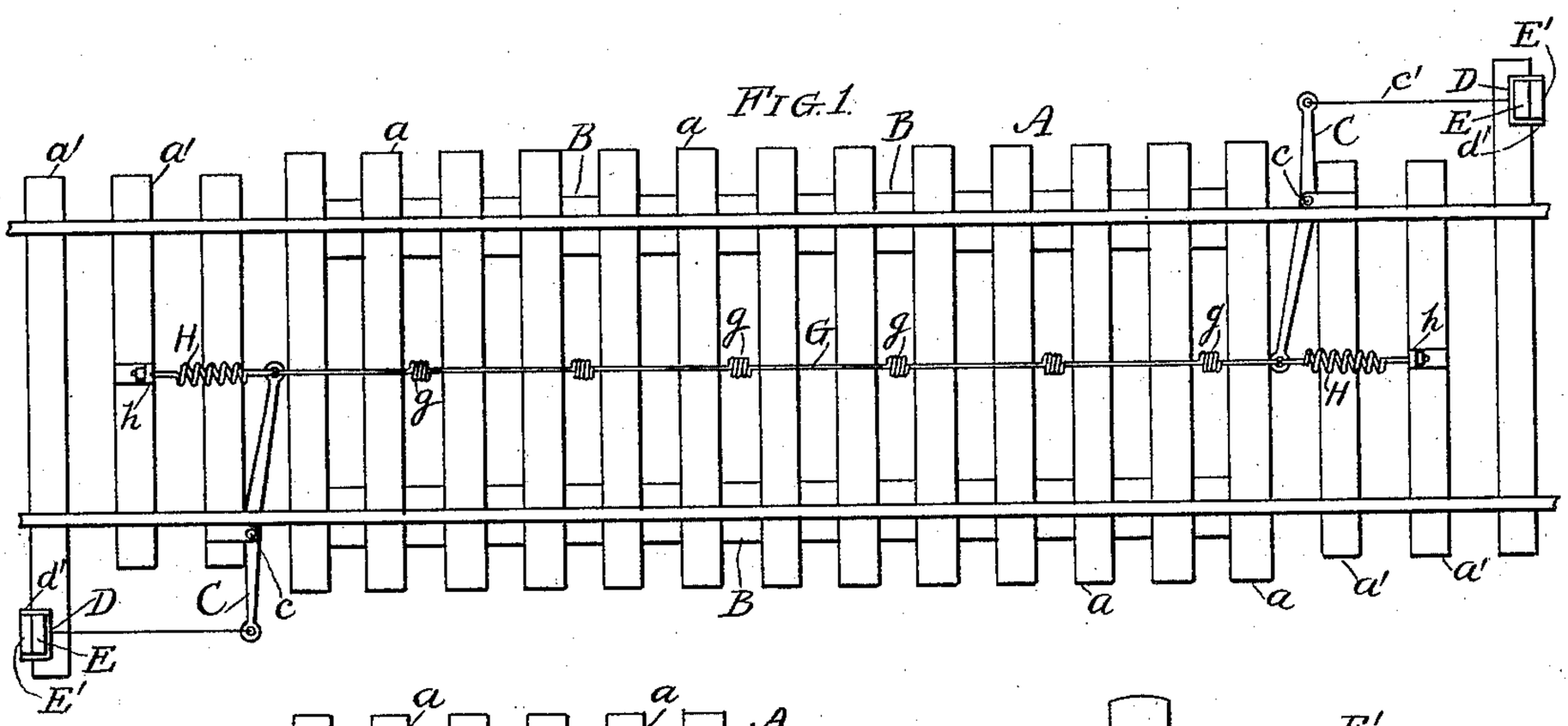
(No Model.)

# J. W. STEELE.

## DANGER SIGNAL FOR RAILWAY BRIDGES.

No. 401,799. Patented Apr. 23, 1889.

FIG. 1.



