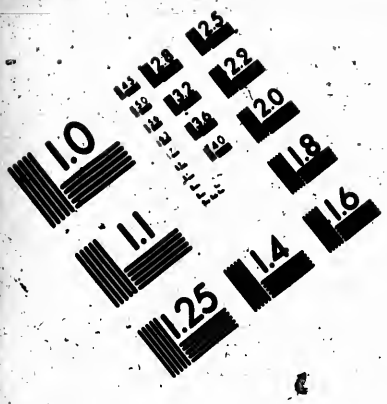

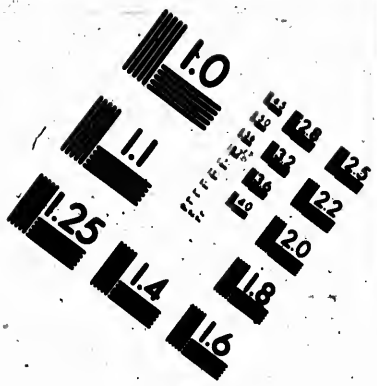

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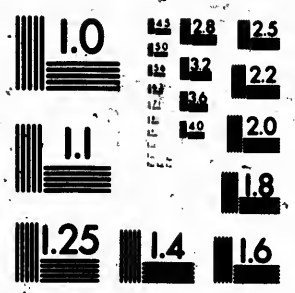

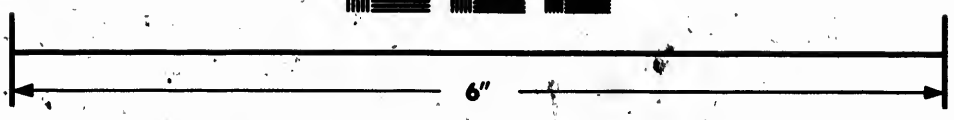

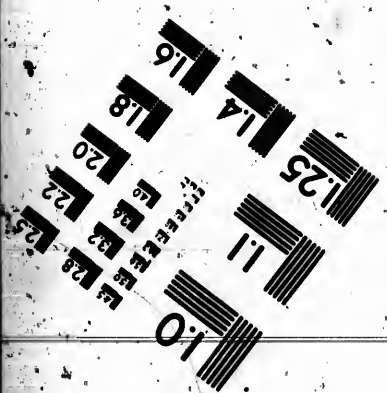

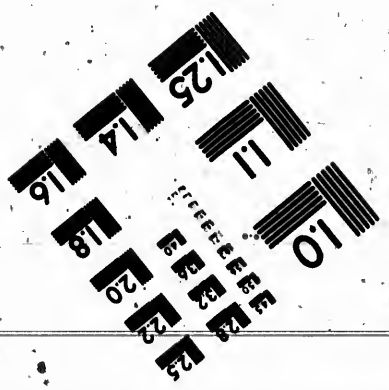

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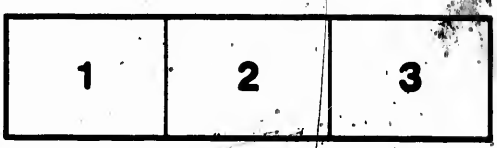

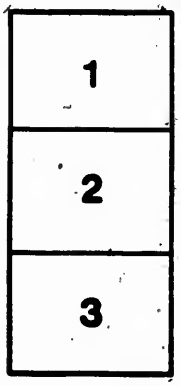

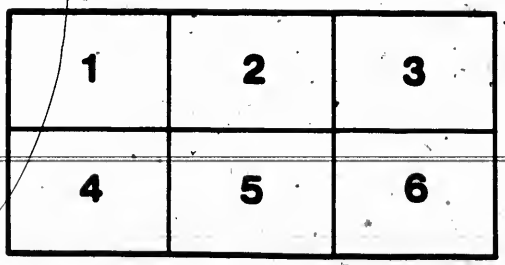

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The WIDDIFIELD & BOWMAN

ELECTRIC AND AUTOMATIC

RAILWAY CAR BRAKE

SYSTEM

A New and Invaluable Railway Invention, perfect and simple, which meets all the requirements of Railway Experts

RIGHTS TO THIS SYSTEM OF RAILWAY CAR BRAKES

ARE PROTECTED BY SIX UNITED STATES PATENTS

Further Patents for the latest improvements are applied for in the United States, Canada and all Foreign Countries

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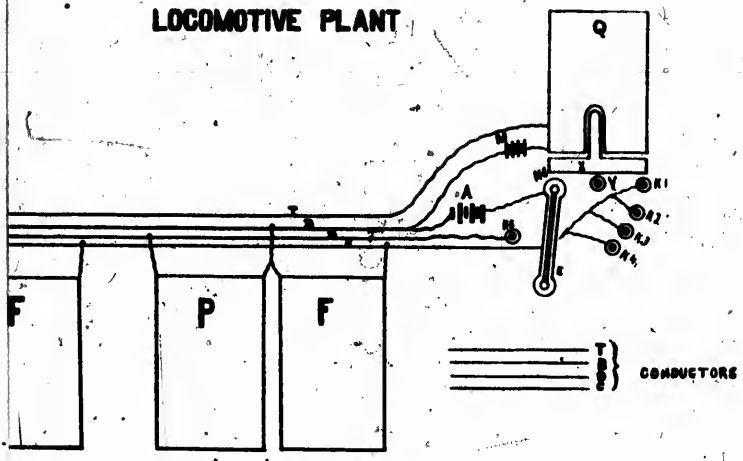
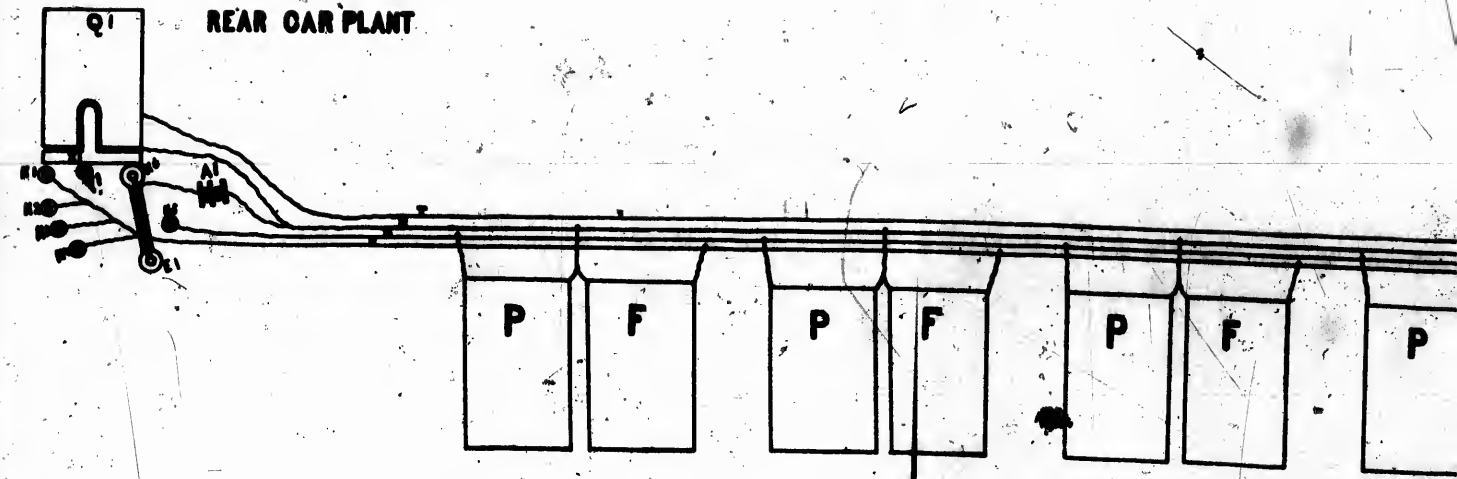

