F. K. HOOVER & A. J. MASON.

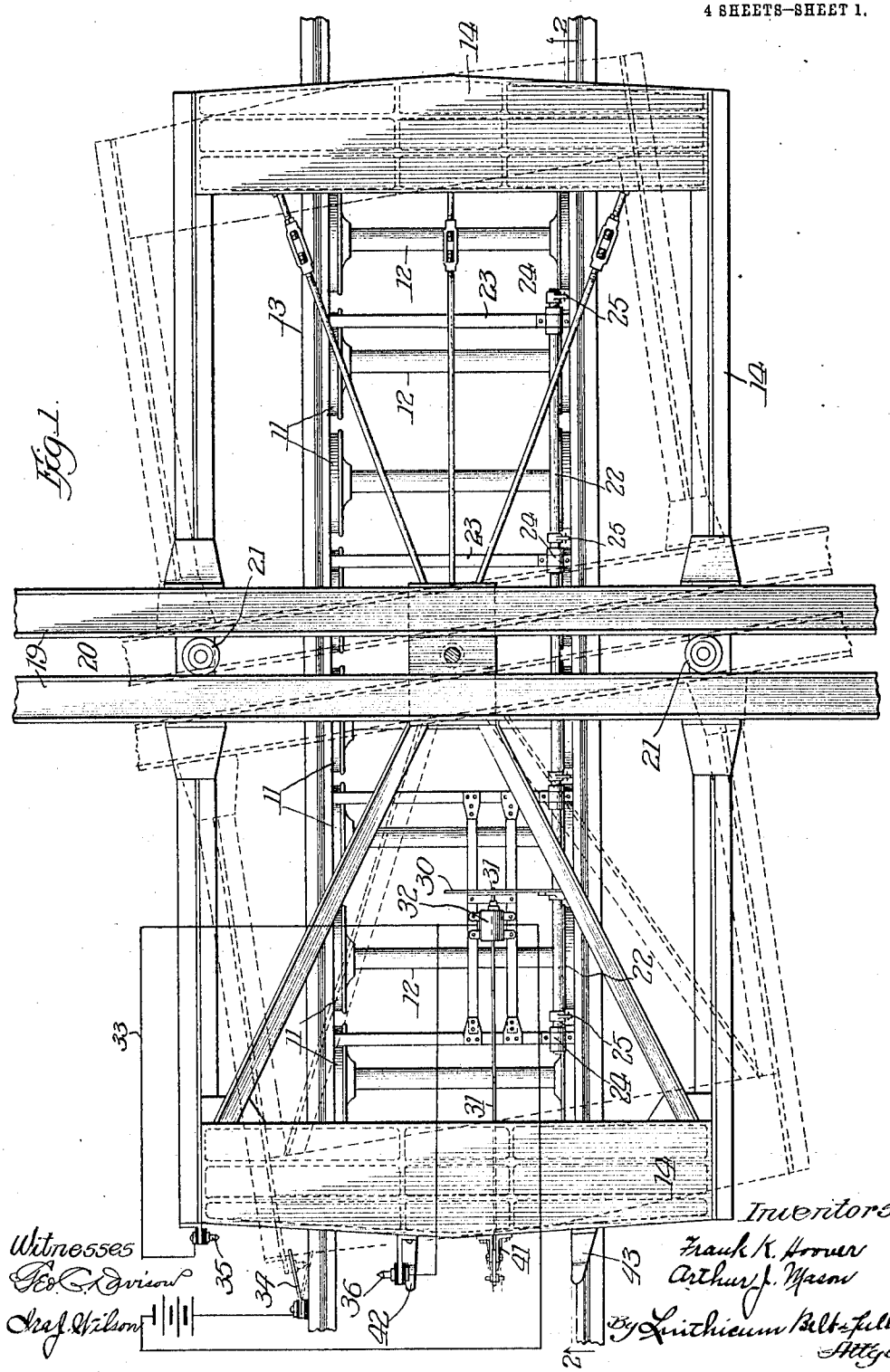
BRAKE MECHANISM FOR ORE HANDLING APPARATUS.

