convenient means for cutting the circuit, so that the alarm may not be sounded throughout the day, when it is not required. For this purpose I provide a switch-box 30, which trips the electric continuity of the positive wire 13, as and by the means hereinabove described. Again, it may be stated that the chief reason for the use of pasteboard or mill-board or other like material for the body of the mat is that it can be constructed out of much thinner material than when made of wood or other like material, so as not to materially raise the carpet; also, it will not split and warp, as wood very frequently does. It is also of a much softer nature than wood, and, while it more freely gives and takes under the pressure of the burglar's foot, and so more freely operates the springs and effects the alarm, it very readily returns to its normal position on the withdrawal of the pressure.

The narrow-strip sectional construction of the mat, with its interlaced sheet-metal and hinged connections, also adds to its flexibility, and the hinges provide the means for folding the mat for removal, &c.

As previously stated, the alarm-mats are preferably placed beneath the carpet, so as to be invisible. I should also state that they are preferably placed above the usual paper lining that underlies the carpet, which paper constitutes a good non-conductor between the mat and the floor, and the bow-wires of the spiral springs work readily upon it.

I claim as my invention—

1. In a burglar-alarm mat, &c., the combination of the series of compartments of the sectional mat constructed of pasteboard or paper fabric, the sheet-metal interlacing straps 19, that flexibly connect said sections, the connecting-strap 22, the straps 24 and 25, secured on top of the mat, the positive and negative conductors 13, 14, and 38, that connect with the straps 22 and 25, the sections of said mat being provided with the spiral-spring housings 27, the twin spiral springs that are seated in said housings and are metallically secured in electric contact to the straps 24, and the bow-wires 29, that couple the twin spirals together, and which bow-wires come into electric contact with the straps 19 when the burglar steps on the mat and closes the circuit, all adapted to form part of a closed-circuit line, substantially as described, and for the purpose set forth.

2. In a burglar-alarm mat, the combination of the series of compartments, of the sectional mat, provided with perforate housings for spiral springs, the sheet-metal interlacing straps 19, their connecting-strap 22, the straps 24 and 25, the twin spiral springs 28, the coupling bow-wire 29, that couples said springs, the copper-foil conductors 38, the electric positive and negative wires 13 and 14, the battery 16, the annunciator 1, and the electric bell 44, substantially as described, and for the purpose set forth.

3. In a burglar-alarm mat, &c., the combination of the perforated compartments of a sectional mat composed of pasteboard or paper fabric, the interlacing sheet-metal strips 19, the strap 22, the straps 24 and 25, the twin spiral springs 28, the bow-wires 29, that couple said springs, the loop-hinges 36, that connect sections of said mat to enable it to fold, the copper-foil conductors 38, the positive and negative conductors 13 and 14, the annunciator 1, having announcing-tablets 3, the magnets 6, the armature 10, the pivoted brush-switches 9, the conducting-bar 12 and its pendent arm 11, with which the brush of said switch affiliates when the circuit is closed, the electric bell 44, with which the side switch of the electric current connects, and the battery 16, substantially as described, and for the purpose set forth.

4. In a burglar-alarm mat, &c., the combination of the perforated compartments of the sectional mat of pasteboard or paper fabric, the interlacing sheet-metal straps 19, the straps 22, 24, and 25, the twin spiral springs 28, their bow-wire coupling 29, the annunciator 1, the battery 16, the electric bell 44, the switch-box 30, for breaking the current, and the circuit making and breaking devices that electro-magnetically connect the parts, substantially as described, and for the purpose set forth.

5. In a burglar-alarm mat, &c., the combi-

nation of the compartments of the sectional electric alarm-mat provided with the spiral-spring housings 27, the sheet-metal interlacing straps, the straps 22, 24, and 25, the twin spiral springs 28, the bow-wires that couple said springs, the fabric cover that surmounts said mat, the battery, the electric bell, the annunciator with its recording-tablets, magnets, brush-switch, and conducting-bar 12, and the copper-foil and wire conductors that connect said parts, substantially as and for the purpose set forth.

JAMES W. DAWSON.

In presence of—
BENJN. A. KNIGHT,
EDW. S. KNIGHT.