LOCOMOTIVE PLANT
Q
A
Y
K1
K2
K3
K4
E
F
P
F
T
B
S
CONDUCTORS


REAR CAR PLANT
P
F
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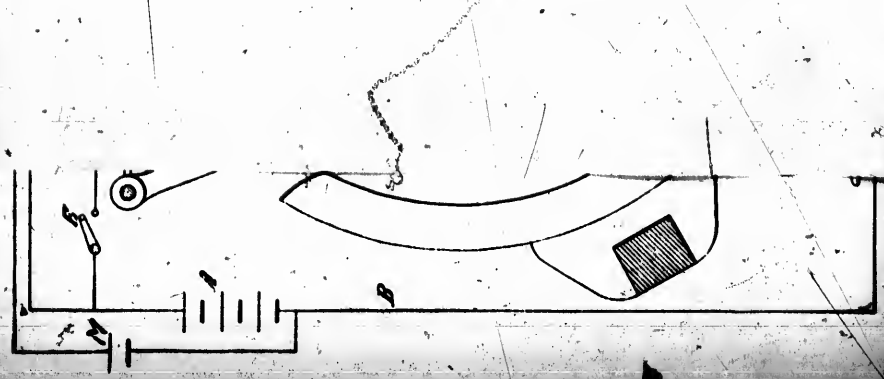
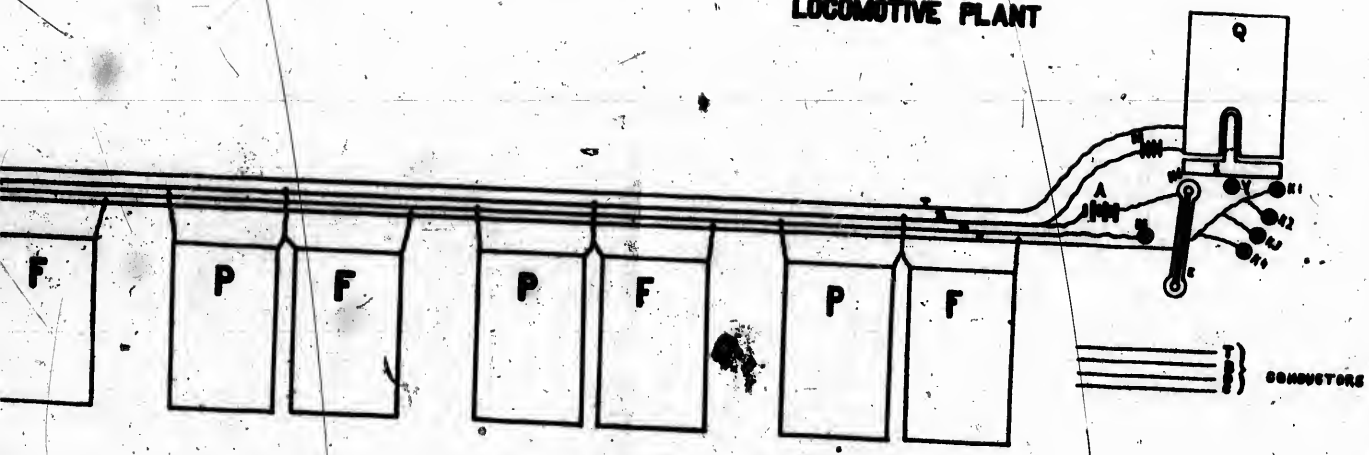
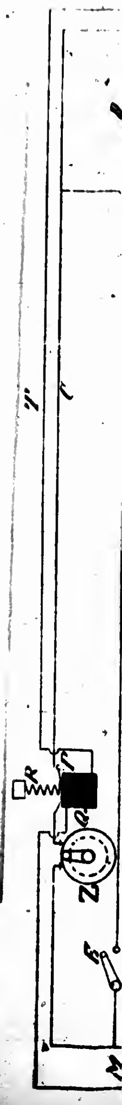