APPLICATION FILED APR. 14, 1911.

1,053,509. Patented Feb. 18, 1913.

4 SHEETS—SHEET 1.

Fig. 1.



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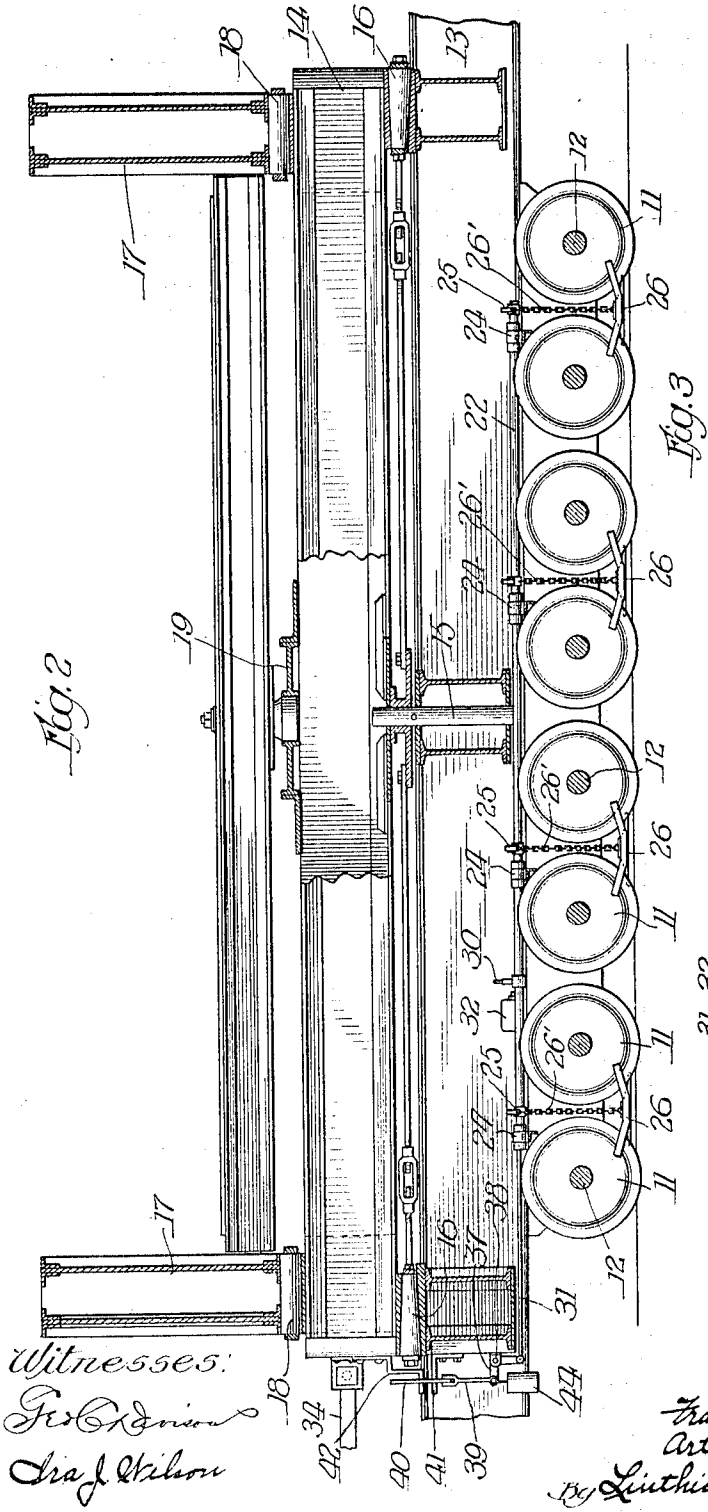

