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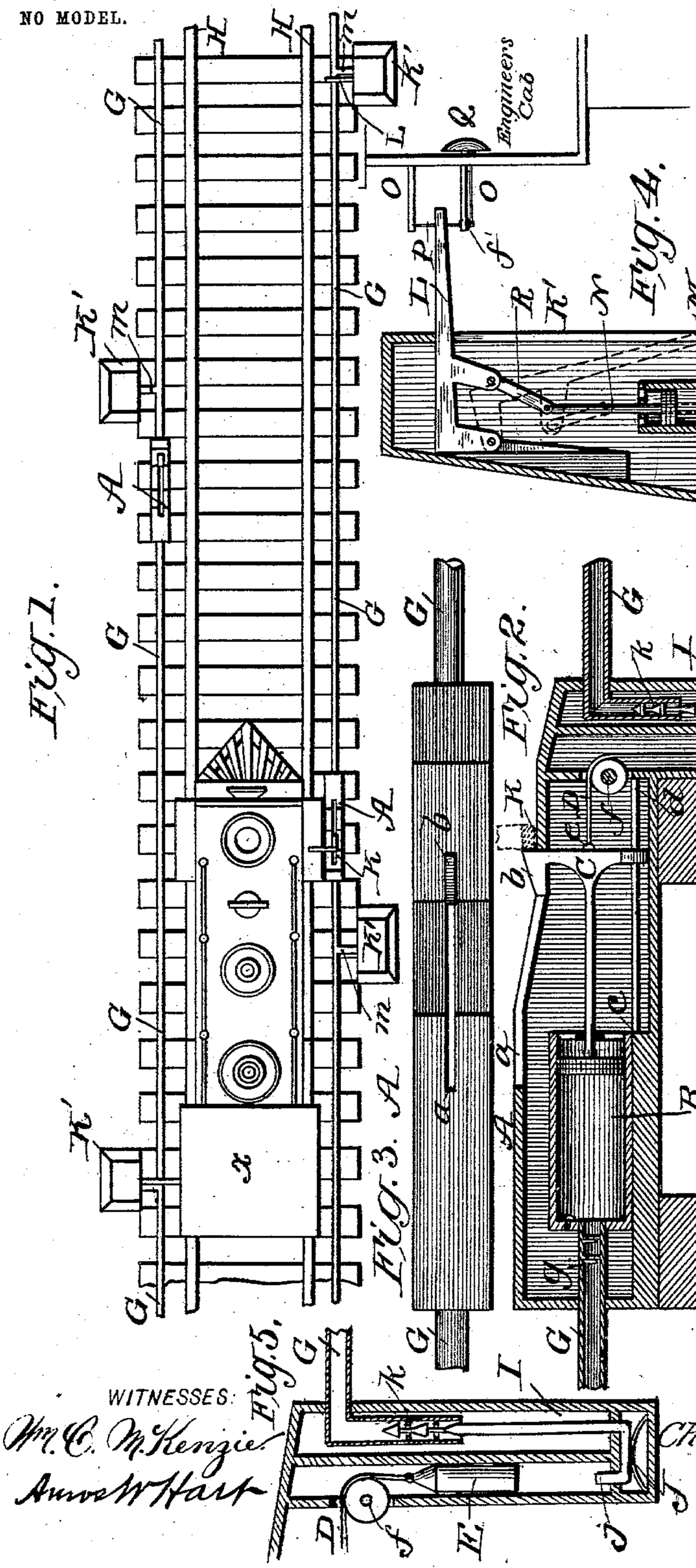
C. D. KING.

AUTOMATIC LOCOMOTIVE ALARM.

APPLICATION FILED JUNE 19, 1902.

NO MODEL.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC LOCOMOTIVE-ALARM.

SPECIFICATION forming part of Letters Patent No. 751,926, dated February 9, 1904.

Application filed June 19, 1902. Serial No. 112,370. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. KING, a citizen of the United States, residing at Olympia, in the county of Thurston, State of Washington, have invented a new and useful Automatic Locomotive-Alarm, for the purpose of preventing collisions on railroads between locomotives being operated upon the same track, of which the following is a specification.