FIGURE 4

LOCOMOTIVE PLANT





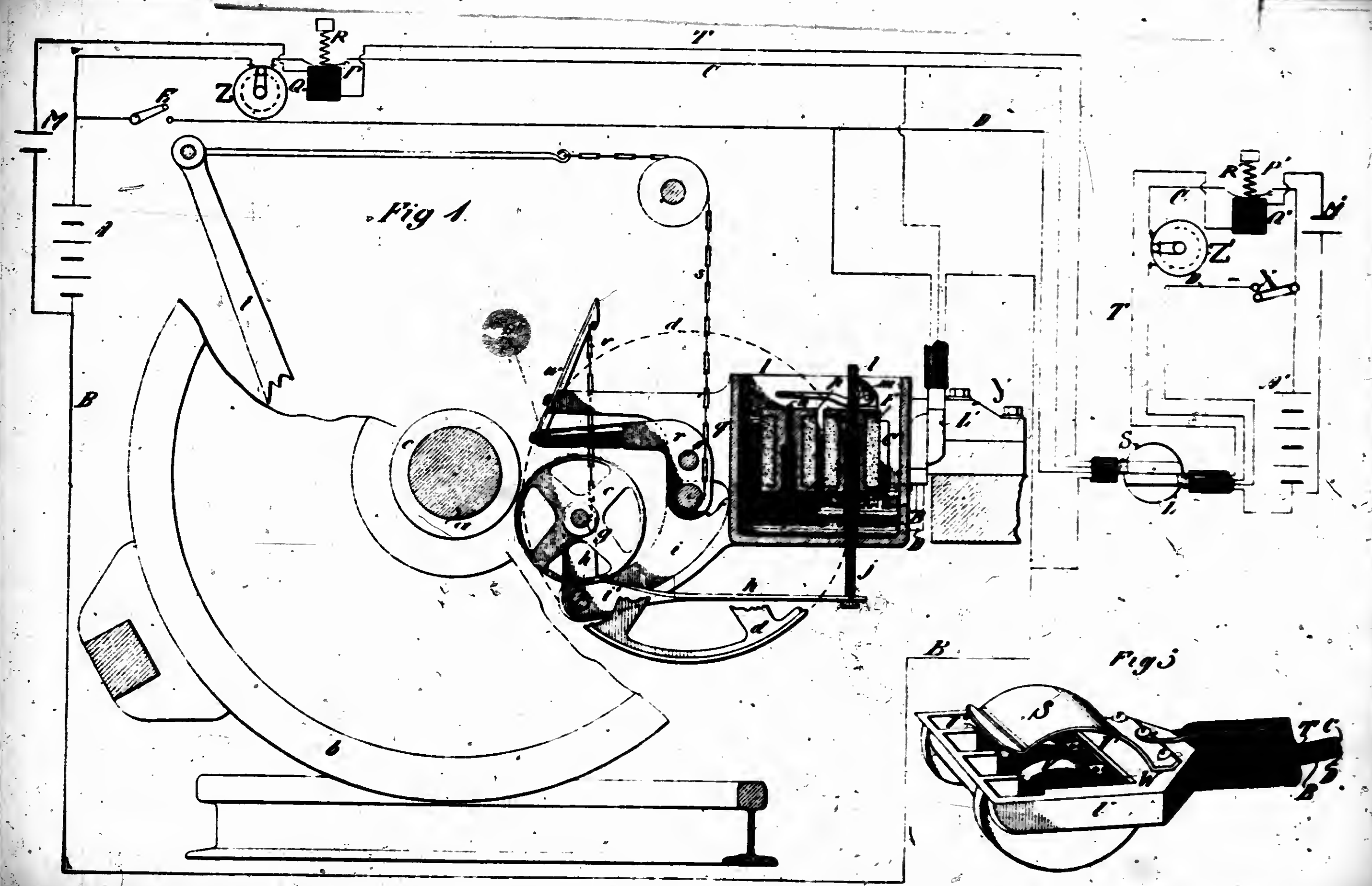


Fig 1.

Fig 3

THE WIDDIFIELD & BOWMAN

ELECTRIC AND AUTOMATIC CAR BRAKE

THE WIDDIFIELD & BOWMAN
ELECTRIC AND AUTOMATIC CAR BRAKE

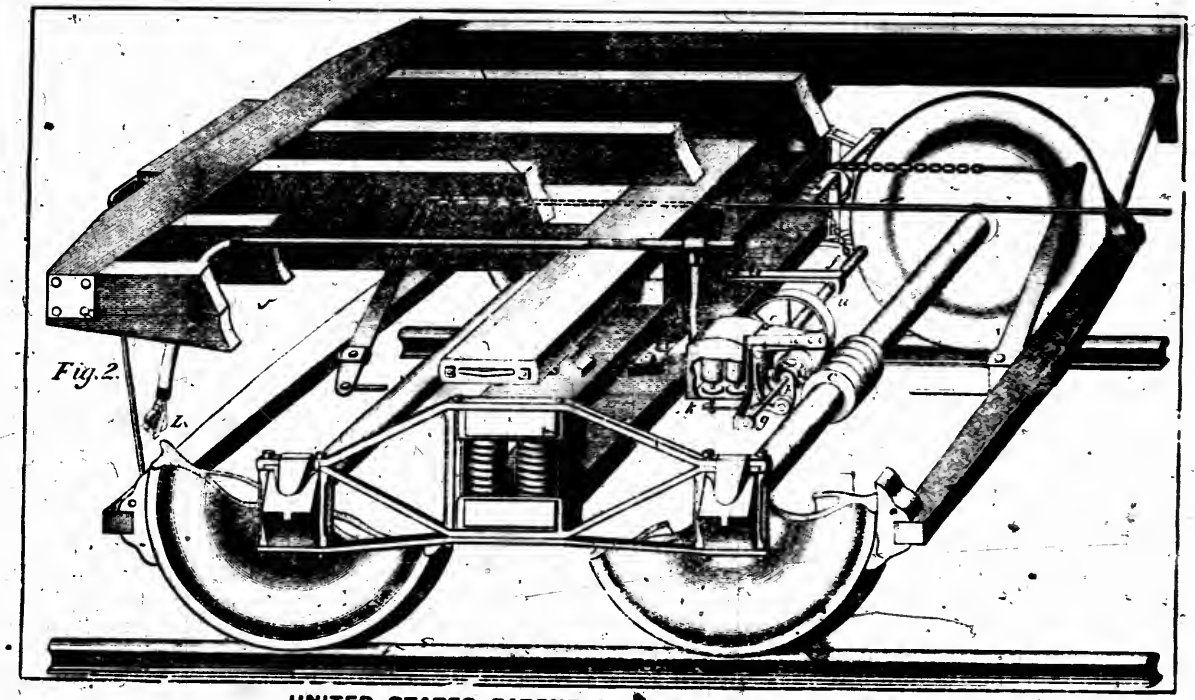


Fig. 2.

UNITED STATES PATENT ALLOWED MAY 31ST, 1888.

