

No. 647,844.

A. KHOLODKOVSKY.  
BRAKE.

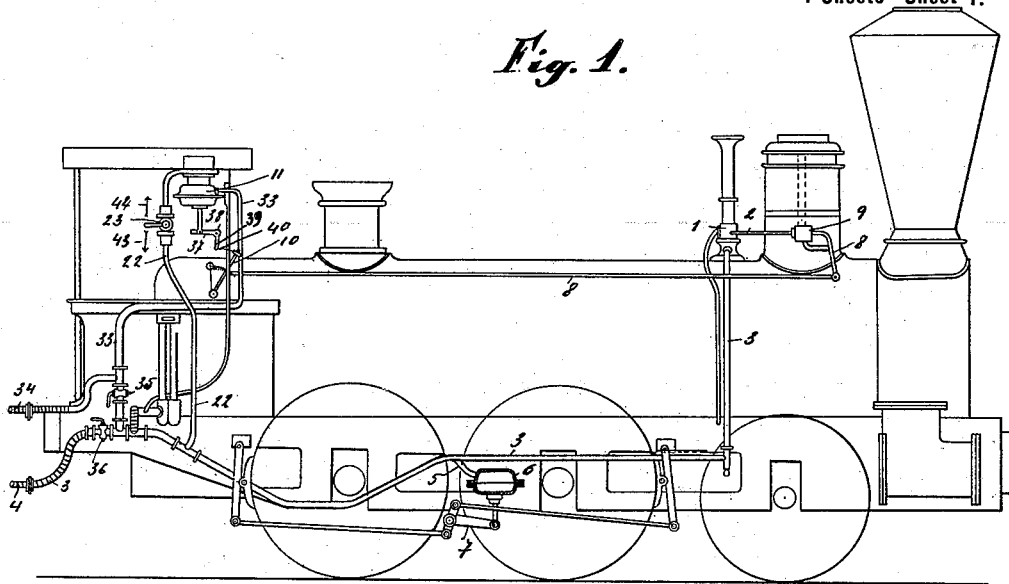
Patented Apr. 17, 1900.

(Application filed Oct. 18, 1898.)

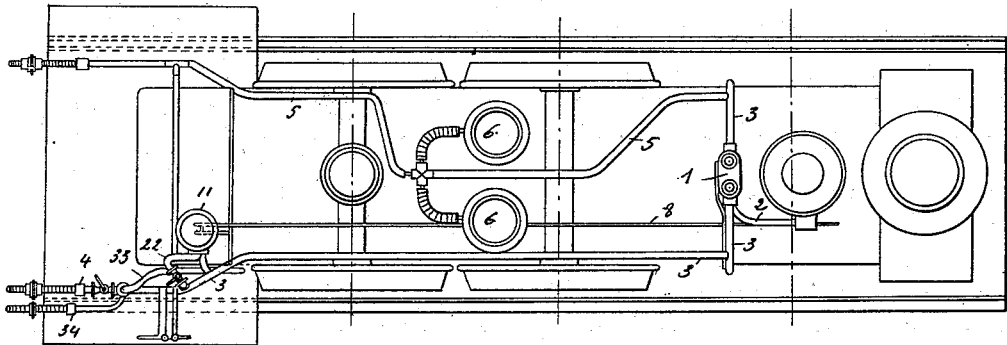
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4 Sheets—Sheet 1.