Fig. 2

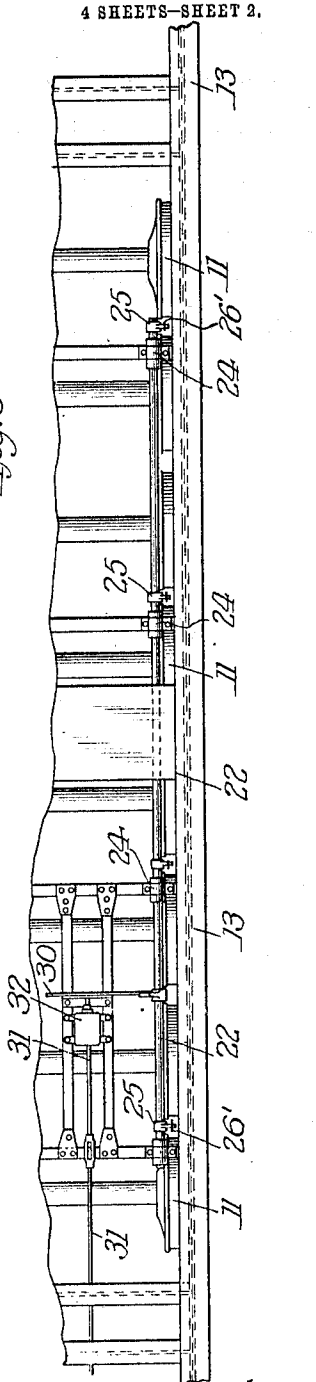

Fig. 3

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4 SHEETS—SHEET 3.

Fig. 4.

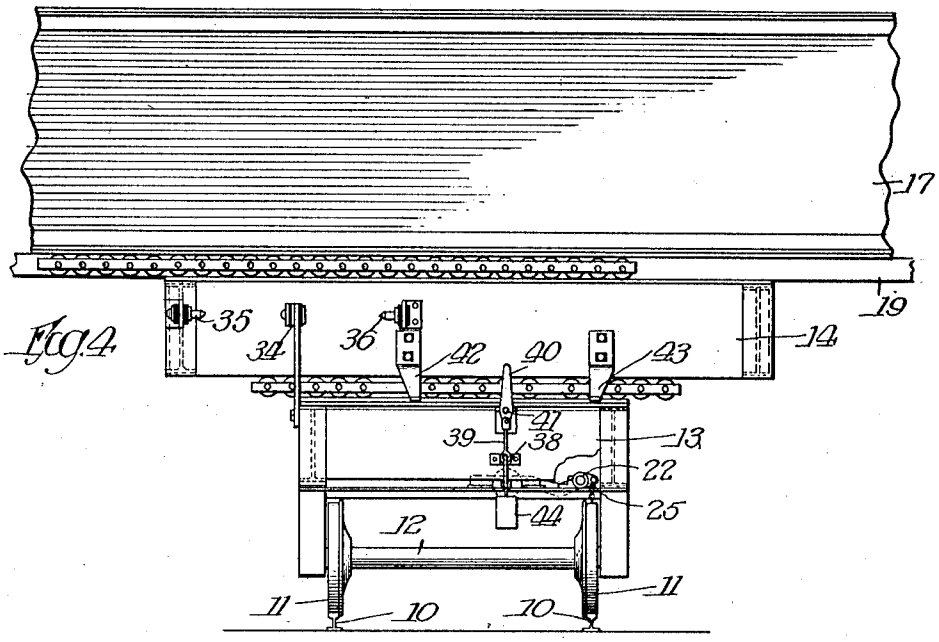


Fig. 5.