TO THE

RAILROAD INTERESTS OF AMERICA

IN handing you plans and specifications and working details of the WIDDIFIELD & BOWMAN ELECTRIC AND AUTOMATIC RAILWAY CAR BRAKE SYSTEM, we would say that the inventors had in view the requirements set forth by the Master Car Builders' Association of America, after the trials of brakes at Burlington, in 1886 and 1887; and we believe they have in this newly completed invention a system that perfectly fulfils in every respect the points of efficiency required by prominent railway experts, especially for freight car service.

Fifty freight cars, equipped with the mechanical parts of this system, upon which they obtained their first patents, have been in constant service on the Lehigh Valley Railway since the Burlington trials in 1886, and the parts have proved efficient and endurable. No repairs have had to be made, and there does not appear to be the least wear or tear to any parts of the device since placed in use.

The Electrical parts of this invention have recently been completed and its application to the frictional mechanism (which has undergone changes in some important particulars), has made up a system of brakes, simple, perfect in operation and fully adapted to all the requirements of practical railroading.

Briefly, with this brake system, we apply the brakes on each and every car on the longest train simultaneously, release the brakes on each and every car simultaneously, cut out cars in shunting without setting the brakes. The locomotive can be detached leaving the train under perfect control at the caboose or rear car. In case of a break loose, the brakes apply at once all along on both sections of the train and release at will from either end.

This new power brake can be applied to any of the brake-gears at present in use, at a remarkably small cost.

DESCRIPTION OF MECHANICAL AND ELECTRICAL PARTS

OF THE

WIDDIFIELD & BOWMAN

Automatic Electric Brake,

AS PLACED UNDER EACH CAR.

(FIGS. 1 AND 2.)

a—Car Axle supporting car wheels *B*.

c—Collar cast on axle *A*.

d—Large friction wheel, with shaft *f*.

e—Small friction wheel, with shaft *g*.

f—Shaft of large friction wheel *d*, on which chain winds on applying brakes

g—Shaft of small wheel *e*. When it revolves it winds up chain *r* attached to lever *w*, causing the latter to operate.

h—Elastic lever of spring steel for applying brakes evenly and smoothly and connected with wheel *e* and rod *j* of core *k* in solenoid *F*.

i—Fulcrum of lever *h*.

o—Pivot for lever *r*.

n—Support for shaft *f*.

t—Brake lever *t*.

r—Bent lever whose arms connect respectively with lever *w* and shaft *f*.

s—Chain connected to shaft *f* and brake lever *t*.

r—Chain connected with shaft *g* and lever *w*.

w—Pivoted lever whose one end is attached to chain *r*, and the other end to lever *w*. When operated by rotation of shaft *g* it turns the bent lever *r*. When the brake is on full the further end of lever *w* strikes the support of shaft *q*, preventing too great stress or pressure on the brake.

F—Solenoid used in applying brakes.

p—Solenoid used in releasing brakes.

k—Core in solenoid *F* with rack *l* attached. When the solenoid F is energized the core *k* is attracted upwards and maintained at maximum height by ratchet *m* until released.

u—Core in solenoid *p*, used in releasing brakes and adapted to be attracted upwards when solenoid *p* is magnetized.

m—Ratchet whose free end is over core *u* of solenoid *p*. It is thrown out of rack *l* by an impulse of current closed through solenoid *p*, so that the core *u* ascending releases the brakes.

j—Terminals of core *k* in solenoid *f* attached to the outer end of the arm of lever *h*.

DESCRIPTION OF THE PLANT ON LOCOMOTIVE AND REAR CAR AND ELECTRICAL SYSTEM APPLIED TO A RAILWAY TRAIN (Fig. 4.)

A—Generator on locomotive. A^1—Generator on rear car.

M—Generator in circuit with conductors T & B through solenoids Q & Q^1.

F—Solenoid (under cars) for applying brakes.

p—Solenoid (under cars) for releasing brakes.

Q & Q^1—Automatic solenoids on locomotive and rear car respectively in closed circuit with generator M and conductors T & B. When magnetized they hold cores, X & X^1, suspended over contact points K^1 & K^6.

C—Positive conductors to solenoid F.

D—Positive conductors to solenoid p.

T—Positive conductor of automatic circuit in connection with solenoids Q & Q^1.

B—Negative conductor, common to all circuits.

E & E^1—Switch lever on locomotive and rear car respectively for making contact with the terminals k^1, k^2, k^3, k^4, k^5.

k^1—Terminal for conductor C.

k^5—Terminal for connection with conductor D and solenoid p for releasing brakes.

k^2, k^3, k^4—Terminals of an ordinary rheostat for graduating the current.

k^6—Terminal in connection with switch levers E & E^1.

x & x^1—Cores of solenoids Q & Q^1.

y & y^1—Plug used for holding cores x & x^1 out of contact with k^1 & k^6 used when shunting, cutting out cars, etc.

k^2, k^3, k^4—Resistance coils adapted to graduate the current to 80%, 60% or 40% of the total electrical energy.

THE ELECTRICAL COUPLING (Fig. 3.)

The ELECTRICAL COUPLING, as seen in Fig. 3, consists of the combination of a metal frame, U, hollow, and containing the terminals V, V^1, V^2 respectively belonging to the conductors B, C & D, and mounted upon insulator, W, in the interior of the frame or casing, U, provided with a terminal, S, of conductor, I, secured to the outside of said casing, each terminal being elastic and adapted to press upon its mate in the other half. If for any reason one of the brake mechanisms is to be cut off or out of circuit, the coupling may be operated by hand; or, in case of a "break loose," it separates automatically with the train without damage to the coupler.

THE GENERATORS.

The GENERATOR *A* serves for all ordinary purposes, while the generator A^1 serves in case of a "break loose" or for occasional use in working trains, in shunting, cut outs, etc. The generator A^1 and *M* are auxiliary. The electrical energy may be stored in the generator whose capacity is such as to last from six to eight months, when they are again charged.

THE ELECTRICAL SYSTEM.

The ELECTRICAL SYSTEM employed is an open circuit system, so that any number of foreign cars not equipped with the electrical appliance may be made up with the train by placing them in the centre of the train and using electrical appliances on the locomotive for the forward section, and generators and electrical appliances in the rear car for the end section, for operating the system.