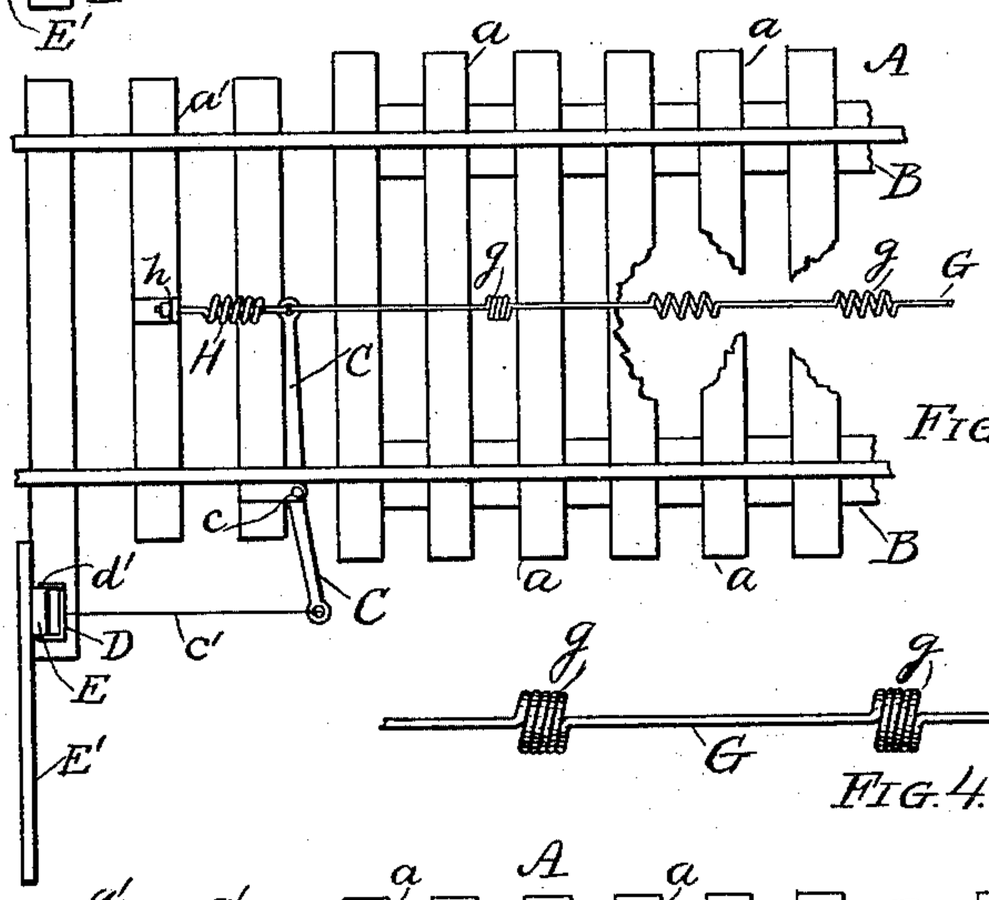




FIG. 2.

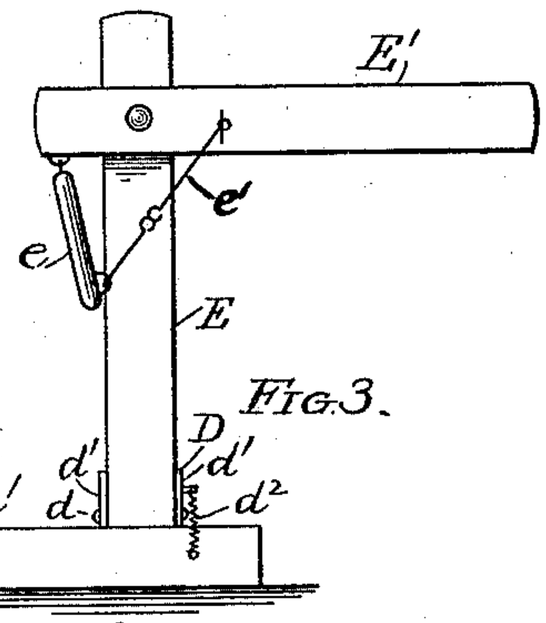



FIG. 3.




FIG. 4.