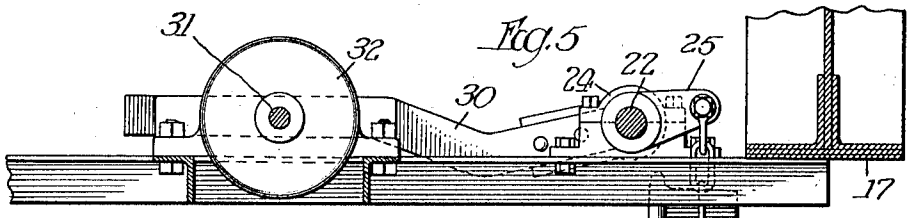
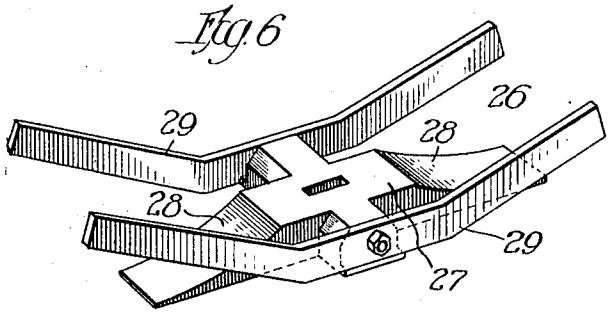
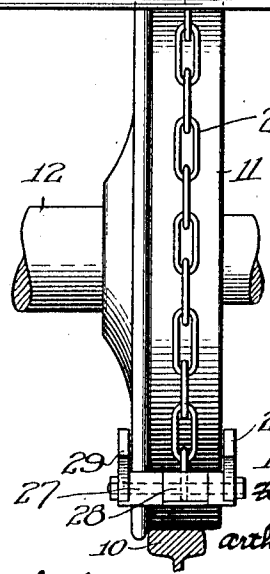


Fig. 6.





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4 SHEETS—SHEET 4.

Fig. 7

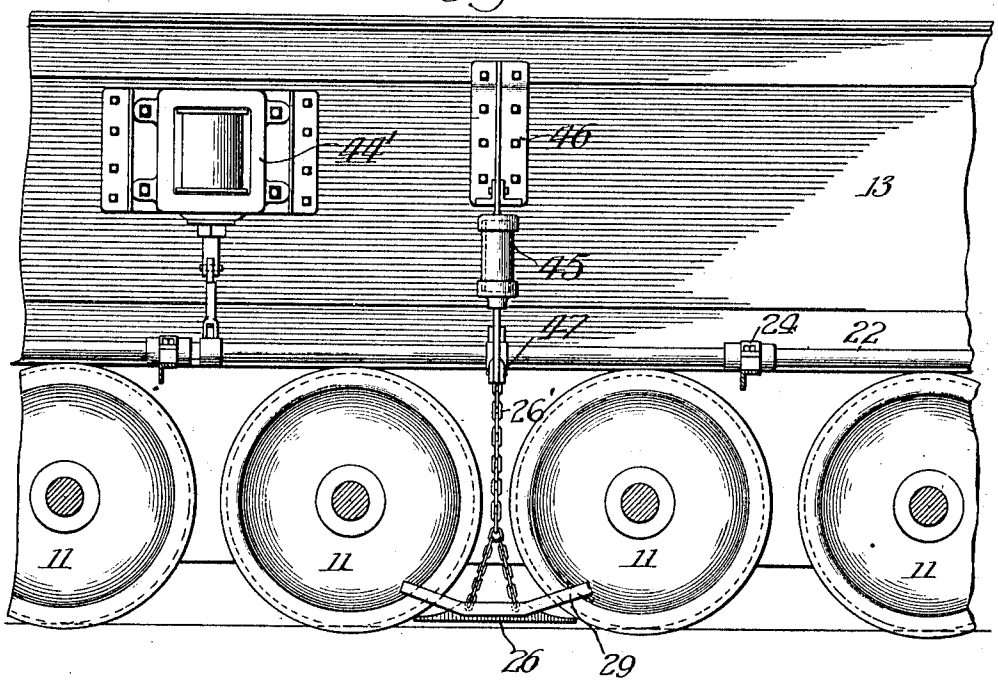
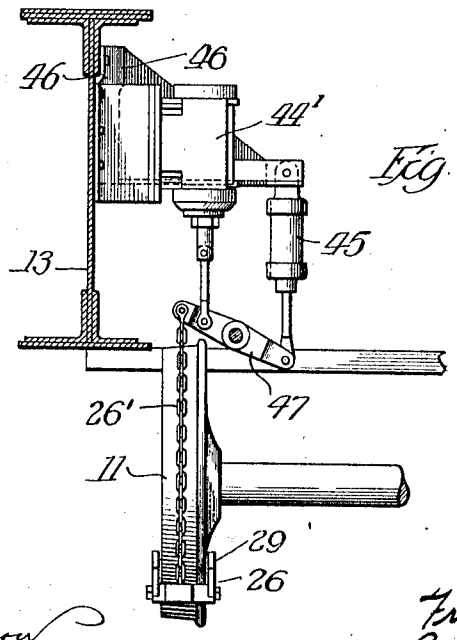