*Fig. 1.*



*Fig. 3.*



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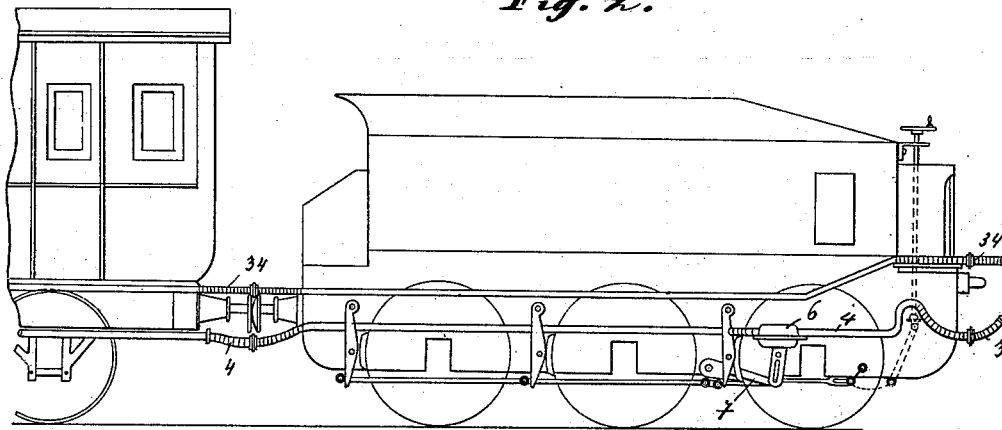
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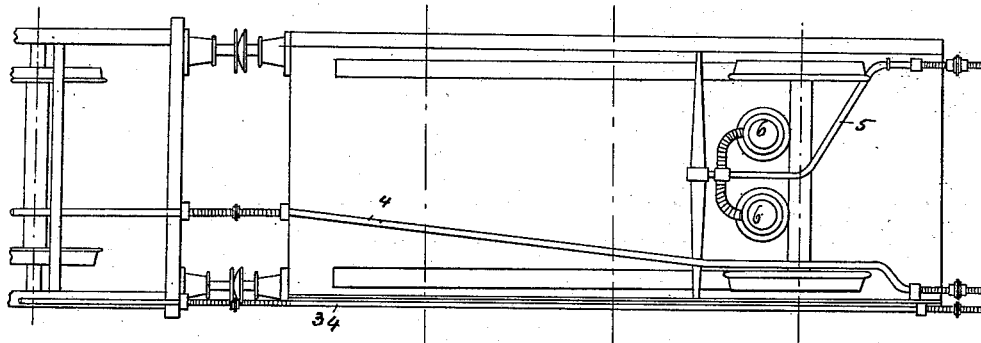
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*Fig. 2.*



*Fig. 4.*



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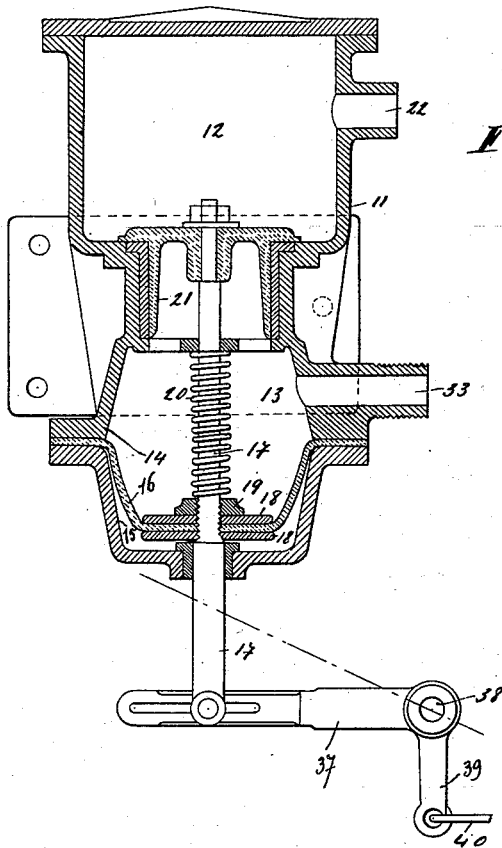
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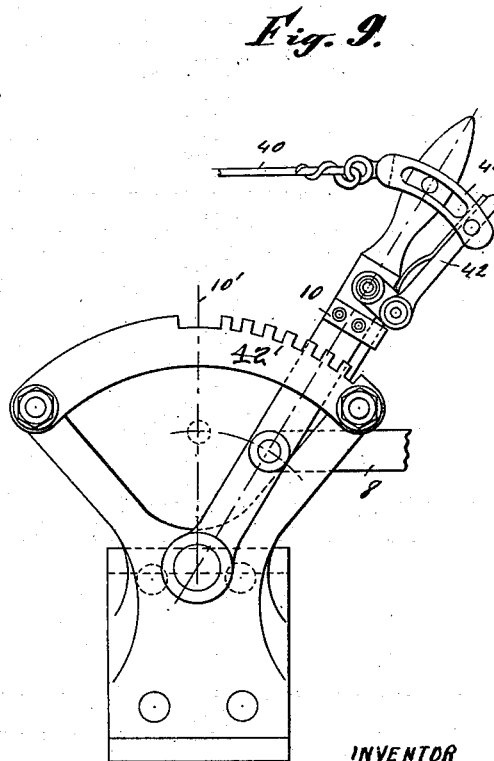
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*Fig. 5.*