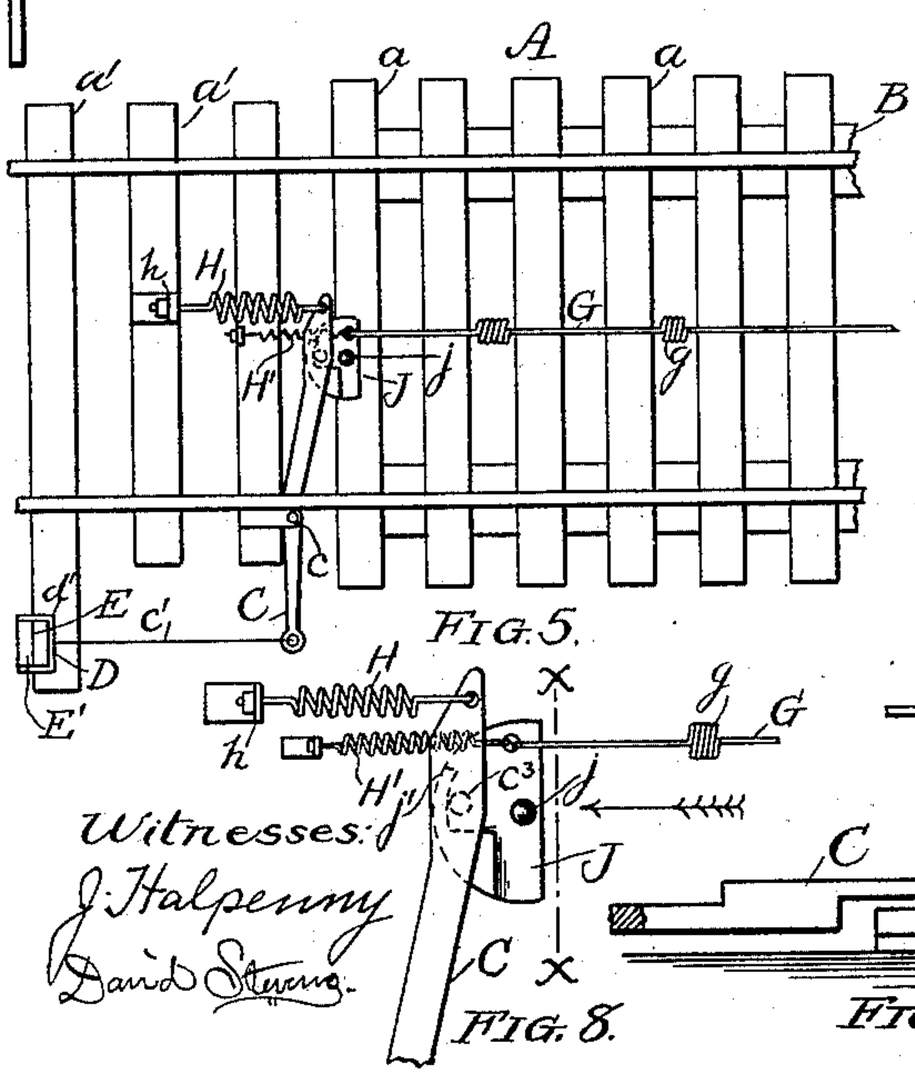



FIG. 5.