My invention consists of a specially-contrived automatic mechanism for the purpose of sounding an alarm upon locomotives when two locomotives are approaching each other from opposite directions upon the same track. This result is attained by means of a spring-gong placed in the cab of the locomotive, to the stop-pin of which is attached a strong cord conveyed through the side of the cab and stretched across the intervening space between two horizontal bars projecting from the side of the cab one above the other in such a manner that when this cord comes in contact with an arm attached to a tower placed by the side of the railroad-track it will withdraw the stop-pin and allow the gong to sound, this arm in the tower being raised and held in place by means of pneumatic pressure created by the opposite approaching locomotive and the mechanism illustrated in the accompanying drawings, in which like characters represent the same parts in all of the views.

Figure 1 is a diagrammatic plan view illustrating the arrangement of the main parts of my alarm apparatus in connection with a railway-track and locomotive. Fig. 2 is a vertical longitudinal section of an air-pump and connected mechanism. Fig. 3 is a plan view of the same. Fig. 4 is a vertical section of one of the towers with pneumatic lifting device located therein. Fig. 5 is a vertical section illustrating the operation of air-release valves. Fig. 6 is a plan view of a trip device.

Fig. 3 represents a stout long narrow metal or wooden or partly metal and partly wooden box A, containing a large air-pump B, to the end of the piston-rod of which is attached a strong cross-head C, which extends above the top of the box A through the long narrow opening *a*. A strong metal rod extends from the raised portion of the floor of the box at *c* to the other end of the box at *d*, passing through the lower projection of the cross-head C in such a manner that the cross-head works upon it, thus giving greater stability to the piston-rod. D is a strong cord attached to the cross-head at the point *e*, passing thence over the pulley *f*, and is attached to the weight E. F is a pit in which the weight E ascends and descends in the working of the machine and in which is inclosed the device shown in Fig. 2 for opening the valves to release the compressed air after the passage of the locomotive, as will be more fully explained hereinafter. G is a metallic pipe connected with the air-pump B and fitted at the point *g* with air-tight valves opening in the direction opposite to the air-pump in such a manner as to prevent the air from returning from the pipe to the air-pump. This pipe G extends from the cylinder of the air-pump in Fig. 1 along and parallel to the rails of the railroad-track and connects, by means of lateral pipes, with the cylinders placed in the several towers and with the escape device of a second box A with contained air-pump placed at a distance along the railroad-track, as will be more fully shown and explained hereinafter. H represents rails resting in place upon the ties for the purpose of showing the relative position the box A will occupy to the railroad-track.

As shown in Fig. 2, I is a metal rod bent at its lower end at right angles in such a manner that there is a short projection parallel with the main rod. This rod is so placed in the walls of the pit F that the short projection passes up through the floor at the point *j*. Under the bottom of this rod is placed a spring J in such a manner that it will force the rod upward when the weight E is removed from the floor of the pit and drive its tapering point into the mouth of the pipe G, opening the valves at the point *k*, (see Fig. 5,) thus permitting the compressed air in the pipe G to escape whenever the weight E is removed from the floor of the pit and permitting the valves to close when the weight returns to its resting-place.

As indicated in Fig. 1, a hinged bar K is attached to the right-hand side of the locomotive just forward of the cylinder or at some

other convenient place at such a height that it will slide across the top of the box A, Fig. 2, but will strike the projecting upper extremity of the cross-head C. This bar K is so hinged that the bar may be bent upward, but not downward. In Fig. 6 is shown a spring V, that bears upon said bar and is intended to hold the outer extremity of the bar steady. This bar extends just far enough beyond the rail to come in contact with the cross-head C aforesaid.

K′ is a wooden or metal tower of about such height that its top will be from twelve to eighteen inches above the lower portion of the cab-windows of a passing locomotive. It is from twelve to eighteen inches square at the base and from six to ten inches square at the summit and is fitted with the following-described mechanism.

L is an arm attached to the back inner wall or wall opposite from the railroad-track by means of a hinge, as shown in the drawings. This arm is capable of being raised to a horizontal position, as shown in Fig. 4, or lowered to the position indicated by the dotted lines.

M is a cylinder connected by a lateral pipe with the main pipe G at the point *m*. The cylinder M is fitted with an air-tight piston having a rod N. This piston-rod is connected by a short link R with the arm L in such a manner that when the compressed air from the air-pump B in the box A is forced into the cylinder M under the piston it presses the piston upward, carrying the arm from the position indicated by the dotted lines to a horizontal position.