The Widdifield & Bowman Electric and Automatic Railway Car Brake

Provides means whereby the efficiency of the electrical appliances used is increased, so that only a small impulse of the electric current is required to produce the necessary brake power.

By this means an impulse of the electric current is first used to move the lever, *h*, connected with the small pulley, *e*, shown in Fig. 1. The lever being turned causes the said pulley to come into frictional contact with the collar, *c* (on the car axle, *a*), and to rotate.

The power thus developed by the revolving of the small pulley *e* is transmitted to the large pulley, *d*, which in its turn is also brought into frictional contact with collar, *c*, on the car axle. The large pulley, *d*, rotates and the brakes are applied. The momentum of the train and multiplication of power by means of the compound pulleys and levers produce the necessary brake power.

The brakes when set are held in position by means of the ratchet *M* (as shown in Fig. 1), until released.

IN WORKING THE TRAIN THE FOLLOWING METHODS ARE USED.

GRADUATING THE SPEED.

Assuming that the electrical brakes are in their normal condition, the train being in motion, and that it is desired to stop or slacken the speed, the engineer moves the switch lever, *E* (shown in Fig. 4), successively into contact

with terminals k^2, k^3 & k^1, as he may find necessary. The solenoid, F, on each car becomes magnetized and attracts the core, k, upwards so that the spring lever, h, operates on its fulcrum and moves the small pulley, e, towards the collar, c, bringing them into contact with a pressure dependent upon the amount of electric current. The pulley, e, rotating, turns the shaft, g, winds up chain, r, and causes the lever, w, to operate and turn the lever, r, until the large pulley, d, is pressed against the collar, c. A rotation of the large pulley, d, now occurs and its shaft, f, revolving winds up the chain, S, attached to the brake lever, t, and thereby the brakes are applied.

The spring arm of the lever, h, applies the brakes smoothly and evenly through above mechanism, and the brakes operating simultaneously on all cars, the speed of the longest train is checked or stopped without perceptible noise, shock or jar to any portion.

EMERGENCY STOPS.

Should an emergency stop be required, the engineer moves the switch lever, E, to terminal, k^1. The brakes are then applied with full current on all cars simultaneously by means of solenoids, F, and mechanism as previously described. The brake power thus obtained brings the longest train to a gradual but quick stop without shock or jar.

RELEASING THE BRAKES.

To release the brakes the engineer moves the switch lever, E, into contact with terminal, k^2, thereby energizing solenoids, p, which attract their cores, n, upwards and raise the free arms of ratchets, M, so that the cores, k, in solenoids, F, are released and fall. By this means the brakes of all cars are released instantly and simultaneously on the longest train.

"BREAK LOOSE."

The solenoids, Q & Q^1 (shown in Fig. 4), being normally in closed circuit with generator, H, by conductors, T & B, the cores, X & X^1, are held suspended by the same solenoids over the terminals, k^1 & k^6, in such positions that when the conductors, T & B, are accidently broken or separated, the cores, X & X^1, fall upon the terminals, k^1 & k^6, thereby closing the circuit of conductors, B & C, and apply the brakes on the separated sections of the train. As soon as brought to a stop, the brakes can be released at will—that in the front section by the engineer and that in the rear section by the conductor,—as independent electric currents remain in force in each section, through generators, A & A^1, respectively.

It will be seen that in case of break-away or other accident which interferes with the electric circuits the brakes are automatically applied to both sections of train. Although the brakes will apply automatically in case of accident, the train men do not lose control of them and need not necessarily stop. As if under certain circumstances it is considered desirable to do so, the engineer can release the brakes on the forward section and signal the men in the rear end to release theirs.

THE WIDDIFIELD AND BOWMAN ELECTRIC AND AUTOMATIC BRAKE SYSTEM.

CLAIMS.

1.—THAT it gives immediate and instantaneous application of the brakes on all cars of the longest train, and consequently "stops up" within the shortest possible time and distance, without shock or rebound.

2.—THAT it gives immediate and instantaneous release to brakes on all cars. The brakes never "stick," and hence they do not require "bleeding" to release.

3.—THAT it gives immediate and instantaneous application of the brakes to separated sections of the train in case of a "break loose."

4.—THAT it gives immediate and easy release (when required) to brakes to forward and rear sections of a separated train in case of a "break loose."

5.—THAT the locomotive may be "cut loose" and "run away," leaving the brake power of the train under perfect control at the rear car.

6.—THAT the train may be "cut" anywhere and at all times to "fly out cars," etc., without the brakes applying automatically.

7.—THAT it perfectly and smoothly graduates the speed of the train by means of resistance coils regulating the proper amount of electrical energy.

8.—THAT the tension of the brakes, being perfectly adjusted and checked when "on full," will not "skid" wheels, which causes the flattening of car wheels.

9.—THAT the link and pin coupling may still be used, and with less wear and tear to the rolling stock than at present.

10.—THAT this system of electrical and automatic brakes is cheap, endurable and applicable to all cars using the present hand brakes—it can be maintained at an estimated minimum cost and easily understood by all train men.

11.—THAT the mechanical parts are simple, endurable and do not require oiling, as there are no loose valves, springs, etc.

12. THAT the electric plant on the locomotive is light and portable, and can be easily transferred from one locomotive to another, and all connections made in a few minutes.

13.—THAT the electrical coupling is very simple in construction and operation, and is easily pushed together, and that it uncouples itself without attention when shunting or cutting out cars, etc.

14.—THAT no parts can be effected by frosts or climate.

15.—THAT the brakes are noiseless in their application and release, a great advantage when used for passenger cars.

16.—THAT there is no loss of steam power in operating this brake system, the brake power being received from the momentum of the train, hence a large saving to motive power and running expenses.

17.—THAT a train fully equipped with this brake is at all times under the control of men at either end of train and can be applied or released by either engineer or conductor whether the train is whole or in sections.

THE WIDDIFIELD & BOWMAN ELECTRIC CAR BRAKE.

THE LATEST INVENTION.