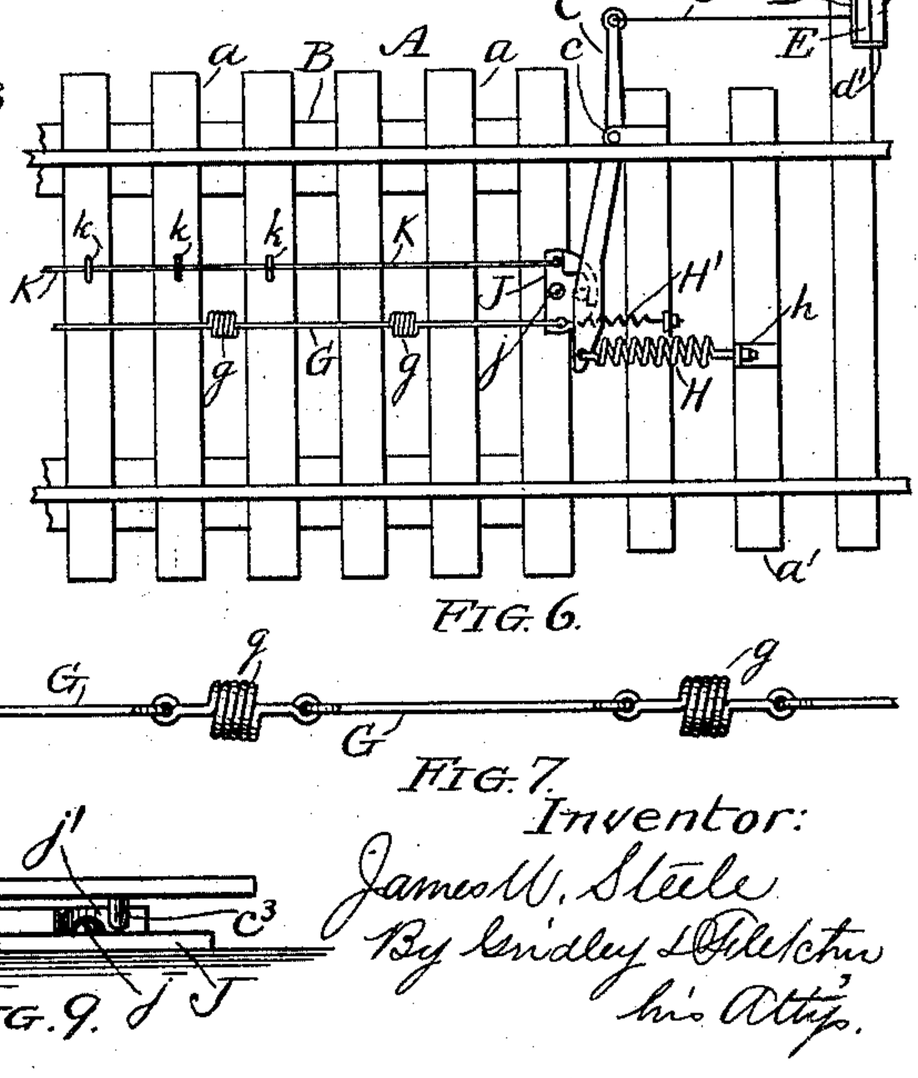



FIG. 6.




FIG. 8.




FIG. 9.

FIG. 7.

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# UNITED STATES PATENT OFFICE.

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## DANGER-SIGNAL FOR RAILWAY-BRIDGES.

SPECIFICATION forming part of Letters Patent No. 401,799, dated April 23, 1889.

Application filed December 14, 1888. Serial No. 293,599. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES W. STEELE, of Topeka, in the county of Shawnee and State of Kansas, have invented certain new and useful Improvements in Danger-Signals for Railway-Bridges, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a plan view of a railway-bridge, showing my improvements applied thereto. Fig. 2 is a like view of a portion of a bridge, partly burned away, showing the mode of operation of said invention. Fig. 3 is a face view, in detail, of a semaphore as the same appears when displayed. Fig. 4 is an enlarged detail view of a section of the bent or coiled wire employed for retaining the semaphores in a normal position. Fig. 5 is a plan view of a portion of a bridge, showing a modification of said invention. Fig. 6 is a like view showing a still further modification. Fig. 7 is a detail view of a portion of a jointed and coiled wire, showing a modification of said invention. Fig. 8 is an enlarged detailed view, in plan, of the mechanism for actuating the signals; and Fig. 9 is a sectional view of the same upon the line *x x*, Fig. 8, viewed in the direction of the arrow there shown.

Like letters of reference in the different figures indicate like parts.

The object of my invention is to provide a cheap and reliable means for actuating danger-signals for railway-bridges in the event of the burning of the bridge or the movement or destruction of the same by flood.

To this end my invention consists, primarily, in connecting, under tension, with the bridge and with suitable signals a wire, rod, or strip of spring metal, having bends, crimps, or coils therein, whereby the annealing of said wire, strip, or rod by heat will permit it to stretch, and thus release the signals. Moreover, it is my purpose to so connect said crimped or coiled wire with a tripping mechanism and a rigid wire or rod that the falling of the bridge or its movement down stream by flood will operate the trigger and display a signal, all of which is hereinafter more fully described and specifically claimed.

A in the drawings represents an ordinary railway-bridge, of which *a* are the ties, and B the stringers upon which they are supported. The ties upon the railway-track approaching the bridge and at the respective ends thereof are indicated by *a'*. Attached by means of a hinge-joint at or near the ends of ties *a' a'*, at the respective ends and upon opposite sides of the bridge—as, for example, at *c c*—are levers C C, one end of which is attached, by means of a rod, *c'*, to a clasp, D, hinged at *d*, Fig. 3, to a post, E, rigidly secured to or adjacent to one of the ties *a'* at any desired distance from the bridge, and to the top of which is loosely hinged an arm, E', having a weight, *e*, Fig. 3, loosely attached to its short end, which is in turn connected with the opposite side of the pivotal point by means of a link, *e'*, so that when the arm is released it will assume a horizontal position, as represented in said figure. When in its normal position, the arm E' is arranged vertically in alignment with the post, as in Fig. 1, where it is retained by means of flanges *d' d'*, upon the clasp D, which is retained in position to clasp the lower end of the arm E' by means of a spring, $d^2$, Fig. 3.

The inner ends of the levers C C are connected by means of a wire, rod, or strip, G, of metal—such as rolled brass, iron, or steel—having one or more, but preferably a series, of crimps or coils, *g*, therein, said metal being possessed of sufficient hardness or temper to impart a resilient quality thereto, so that said coils or crimps may serve to resist a tensional strain thereon. Attached, also, to the inner ends of said levers, respectively, are spring-coils H H, which are in turn attached to rigid fastenings *h h* upon the ties *a'*. Said coils H are made weaker than the coils *g*, and are stretched sufficiently by the latter to enable the levers C to assume the positions shown in Fig. 1, so that the clasps D are in normal engagement with the arms E'. In the event of a fire one or more of the coils *g* are heated sufficiently to anneal the metal, whereupon it expands by virtue of the pressure of the springs H H, which actuates the levers C C and in turn releases the semaphores. In Fig. 2 the ties are represented as being burned away and the coils *g* expanded, while the coil H, lever C, clasp D, and arm E' of the sema-

phore are shown to be in an abnormal position.