*Fig. 9.*

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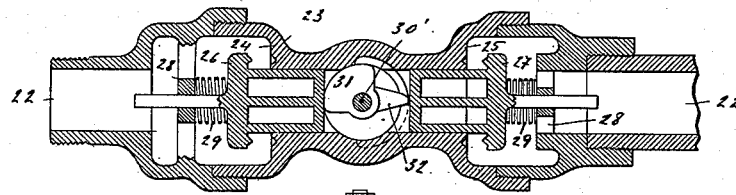
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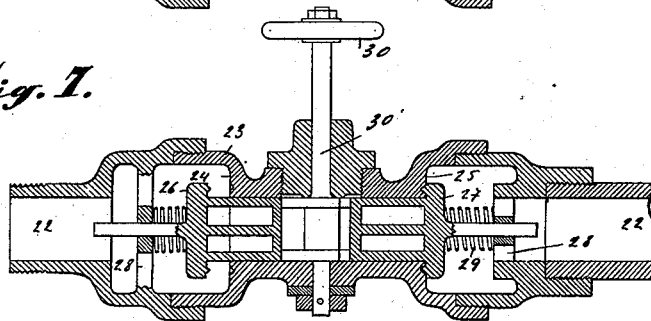
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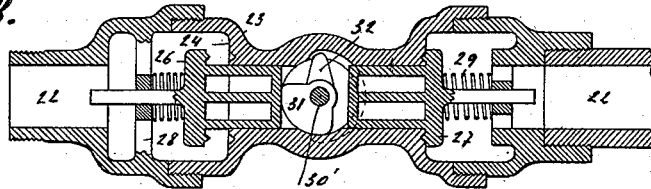
*Fig. 6.*



*Fig. 7.*



*Fig. 8.*



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# UNITED STATES PATENT OFFICE.

ANDRE KHOLODKOVSKY, OF KISHINEV, RUSSIA.

## BRAKE.

SPECIFICATION forming part of Letters Patent No. 647,844, dated April 17, 1900.

Application filed October 18, 1898. Serial No. 693,908. (No model.)

*To all whom it may concern:*

Be it known that I, ANDRE KHOLODKOVSKY, a subject of the Emperor of Russia, residing at Kishinev, Russia, have invented new and  
5 useful Improvements in Brakes, of which the following is a specification.

My invention relates to the brake mechanism of railway-carriages and the like, and has as its main object to allow of converting ordi-  
10 nary vacuum-brakes into automatic vacuum-brakes; and to this end my invention consists in certain features of construction and constructions of devices, as will be hereinafter more fully described, and particularly pointed  
15 out in the appended claims.

In the accompanying drawings, Figure 1 is a side elevation of a locomotive provided with a general arrangement of ordinary vacuum-brakes converted into automatic vacuum-  
20 brakes according to my invention; Fig. 2, a side elevation of the locomotive-tender and the cars, showing the pipes and vacuum-cylinders upon this part of the rolling-stock. Fig. 3 is a plan view of the general arrange-  
25 ment upon the locomotive. Fig. 4 is a plan view of the general arrangement upon the locomotive-tender and upon the cars. Fig. 5 is a section of a special vacuum-cylinder constructed according to my invention. Fig. 6  
30 is a sectional view of a double valve which is combined with the special vacuum-cylinder just referred to. Fig. 7 is a horizontal section, and Fig. 8 a vertical section, of the said double valve, showing one of the valves open  
35 and the other valve closed. Fig. 9 is a detail view of the operating-lever of the air-ejector.