Fig. 8.



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BRAKE MECHANISM FOR ORE-HANDLING APPARATUS.

1,053,509. Specification of Letters Patent. Patented Feb. 18, 1913.

Application filed April 14, 1911. Serial No. 621,001.

To all whom it may concern:

Be it known that we, FRANK K. HOOVER and ARTHUR J. MASON, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Brake Mechanism for Ore-Handling Apparatus, of which the following is a specification.

This invention relates to a brake mechanism which may be employed with any moving structure supported on wheels, but is particularly adapted for use in connection with and as an accessory to, an apparatus for handling ore, of the general character disclosed in our prior Patent No. 733,647, granted July 14th, 1903. By referring to this patent it will be observed that the apparatus comprises, in a general way, a pair of supporting cars or trucks adapted to travel upon parallel tracks and a bridge or truss swingingly mounted on the cars so that either of the cars may travel relatively in advance of the other to carry the truss to any desired position. A sliding connection is preferably provided between one of the cars and the truss so that a limited movement of the truss transversely of the car sufficient to permit the truss to assume the various desired positions, may take place. The truss may, however, be pivoted or hung in a sling or stirrup, permitting a limited amount of angular movement, or it may be rigidly connected to or mounted on the supporting cars. In any of these forms if one of the trucks should be moved relatively to the other a distance greater than that normally permitted by the design of the apparatus, disastrous results to the mechanism would be produced either by the withdrawal of the truck from beneath the truss or by the twisting and distortion of the structure.

It is the object of our present invention, therefore, to guard against the possibility of accidents such as would result from excessive movement of one of the trucks relatively to the other caused by the carelessness of the operator or by severe storms which might overcome the action of the ordinary brakes and this object is effected by the provision of mechanism which automatically brakes the car wheels and prevents further movement of the trucks when they have assumed a predetermined relative position considered to be the maximum within which the cars may move with reasonable safety.

Another object is to provide a mechanism capable of use with structures rigidly connected to the supporting cars, as well as to the swinging or skewing type, which permits the chock blocks to remain in operative position at all times except when the current is turned on to move the cars, the turning on of the current acting automatically to raise the blocks.

Our invention will be perhaps best understood by referring to the following description in connection with the accompanying drawings illustrating one preferred embodiment thereof.

On the drawings—Figure 1 is a plan view of a truck upon which one end of the truss is mounted. Fig. 2 is a longitudinal sectional view on line 2—2 of Fig. 1. Fig. 3 is a fragmentary plan view of the truck with the truss removed. Fig. 4 is an end elevation of a truck and a section of the truss carried thereby. Fig. 5 is an enlarged detail view showing the arrangement of the chock block locking lever and the lock therefor. Fig. 6 is a perspective view of one of the chock blocks. Fig. 7 is a fragmentary side elevation of a truck equipped with another embodiment of our invention; and Fig. 8 is a detail elevation looking toward the right in Fig. 7.