In practice I prefer to use a wire, and to coil it, instead of abruptly bending or crimping it; and while I do not wish to confine myself to any particular metal or combination of metals, I would recommend hard-drawn brass as being the most desirable, in that it will not rust from exposure and is more readily annealed by heat than hard-drawn iron or steel wire.

While the wire G and coils H H may be directly connected, so that the former is retained under tension by the latter, yet I prefer to interpose a tripping mechanism to receive the strain of the springs H H, and thus only permit them to act upon the wire G in case of fire. Such modifications are shown in Figs. 5, 6, 8, and 9. In each of said figures J represents a semicircular plate loosely pivoted to the tie at *j*. The wire G is attached to said plate, as shown, and also a secondary wire, H′, which is attached in turn to the tie, and is under tension. Upon said plate is an upturned curved flange, *j′*, Fig. 9, indicated in dotted lines in Fig. 8. A stud, $c^3$, Fig. 9, serves to engage with said flange, and thus the wire G is relieved from the strain of the coil H. As soon as the coils *g* are weakened by heat the spring H′, which may be made comparatively weak, revolves the plate J and releases the stud $c^3$ from its engagement with the flange *j′*, when the spring H is free to act and operate the signal. This construction enables the spring H to be made much stronger, and to that extent it is more positive in its action. It also enables the wire G to be made smaller, and hence more sensitive.

In Fig. 6 I have shown a still further modification, which is designed to operate the signals either in case of fire or the falling or carrying away of the bridge by flood.

Upon the opposite ends of the plates J from those to which the wire G is attached I connect a straight taut wire, K, which is secured, by means of staples *k* or otherwise, to the ties *a*. In case the bridge is undermined by flood and falls, or the middle is carried down the stream, the wire K is drawn with it and acts upon the plate J, the wire G, by reason of the coils, yielding in like proportion. The plates J are thus revolved and the triggers released.

Having thus described my invention, I claim—

1. The combination, with a railway-bridge and danger-signal, of a coiled, crimped, or bent wire, rod, or strip for holding said signal in a normal position, said wire, rod, or strip being composed of a material capable of being annealed by heat, substantially as shown and described.

2. The combination, with a railway-bridge and the tripping mechanism of a danger-signal, of a tempered metallic wire, rod, or strip having a series of coils, bends, or crimps therein, whereby the heat caused by the burning of the bridge will permit said wire to stretch and release the signal, substantially as shown and described.

3. The combination, with a railway-bridge, of a semaphore, means—such as the spring H—in operative connection with said semaphore for unlocking and releasing it, and a tempered wire, rod, or strip having coils, crimps, or bends therein and attached to said bridge and spring, respectively, for normally holding the latter in an expanded position, substantially as shown and described.

4. The combination, with a railway-bridge, of a semaphore, means—such as a spring—in operative connection with said semaphore for unlocking it, a tripping mechanism for normally holding said spring in an expanded position, a tempered wire, rod, or strip having a series of bends, coils, or crimps therein, attached to said tripping mechanism and to the bridge, respectively, and a secondary spring attached to said tripper for actuating the same upon the annealing of the coils, crimps, or bends in said rod, substantially as shown and described.

5. The combination, with a railway-bridge, of a semaphore, a spring in operative connection with said semaphore for unlocking it, a pivoted tripping device—such as the plate J—for normally holding said spring in an expanded position, wires, rods, or strips K G, attached to said tripping device upon opposite sides of its pivotal point, the former being straight and the latter provided with coils, crimps, or bends *g*, substantially as shown and described.

6. The combination, with a railway-bridge, of a semaphore arranged at a distance therefrom, a tripper for locking it in a normal position, lever C and spring H, for operating said tripper, pivoted plate J, stud $c^3$, flange *j′*, and wires K G, the latter having a series of coils therein, whereby the burning or carrying away of the bridge may permit the plate J to rotate and thus actuate the signal, substantially as shown and described.

In testimony whereof I have signed this specification, in the presence of two subscribing witnesses, this 2d day of November, 1888.

JAMES W. STEELE.

Witnesses:
D. H. FLETCHER,
J. B. HALPENNY.