From the left side of a locomotive-cab X (see Figs. 1 and 4) project two parallel horizontal arms O. A strong cord P, attached to the upper bar at a point near its extremity, is stretched across the intervening space between the two bars over the pulley in the lower bar, thence inward along the lower side of the lower bar and through the wall of the cab, and is there attached to the stop-pin of a spring-gong, so that when the pin is withdrawn it will release the hammer and ring the gong Q.

Manner of placing.—For the purpose of equipping a railroad with a full system of automatic alarms four independent sets of the mechanism hereinbefore described will be required, two independent sets upon each side of the track, the sets upon one side working or progressing in one direction and those upon the other working or progressing in the other as follows: Beginning at one end of a section of railroad to be provided with alarms, (the east end, for instance, of a section of railroad extending east and west,) a box A, Fig. 1, will be placed by the right-hand side of the track looking westward with the end from which the pipe G proceeds to the west at a distance of anywhere from twelve to twenty-four inches from the rail resting upon and securely fastened to the ties. At a given distance westward from this box—say one-half mile or such other distance as may be taken as a unit—a tower K′ will be placed upon the same side of the track and so situated with reference to the track that when the arm L is extended in a horizontal position it will point directly across the track and reach to a point a short distance within the bars O O, Fig. 4, attached to and extending from a passing locomotive-cab, and easily come in contact with the cord P between said bars, as shown in the drawings. The cylinder M in the tower will be connected with the pipe G, extending from the air-pump B of this box. In the intervening space between this tower and the distance of one mile westward from this box there will be placed two or more towers, occupying the same relative position to the track as does the first and with their cylinders connected by lateral pipes to the main pipe in all things similar to the first tower. At the distance of one mile westward from the above-specified box, which may be referred to as box I, is placed another box, which may be referred to as box II, this box to occupy the same relative position to the track as does box I. The pipe G, connecting with the air-pump B in box I, extends along the side of the rails of the track and after connecting by lateral pipes with the cylinders of the several towers, as above described, connects with the escape device in the pit F of box II. From the air-pump B in box II a pipe will extend on westward in like manner and be connected with towers and the escape device of another box in the same way that the pipe connects boxes I and II and the intervening towers, and so on to the full extent of the section of railroad to be equipped, forming one continuous series.

It will be observed that the towers above referred to only occupy each alternate half-mile of the railroad-track on one side. In order to make the equipment continuous, at the distance of one-half mile westward from box I of this series or at the point where the first tower of this series is placed a box I of a second series is placed in all respects in the same manner as is box I of the first series and is connected with towers and a box II of the second series in the same manner as are boxes I and II of the first series, the towers of the second series occupying the intervening half-mile spaces left vacant in placing the towers of the first series, this second series to be continued in like manner as the first to the full extent of the railroad to be equipped, the towers of the two series occupying alternate half-mile sections of the road.

Boxes A and towers are to be placed upon the opposite side of the railroad-track, occupying the same relative positions, and in first and second series in all things the same as those above described except that they progress in the opposite direction—that is, in

the above-supposed case the end of the box A, from which the pipe proceeds, would be placed toward the east instead of toward the west.

Manner of operating.—The boxes A and towers being in place, as above described, on each side of a section of railroad, as we have above supposed, extending east and west a locomotive moving westward, having a hinge-bar K, attached as hereinbefore described, upon passing box I upon the right-hand side of the track this hinge-bar would come in contact with that portion of the cross-head C, Fig. 1, which extends above the box A at the point *b* and carry it forward toward the point *a*, at which point by reason of the sloping or raised surface of the box it would be raised over the top of the cross-head and pass on. By this operation the piston of the air-pump B would be driven forward, forcing the air in the pump into the pipe G, in which it is retained by reason of the air-tight valves at the points *g* and *k k*. The result of this additional pressure is that the pistons fitted in the cylinders of each of the towers K′, Fig. 4, are instantly forced upward, raising the attached arms to a horizontal position and holding them there till the air in the pipe is released. As the hinge-bar attached to the locomotive strikes the cross-head of each box and moves the piston-rod forward and raises the weight E from the floor of the pit F it releases the rod I, which being forced upward by means of the spring J into the mouth of the pipe G, raising the valves *k*, Fig. 2, permitting the compressed air in the pipe to the rearward of the locomotive to escape, when the weight of the arm L in the several towers connected with this pipe will force the pistons no longer being held by the pressure from below down into the cylinders, and thus allowing these arms to return to the position occupied by the dotted lines, Fig. 4. At the point *a* the spring-bar will be raised over the top of the cross-head C, as above shown, allowing the piston to be drawn back to its original position by means of the cord D and the weight E. In case of two locomotives approaching each other from opposite directions upon the same track each by means of its hinge-bar striking the cross-heads of the boxes A upon its right-hand side will keep the arms in the several towers upon that side for at least one-half mile (or such other distance as may be taken as a unit) immediately in its front raised to a horizontal position. The cord P (represented in Fig. 4) upon each locomotive upon coming within this range will come in contact with the first arm, withdrawing the stop-pin of the gong in each and allowing them to sound at the same moment, thus warning the engineer of each locomotive of the presence of the other.