Referring now to the drawings more in detail, 10 designates one of the parallel tracks upon which the bridge trucks are adapted to travel. The truck illustrated in the present instance comprises a number of pairs of wheels 11 mounted on the usual axles 12 and carrying the truck frame or turntable 13. The bridge or truss base 14 is pivotally connected with the frame by a king-bolt 15, the ends of the base being supported upon rollers 16 which permit the base to swing relatively to the truck. The truss or bridge proper 17 is supported upon the base so as to move relatively thereto on the rollers 18 as the trucks approach or separate from each other in their movements along the parallel tracks. A pair of members 19 extending transversely across the base provide a central longitudinal slot 20 forming a guide for one or more rollers 21 on the outer side of that portion of the

truss which overlies the base whereby angular movements of the truss are conveyed to the base, at the same time permitting limited longitudinal travel of the truss relatively to the base.

The construction thus far described is of a usual well known type which is fully described in our prior patent to which reference has previously been made.

From an inspection of Figs. 1 to 5 inclusive, it will be observed that a rock-shaft 22 is mounted upon the bed pieces 23 of the truck frame in suitable journals or brackets 24 and that this rock-shaft extends longitudinally of the frame near the inner face of one of the sides thereof. The rock-shaft is equipped at intervals with a series of arms 25 extending outwardly from the shaft and from the outer end of each of these arms is suspended a chock block 26 by means of a chain or other flexible connection 26′. As is best shown in Fig. 6 each of these chock blocks 26 comprises a body 27 having oppositely disposed inclined faces 28 which are preferably made on the arc of a circle having a radius equal to the radii of the wheels 11. To the sides of the block are bolted guide members 29 shown as bars having their ends upturned to lie on opposite sides of the wheels and adapted to engage therewith for the purpose of guiding the blocks and maintaining them in alinement with the wheels. It will be obvious, however, that these guides might be secured to the block with their ends downturned instead so as to engage with the sides of the track rails 10 in lieu of with the sides of the wheel as shown. The blocks are suspended midway between the axles of adjacent wheels and when in inoperative position are held a short distance above the track rail and out of engagement with the wheel treads and when lowered to operative position rest upon the rail in position to permit either of the adjacent wheels to roll up on one of the inclined surfaces 28 to bring the truck to a standstill. The chocks are normally held in elevated or inoperative position by a lever 30 fixed on the rock-shaft 22; this lever when moved to the position shown in Figs. 1, 2, 3 and 5, being held in that position by a rod 31 mounted in a solenoid 32 so that its end is projected above the lever 30 or through an opening therein to maintain the lever in a substantially horizontal position as shown. The rod 31 which acts as a locking device for the lever 30 forms the core of the solenoid 32 so that when the solenoid is energized the rod will be withdrawn from engagement with the lever thereby permitting the rock-shaft 22 to turn and permit the chock blocks to drop into operative position on the track rail. A switch controlling the electric circuit which energizes the solenoid may be located in the operator's cab so that by throwing the switch the chocks may be dropped at will by the operator.