W. P. Widdifield and A. H. Bowman, electrician, of Allentown, Pa., U.S., are the inventors of a new continuous Car Brake, which promises to supersede all other car brakes in use, including the celebrated air brake. On Tuesday last a number of railway experts and others from different parts of the States and Canada met at Bethlehem, Pa., to view a test of the new brake. A fully equipped train was run up and down the Lehigh Valley Railroad, put through every known test, and all were amazed at the simplicity and perfection of the new device. Many stops were made when running at forty to fifty miles an hour, within as short a time and distance as it is possible to stop a train without breaking it up by the force of its own momentum. Unlike the air or any other brake, this one is controlled from either end of the train. In case the train is accidently broken in the middle, the brakes apply all along the train automatically and in an instant, and the brakes on each section of the train can be released instantaneously, although the train is separated, the independent electric circuits remain in each section, leaving absolute control of the forward section at the engine, and of the rear section at the caboose or rear car. Thus it will be seen that cars that are not fitted up with the brake may be taken into the middle of the train and switched out at will without interfering with the operation of the brake from either end of the train. At Tuesday's trial tests this important advantage was fully demonstrated. Another advantage over the present brakes is that each car on the longest train is independently and instantly acted upon, and the whole train gradually slows up to a stop without any vibration or bumping. The essential features of this new brake consist of a composite sleeve cast on to the car axle, upon which two friction pulleys, properly geared, are thrown into action by an impulse of electric current, by which a chain gear is wound, which applies the brakes to the car wheels. The electricity is stored in cells, which are placed on the engine and rear car, and carried by an insulated wire cable along the train, and suitably coupled between each car. It is contemplated to store the electricity from a dynamo attached to the engine, which may be used also to light the train. The application of this brake costs less than one-third, and the expense of running less than one-twentieth that of the air brake, because an impulse only of electricity is all that is required to apply the brakes; friction obtained from the momentum of the train does the rest. A large train is now being fitted up at the shops of the Lehigh Valley Railroad, under the supervision of the inventors, to run to New York, and a strong syndicate of capitalists is being organized to control the American patents. Patents are also applied for in Canada, and all foreign countries. When it is considered that there are over 1,000,000 freight cars in America alone upon which the hand brake is still in use, the importance of this invention can be partly realized.—*The Empire*, Toronto, Ontario.

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Fifty freight cars, equipped with the mechanical parts of this system, upon which they obtained their first patents, have been in constant service on the Lehigh Valley Railway since the Burlington trials in 1886, and the parts have proved efficient and enduring. No repairs have had to be made, and there does not appear to be the least wear or tear to any parts of the device since placed in use.

The Electrical parts of this invention have recently been completed and its application to the frictional mechanism (which has undergone changes in some important particulars), has made up a system of brakes, simple, perfect in operation and fully adapted to all the requirements of practical railroading.

Briefly, with this brake system, we apply the brakes on each and every car on the longest train simultaneously, release the brakes on each and every car simultaneously, cut out cars in shunting without setting the brakes. The locomotive can be detached leaving the train under perfect control at the caboose or rear car. In case of a break loose, the brakes apply at once all along on both sections of the train and release at will from either end.

This new power brake can be applied to any of the brake gears at present in use, at a remarkably small cost.

DESCRIPTION OF MECHANICAL AND ELECTRICAL PARTS

OF THE

WIDDIFIELD & BOWMAN

Automatic Electric Brake,

AS PLACED UNDER EACH CAR.

(FIGS. 1 AND 2.)

a—Car Axle supporting car wheels *B*.

c—Collar cast on axle *A*.

d—Large friction wheel, with shaft *f*.

e—Small friction wheel, with shaft *g*.

f—Shaft of large friction wheel *d*, on which chains wind on applying brakes.

g—Shaft of small wheel *e*. When it revolves it winds up chain *r* attached to lever *w*, causing the latter to operate.

h—Elastic lever of spring steel for applying brakes evenly and smoothly and connected with wheel *e* and rod *j* of core *k* in solenoid *F*.

i—Fulcrum of lever *h*.

o—Pivot for lever *r*.

n—Support for shaft *f*.

t—Brake lever *t*.

r—Bent lever whose arms connect respectively with lever *w* and shaft *f*.

s—Chain connected to shaft *f* and brake lever *t*.

r—Chain connected with shaft *g* and lever *w*.

w—Pivoted lever whose one end is attached to chain *r*, and the other end to lever *w*. When operated by rotation of shaft *g* it turns the bent lever *r*. When the brake is on full the further end of lever *w* strikes the support of shaft *q*, preventing too great stress or pressure on the brake.

F—Solenoid used in applying brakes.

p—Solenoid used in releasing brakes.

k—Core in solenoid *F* with rack *l* attached. When the solenoid F is energized the core *k* is attracted upwards and maintained at maximum height by ratchet *m* until released.

u—Core in solenoid *p*, used in releasing brakes and adapted to be attracted upwards when solenoid *p* is magnetized.

m—Ratchet whose free end is over core *u* of solenoid *p*. It is thrown out of rack *l* by an impulse of current closed through solenoid *p*, so that the core *u* ascending releases the brakes.

j—Terminals of core *k* in solenoid *f* attached to the outer end of the arm of lever *h*.

DESCRIPTION OF THE PLANT ON LOCOMOTIVE AND REAR CAR AND ELECTRICAL SYSTEM APPLIED TO A RAILWAY TRAIN (Fig. 4.)

A—Generator on locomotive. A^1—Generator on rear car.

M—Generator in circuit with conductors T & B through solenoids Q & Q^1.

F—Solenoid (under cars) for applying brakes.

p—Solenoid (under cars) for releasing brakes.

Q & Q^1—Automatic solenoids on locomotive and rear car respectively in closed circuit with generator M and conductors T & B. When magnetized they hold cores, X & X^1, suspended over contact points K^1 & K^6.

C—Positive conductors to solenoid F.

D—Positive conductors to solenoid p.

T—Positive conductor of automatic circuit in connection with solenoids Q & Q^1.

B—Negative conductor, common to all circuits.

E & E^1—Switch lever on locomotive and rear car respectively for making contact with the terminals k^1, k^2, k^3, k^4, k^5.

k^1—Terminal for conductor C.

k^5—Terminal for connection with conductor D and solenoid p for releasing brakes.

k^2, k^3, k^4—Terminals of an ordinary rheostat for graduating the current.

k^6—Terminal in connection with switch levers E & E^1.

x & x^1—Cores of solenoids Q & Q^1.

y & y^1—Plug used for holding cores x & x^1 out of contact with k^1 & k^6 used when shunting, cutting out cars, etc.

k^2, k^3, k^4—Resistance coils adapted to graduate the current to 80%, 60% or 40% of the total electrical energy.