In the accompanying drawings, 1 represents an air-ejector of ordinary construction mounted upon the locomotive-boiler.

2 is the steam-pipe of the said air-ejector, connected to the steam-chamber of the locomotive.

3 is the air-pipe of the said air-ejector, extending along the locomotive and connected  
45 upon the tender with an air-pipe 4, Fig. 2, extending the whole length of the train, and connected by means of pipes 5 to vacuum-cylinders or elastic vessels 6, of well-known construction, acting directly upon the brake-  
50 levers 7 in order to apply the brakes when a vacuum is produced in the said elastic vessels by means of the air-ejector 1. In the an-

nexed drawings, Fig. 3, another pipe 3 5 is connected to the ejector 1 and directly to the vacuum-cylinders 6 of the locomotive and of  
55 the tender in order to enable the action of the brakes on the locomotive and tender to be independent of the brake-pipe 3 4, leading to the brake-cylinders placed on each car of the train, which brake-cylinders are not illus-  
60 trated on the drawings, but are quite identical to the brake-cylinders 6, placed on the locomotive and on the tender.

8 represents levers connected to the stop-valve 9 of the air-ejector 1 and to the actuat-  
65 ing-lever 10 of the air-ejector.

The hereinbefore-described arrangement is the ordinary arrangement of vacuum-brake.

When the brakes are released, the valve 9 is closed and the air-ejector stopped, the at-  
70 mospheric air admitted in the pipe 3 through the air-ejector 1 acting in the elastic vessels 6 to maintain the lever 7 in a lower position corresponding to the releasing of the brakes.

When it is desired to apply the brakes, the  
75 driver moves the lever 10 in order to bring it into the position 10', (shown in Fig. 9 in dotted line,) so as to open the valve 9, thereby starting the air-ejector 1, which, exhausting  
80 air from the pipe 3 and from the vacuum-cylinders 6, causes the diaphragm or piston (of well-known construction) of these cylinders to be raised together with the lever 7, which applies the brakes in the ordinary manner.

According to my invention for converting  
85 ordinary or non-automatic vacuum-brakes of this kind into automatic vacuum-brakes I arrange upon the locomotive in proximity to the driver's cabin a special vacuum-cylinder  
90 11, divided into an upper and a lower chamber 12 13, Fig. 5. The lower chamber 13 is formed of two parts 14 15, between which is fixed a cup 16 of porous material, traversed  
95 by a rod 17, fixed to the bottom of the cup 16 by means of washers 18 and a nut 19, on which rests a spring 20, surrounding the rod 17. The said rod 17 carries at its upper end a pis-  
100 ton 21, which in the position shown on Fig. 5 closes all communication between the upper and lower chambers 12 13. The upper chamber 12 of the vacuum-cylinder 11 is connect-  
ed by a pipe 22 to the usual general pipe 3, connected to a pipe 4, extending the whole length of the train, this latter pipe leading to

brake-actuating cylinders placed on each car and not shown on the drawings, but similar to the brake-actuating cylinders 6 on the locomotive and tender.

- 5 23 is a double valve on the pipe 22 and is shown separately in Figs. 6, 7, and 8. This valve comprises two valve-seats 24 25, each provided with a valve 26 27, guided in cross-pieces 28 and kept to its seat by a spring 29.  
 10 The two valves 26 27 can be both kept open simultaneously by a key 30, Fig. 7. This key 30 is provided with a stem 30', fitted with two cams 31 32, arranged to each other in such a manner that, according to the position of  
 15 the key 30, the two valves 26 27 can be both kept open simultaneously or one, 27, can be kept closed and the other, 26, open, as shown clearly in Figs. 7 and 8.

- 20 33 is a pipe connecting the lower chamber 13 of the cylinder 11 with the general pipe 3 and its extension 4.

34 is a pipe connected to the said pipe 33, and extending the whole length of the train, like the general pipe 3 4.