In order to insure against excess relative movement of the trucks such as would withdraw one of the trucks from beneath the truss or distort the structure if it be rigid, we have provided means for automatically withdrawing the locking rod 31 to release the blocks from inoperative position whenever the truss assumes a predetermined diagonal position on the trucks. One preferred form of this means, which we term a safety device, comprises a switch interposed in the circuit 33 controlling the solenoid, one terminal 34 of which is mounted upon a side member of the truck frame 13. The other terminal 35 is mounted on the end of the swinging base 14 in position to engage the fixed terminal 34 and close the circuit whenever the truss assumes a predetermined position relatively to the truck, such as is indicated in dotted lines in Fig. 1. The closing of the switch, as will be readily understood, energizes the solenoid, releases the locking bolt and drops the chock blocks, thereby bringing the moving truck to a stop. A terminal 36 similar to the terminal 35 is mounted upon the swinging base the same distance on the opposite side of the terminal 34 and in position to close the circuit upon swinging movement of the base the same distance in the opposite direction. This construction provides a safety device adapted to drop the blocks when the truss swings in either direction to a predetermined position relatively to the trucks. To avoid possibility of accident, however, such as might occur in case the electrical safety device should fail to operate for any reason, we have provided mechanical means for positively withdrawing the locking rod from operative engagement with the lever 30 should the swinging base swing past the position determined by the contact of the terminals 35 or 36 with the terminal 34. This mechanical means comprises, as is shown in Figs. 1, 2 and 4, a bell-crank lever 37 pivoted at 38 on the end of the truck frame and having one arm connected with the end of the rod 31 and the other arm connected by a link 39 with a lever 40 pivoted on a bracket 41 above the bell-crank lever. A stationary arm or bracket 42 is secured to the end of the swinging frame in position to engage the upwardly projecting arm of the lever 40 when the base swings past the position required to energize the solenoid 32. It will be apparent that engagement of the arm 42 with the lever 40 will rock said lever which, through the link 39 and the bell-crank lever 37, will positively withdraw the locking rod from operative position. A similar arm or bracket 43 is mounted on the swinging base on the opposite side of the lever 40 to likewise rock said lever and posi-

tively release the locking rod upon swinging movement of the frame the same distance in the opposite direction. A weight 44 may be attached to the horizontal arm of the bell-crank lever 37, if desired, to return the locking rod to operative position. From the foregoing it will be obvious that if the electrical safety device should fail to operate, the mechanical device could be relied upon to positively drop the blocks before the trucks could move away from each other far enough to endanger the apparatus.

In Figs. 7 and 8 is shown another embodiment of our invention designed particularly for use in connection with rigid structures although it is equally adaptable to the swinging or skewing structures described. In this construction as shown, the rock-shaft 22 is controlled by a solenoid 44′ mounted upon one of the side members of the truck frame 13. This solenoid is preferably interposed in the main circuit which actuates the truck motor, so that whenever the current is turned on to move the trucks the solenoid rocks the shaft 22 and lifts the blocks 26 out of operative position and when the current is turned off, the blocks are immediately lowered by gravity into operative position. It is usually desirable that the movement of the truck be slowed down by the ordinary brakes before the chock blocks are applied, and to enable this result to be accomplished a dash-pot 45 is mounted in a bracket 46 on the truck frame side and connected with an arm 47 fixed on the rock-shaft so that when the blocks are released by the solenoid their downward movement will be retarded by the dash-pot, thus giving the brakes an opportunity to slow down the truck before the blocks are brought into operative position. Automatic mechanism similar to the electrical safety device previously described, can also be used in connection with this embodiment of the invention, the only material difference being that the circuit is broken upon swinging movement of the truss to predetermined position relatively to the truck, instead of being closed as in the construction previously described. When this embodiment of the invention is employed the mechanical mechanism for insuring application of the chock blocks is not required for the reason that whenever the circuit which energizes the solenoid 44 is broken the blocks will be permitted to drop under the influence of gravity.

In the drawings we have shown the chock blocks applied to only one side of the truck, but it will be obvious that they might be applied to both sides, if desired, and it will also be apparent that many mechanical changes in the size, shape, number, proportion and arrangement of the various parts differing from the embodiments which have been disclosed for the purposes of illustration, may be made without departing from the spirit or sacrificing any of the advantages of the invention.

We claim:

1. In a device of the character described, the combination of a series of supporting wheels, a frame supported by said wheels, a shaft mounted on said frame and extending over the said series of wheels, a plurality of chock blocks suspended from said shaft between adjacent wheels, and means for simultaneously placing all of said blocks in position to be engaged by said wheels.