I claim as my invention and desire to receive Letters Patent upon the following:

1. An automatic railway signaling apparatus comprising an air-pump arranged alongside the track, the piston thereof having a rod provided with a projection adapted for contact with a device attached to a locomotive, an air-cylinder with piston and a vertical support for said cylinder, a pivoted arm connected with the rod of said piston and adapted to be thrown up so as to trip an alarm on the locomotive, an air-pipe extending along the track and having branches extending to the said air-pump and cylinder, check-valves arranged in one of the terminals of said air-pipe, a vertically-movable device adapted to raise and thereby open such valves, means for supporting said device and means connected with the piston of the aforesaid air-pump for holding the valve-lifting device normally depressed, substantially as described.

2. An automatic railway signaling apparatus comprising an air-pump arranged alongside the track, the piston thereof having a rod provided with a projection adapted for contact with a device attached to a locomotive, an air-cylinder with piston located at a point removed from said air-pump and a vertical support therefor, a pivoted arm connected with the rod of said piston and adapted to be thrown up so as to trip an alarm on the locomotive, an air-pipe extending along the track and having branches connecting with the said air pump and cylinder, check-valves arranged in a vertical terminal of said air-pipe, a bent rod working in suitable guides and one end thereof arranged for contact with the said check-valves, a spring normally supporting the rod, and a vertically-slidable weight connected with the piston of the air-pump and adapted to rest upon one arm of the bent rod, whereby when the piston of the air-pump is retracted the weight depresses the said rod and this leaves the check-valve seated so as to maintain pressure in the air-pipe as and for the purpose specified.

3. In an automatic railway signaling apparatus the combination with an air-pipe extending along the track and a vertically-movable device adapted to be operated by air-pressure for tripping an alarm on the locomotive, of an air-pump connected with said pipe, a box arranged for connection with said pump and having an inclined top portion as described, the piston of said air-pump having a portion which projects above the box at the lower portion of the incline and passes within the box upon reaching the railway portion of the incline when operated by a projecting device on a locomotive substantially as shown and described.

4. In an automatic railway signaling apparatus of the class described the combination with an air-pipe extending along the track, an air-cylinder located at a point adjacent to the track and connected with said pipe, a vertically-movable device operatively connected with the piston of said cylinder, vertically-

movable check-valves located in the vertical terminal of the air-pipe, a bent rod adapted to engage the valves, a spring supporting the same, a slotted box having an incline on its upper side and an air-pump arranged within it and its piston provided with a portion adapted to traverse said slot and to project from the lower portion only thereof, a vertically-slidable weight and a cord connecting it with the piston-rod, the weight resting normally upon the rod when the piston is retracted whereby the valves are left seated as and for the purpose specified.

5. In an automatic railway signaling apparatus the combination with a valved air-pipe and an air-pump having a piston adapted to be operated by a device attached to a locomotive, of an air-cylinder and piston working therein and located at a point removed from the said air-pump, a vertical tower having a vertical guide-slot, and an arm pivoted within the tower and adapted to swing vertically in the aforesaid slot, a piston working in the said cylinder and connected with said arm, whereby the latter may be thrown up and held in vertical position for tripping an alarm on another locomotive substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two witnesses.

CHAS. D. KING.

Witnesses:
MARY H. OWINGS,
FRANK C. OWINGS,