THE ELECTRICAL COUPLING (Fig. 3.)

The ELECTRICAL COUPLING, as seen in Fig. 3, consists of the combination of a metal frame, U, hollow, and containing the terminals V, V^1, V^2 respectively belonging to the conductors B, C & D, and mounted upon insulator, W, in the interior of the frame or casing, U, provided with a terminal, S, of conductor, I, secured to the outside of said casing, each terminal being elastic and adapted to press upon its mate in the other half. If for any reason one of the brake mechanisms is to be cut off or out of circuit, the coupling may be operated by hand; or, in case of a "break loose," it separates automatically with the train without damage to the coupler.

THE GENERATORS.

The GENERATOR A serves for all ordinary purposes, while the generator A^1 serves in case of a "break loose" or for occasional use in working trains, in shunting, cut outs, etc. The generator A^1 and M are auxiliary. The electrical energy may be stored in the generator whose capacity is such as to last from six to eight months, when they are again charged.

THE ELECTRICAL SYSTEM.

The ELECTRICAL SYSTEM employed is an open circuit system, so that any number of foreign cars not equipped with the electrical appliance may be made up with the train by placing them in the centre of the train and using electrical appliances on the locomotive for the forward section, and generators and electrical appliances in the rear car for the end section, for operating the system.

The Widdifield & Bowman Electric and Automatic Railway Car Brake

Provides means whereby the efficiency of the electrical appliances used is increased, so that only a small impulse of the electric current is required to produce the necessary brake power.

By this means an impulse of the electric current is first used to move the lever, h, connected with the small pulley, e, shown in Fig. 1. The lever being turned causes the said pulley to come into frictional contact with the collar, c (on the car axle, a), and to rotate.

The power thus developed by the revolving of the small pulley e is transmitted to the large pulley, d, which in its turn is also brought into frictional contact with collar, c, on the car axle. The large pulley, d, rotates and the brakes are applied. The momentum of the train and multiplication of power by means of the compound pulleys and levers produce the necessary brake power.

The brakes when set are held in position by means of the ratchet M (as shown in Fig. 1), until released.

IN WORKING THE TRAIN THE FOLLOWING METHODS ARE USED.

GRADUATING THE SPEED.

Assuming that the electrical brakes are in their normal condition, the train being in motion, and that it is desired to stop or slacken the speed, the engineer moves the switch lever, E (shown in Fig. 4), successively into contact

with terminals k^2, k^3 & k^4, as he may find necessary. The solenoid, F, on each car becomes magnetized and attracts the core, k, upwards so that the spring lever, h, operates on its fulcrum and moves the small pulley, e, towards the collar, c, bringing them into contact with a pressure dependent upon the amount of electric current. The pulley, e, rotating, turns the shaft, g, winds up chain, r, and causes the lever, w, to operate and turn the lever, r, until the large pulley, d, is pressed against the collar, c. A rotation of the large pulley, d, now occurs and its shaft, f, revolving winds up the chain, S, attached to the brake lever, t, and thereby the brakes are applied.

The spring arm of the lever, h, applies the brakes smoothly and evenly through above mechanism, and the brakes operating simultaneously on all cars, the speed of the longest train is checked or stopped without perceptible noise, shock or jar to any portion.

EMERGENCY STOPS.

Should an emergency stop be required, the engineer moves the switch lever, E, to terminal, k^1. The brakes are then applied with full current on all cars simultaneously by means of solenoids, F, and mechanism as previously described. The brake power thus obtained brings the longest train to a gradual but quick stop without shock or jar.

RELEASING THE BRAKES.

To release the brakes the engineer moves the switch lever, E, into contact with terminal, k^5, thereby energizing solenoids, p, which attract their cores, n, upwards and raise the free arms of ratchets, M, so that the cores, k, in solenoids, F, are released and fall. By this means the brakes of all cars are released instantly and simultaneously on the longest train.

"BREAK LOOSE."

The solenoids, Q & Q^1 (shown in Fig. 4), being normally in closed circuit with generator, M, by conductors, T & B, the cores, X & X^1, are held suspended by the same solenoids over the terminals, k^1 & k^6, in such positions that when the conductors, T & B, are accidently broken or separated, the cores, X & X^1, fall upon the terminals, k^1 & k^6, thereby closing the circuit of conductors, B & C, and apply the brakes on the separated sections of the train. As soon as brought to a stop, the brakes can be released at will—that in the front section by the engineer and that in the rear section by the conductor,—as independent electric currents remain in force in each section, through generators, A & A^1, respectively.

It will be seen that in case of break-away or other accident which interferes with the electric circuits the brakes are automatically applied to both sections of train. Although the brakes will apply automatically in case of accident, the train men do not lose control of them and need not necessarily stop. As if under certain circumstances it is considered desirable to do so, the engineer can release the brakes on the forward section and signal the men in the rear end to release theirs.

THE WIDDIFIELD AND BOWMAN ELECTRIC AND AUTOMATIC BRAKE SYSTEM.

CLAIMS.

1.—THAT it gives immediate and instantaneous application of the brakes on all cars of the longest train, and consequently "stops up" within the shortest possible time and distance, without shock or rebound.

2.—THAT it gives immediate and instantaneous release to brakes on all cars. The brakes never "stick," and hence they do not require "bleeding" to release.

3.—THAT it gives immediate and instantaneous application of the brakes to separated sections of the train in case of a "break loose."

4.—THAT it gives immediate and easy release (when required) to brakes to forward and rear sections of a separated train in case of a "break loose."

5.—THAT the locomotive may be "cut loose" and "run away," leaving the brake power of the train under perfect control at the rear car.

6.—THAT the train may be "cut" anywhere and at all times to "fly out cars," etc., without the brakes applying automatically.

7.—THAT it perfectly and smoothly graduates the speed of the train by means of resistance coils regulating the proper amount of electrical energy.

8.—THAT the tension of the brakes, being perfectly adjusted and checked when "on full," will not "skid" wheels, which causes the flattening of car wheels.