2. In a device of the character described, the combination of a truck comprising a series of supporting wheels and a frame carried thereby, a plurality of two faced chock blocks normally supported between adjacent wheels of a series, and electrically operated means for automatically and simultaneously placing all of said blocks in position between a pair of wheels for operative engagement by either of said wheels whereby to brake the movement of said truck.

3. In a device of the character described, the combination of a truck comprising supporting wheels and a frame carried thereby, a truss swingingly mounted on said frame, a chock block arranged between adjacent wheels, and means for automatically positioning said block in operative relation to said wheels upon swinging movement of said truss to a predetermined position relatively to said truck.

4. In a device of the character described, the combination of a truck comprising a series of wheels and a frame carried thereby, chock blocks suspended from said frame between adjacent wheels of said series, means for maintaining said chock blocks in alinement with the wheels, a truss mounted to swing on said truck, and means for automatically dropping said chock blocks into operative position to be engaged by either of the wheels adjacent thereto upon swinging movement of said truss to a predetermined position relatively to said truck.

5. In a device of the character described, the combination of a plurality of wheels, a frame carried thereby, a chock block disposed adjacent said wheels, means projecting from said chock block in position to engage with said wheels to maintain the block in alinement with said wheels, and electrical means for controlling the position of said block.

6. In a device of the character described, the combination of a plurality of wheels, a frame carried thereby, a chock block disposed adjacent said wheels, means adapted to engage the wheels to maintain the block in alinement with said wheels, and electrical means for controlling the position of said block.

7. In a device of the character described,

the combination of supporting wheels, a frame carried thereby, a chock block having oppositely disposed faces adapted to coöperate with either of two adjacent wheels and suspended from said frame between said wheels, means coöperating with each of the two adjacent wheels for maintaining the block in alinement with the wheels, means for raising and lowering said block relatively to the wheels, means for normally retaining said block in elevated position, and means for automatically releasing said retaining means to permit the block to assume an operative position relatively to the wheels.

8. In a device of the character described, the combination of a truck comprising a plurality of wheels and a frame carried thereby, a rock-shaft mounted on said frame, a plurality of chock blocks suspended from said rock-shaft adjacent said wheels, means for retaining said chock blocks in alinement with the wheels, a lock for holding said blocks in inoperative position, and automatic means for releasing said lock to position the chock blocks in operative relation to the wheels.

9. In a device of the character described, the combination of a truck comprising supporting wheels and a frame carried thereby, a rock-shaft mounted on said frame, a series of arms projecting from said shaft, a chock block suspended from each of said arms adjacent said wheels, a lever fastened on said rock-shaft, a lock adapted to engage said lever and retain the chock blocks in inoperative position, a truss swingingly mounted on said truck, and means for automatically releasing said lock when said truss assumes a predetermined position relatively to said truck whereby said blocks are brought into operative relation with the wheels to stop the movement of the truck.

10. In a device of the character described, the combination of a truck comprising a plurality of wheels and a frame carried thereby, a rock-shaft mounted on said frame, a chock block suspended from said rock-shaft, a lock for holding said block in inoperative position, a truss swingingly mounted on said truck, electrical means adapted to release said lock upon movement of said truss to a predetermined position relatively to said truck, and mechanical means to positively release said lock in the event of continued movement of said truss beyond said predetermined position.

11. In a device of the character described, the combination of a chock block having a pair of oppositely inclined faces and guides positioned to engage the wheel on each side of the block for maintaining said block in alinement, and means for raising and lowering the block.

12. A chock block having a pair of oppositely inclined faces, and guides secured to the sides of the block and projecting above the inclined faces in position to engage with the sides of two adjacent wheels whereby the block may be maintained in alinement with the wheels.

13. In a device of the character described, the combination of a plurality of wheels, a chock block disposed between said wheels and having a pair of wearing faces formed on an arc having a radius approximately equal to the radii of said wheels, upwardly projecting guides secured on each side of said block, and means for suspending said block adjacent said wheels and normally out of contact therewith.

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