9.—THAT the link and pin coupling may still be used, and with less wear and tear to the rolling stock than at present.

10.—THAT this system of electrical and automatic brakes is cheap, endurable and applicable to all cars using the present hand brakes—it can be maintained at an estimated minimum cost and easily understood by all train men.

11.—THAT the mechanical parts are simple, endurable and do not require oiling, as there are no loose valves, springs, etc.

12. THAT the electric plant on the locomotive is light and portable, and can be easily transferred from one locomotive to another, and all connections made in a few minutes.

13.—THAT the electrical coupling is very simple in construction and operation, and is easily pushed together, and that it uncouples itself without attention when shunting or cutting out cars, etc.

14.—THAT no parts can be effected by frosts or climate.

15.—THAT the brakes are noiseless in their application and release, a great advantage when used for passenger cars.

16.—THAT there is no loss of steam power in operating this brake system, the brake power being received from the momentum of the train, hence a large saving to motive power and running expenses.

17.—THAT a train fully equipped with this brake is at all times under the control of men at either end of train and can be applied or released by either engineer or conductor whether the train is whole or in sections.

THE WIDDIFIELD & BOWMAN ELECTRIC CAR BRAKE.

THE LATEST INVENTION.

W. P. Widdifield and A. H. Bowman, electrician, of Allentown, Pa., U.S., are the inventors of a new continuous Car Brake, which promises to supersede all other car brakes in use, including the celebrated air brake. On Tuesday last a number of railway experts and others from different parts of the States and Canada met at Bethlehem, Pa., to view a test of the new brake. A fully equipped train was run up and down the Lehigh Valley Railroad, put through every known test, and all were amazed at the simplicity and perfection of the new device. Many stops were made when running at forty to fifty miles an hour, within as short a time and distance as it is possible to stop a train without breaking it up by the force of its own momentum. Unlike the air or any other brake, this one is controlled from either end of the train. In case the train is accidently broken in the middle, the brakes apply all along the train automatically and in an instant, and the brakes on each section of the train can be released instantaneously, although the train is separated, the independent electric circuits remain in each section, leaving absolute control of the forward section at the engine, and of the rear section at the caboose or rear car. Thus it will be seen that cars that are not fitted up with the brake may be taken into the middle of the train and switched out at will without interfering with the operation of the brake from either end of the train. At Tuesday's trial tests this important advantage was fully demonstrated. Another advantage over the present brakes is that each car on the longest train is independently and instantly acted upon, and the whole train gradually slows up to a stop without any vibration or bumping. The essential features of this new brake consist of a composite sleeve cast on to the car axle, upon which two friction pulleys, properly geared, are thrown into action by an impulse of electric current, by which a chain gear is wound, which applies the brakes to the car wheels. The electricity is stored in cells, which are placed on the engine and rear car, and carried by an insulated wire cable along the train, and suitably coupled between each car. It is contemplated to store the electricity from a dynamo attached to the engine, which may be used also to light the train. The application of this brake costs less than one-third, and the expense of running less than one-twentieth that of the air brake, because an impulse only of electricity is all that is required to apply the brakes; friction obtained from the momentum of the train does the rest. A large train is now being fitted up at the shops of the Lehigh Valley Railroad, under the supervision of the inventors, to run to New York, and a strong syndicate of capitalists is being organized to control the American patents. Patents are also applied for in Canada, and all foreign countries. When it is considered that there are over 1,000,000 freight cars in America alone upon which the hand brake is still in use, the importance of this invention can be partly realized.—*The Empire*, Toronto, Ontario.

THE WIDDIFIELD & BOWMAN
ELECTRIC AND AUTOMATIC CAR BRAKE

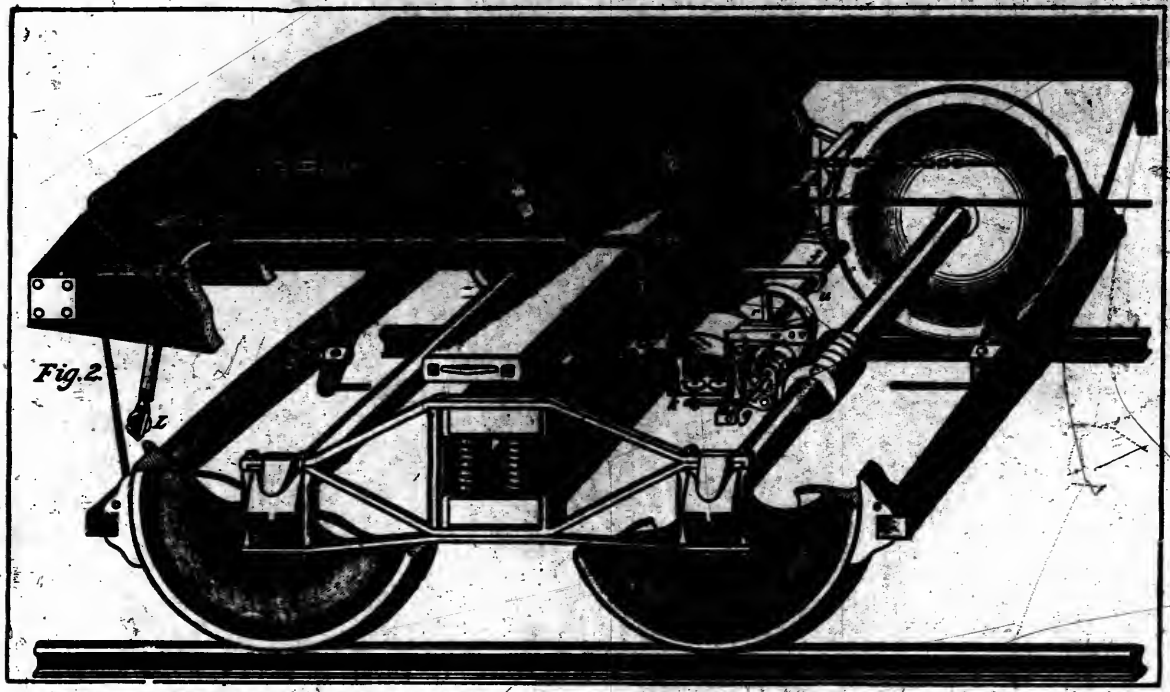

Fig. 2.