- 25 35 is a cock placed on the pipe 33 between the pipe 34 (which will be called hereinafter the "supplementary" pipe) and the general or brake pipe 3 4.

- 30 36 is a cock placed on the general or brake pipe 3 before its connection with the pipe 4 and after its connection with the pipe 33.

- 37 is a bell-crank lever connected to the lower end of the rod 17, extending out of the cylinder 11. This lever is pivotally mounted  
 35 at 38 and connected with its arm 39, Fig. 9, to a short wire 40, attached to the operating-lever 10 of the air-ejector 1, Figs. 1 and 9, by means of a slotted bar 41 and of a spring-actuated pawl 42, engaging the teeth on a segment  
 40 42', adapted to fix the actuating-lever 10 in a given position by aid of the said pawl.

- The mechanism acts in the following manner: Let us suppose the brakes have just  
 45 been applied manually by the driver having started the air-ejector 1. This operation may be easily effected, the wire connection 40 allowing the displacement of the lever 10 without acting upon the lever 37 and the rod 17 of the vacuum-cylinder. In order to release the  
 50 brakes, the driver closes the valve 9 by means of the hand-lever 10, which is placed, therefore, in the position shown in Figs. 1 and 9. Now in order to set the system ready for operation the driver closes the cock 36 and opens the  
 55 cock 35, and then by starting again the ejector 1 in bringing the lever 10 in the position 10' (shown in dotted line, Fig. 9) he exhausts the air from so much of the pipe 3 as extends forward of the cock 36, and as this section of  
 60 the pipe 3 is connected with the pipe 22 directly the air will be exhausted from the pipe 22 and the upper chamber 12 of the vacuum-cylinder 11, the valve 27, which is the lower one and opens downwardly in the direction of  
 65 the arrow 43, Fig. 1, falling from its seat by the suction, while the valve 26 is held off of its seat, in the direction of the arrow 44, Fig.

1, by the cam 31 of the key 30. The air is also exhausted from the pipe 33 and the auxiliary pipe 34 by way of the cock 35, and the  
 70 pipe 33 connecting with the chamber 13 the air is exhausted from there also. The cock 35 is then closed and the cock 36 is opened and the air-ejector stopped. The brakes are kept off or free from the wheels, the air hav-  
 75 ing not been exhausted from the pipe 4 and being again admitted in the pipe 3. This air flowing up the pipe 22 closes automatically the valve 27. The brakes are thus released and ready to be operated automatically upon  
 80 any accident to the auxiliary pipe 34 or upon the reduction of pressure in the pipes 3 4, caused by the engine-driver when by acting manually upon the actuating-lever 10 he applies the brakes manually. If air is admitted  
 85 to the pipe 34 upon any accident, it will flow by pipe 33 into chamber 13, and thus force the piston 21 up to operate the rod 17, and thus through the connection 37 40 will operate the ejector 1, which, starting, will ex-  
 90 haust the air from the pipes 3 and 4 and cause the brakes to be applied in the well-known manner. The brakes having been operated automatically in this manner the driver, in order to release them again, has only to stop  
 95 the ejector, which operation may be easily effected by setting the lever 10 again in the position shown in Fig. 1 and turning the key 30 of the double valve 23 in the position shown  
 100 in Fig. 6, so as to allow the entrance of the air in the chamber 12 of the vacuum-cylinder 11. In order to set the system ready again to operate automatically, the first operation hereinbefore described must be repeated—in other  
 105 words, the cock 36 must be closed, the cock 35 opened, the key of the valve 23 turned so as to open the valve 26 and to close the valve 27, and the ejector started in order to exhaust the air from the pipes 34 33 22 and from the chambers 12 and 13 of the vacuum-  
 110 cylinder 11.

It will be observed that the elastic cup 16 in the vacuum-cylinder 11 is only provided in order to guide more easily the rod 17 of the piston 21 and to serve as a bearing for the  
 115 washers 18, upon which rests the spring 20. This cup might be dispensed with in the case of using a rod 17 sufficiently strong.

I am aware that means for starting automatically the air-ejector of vacuum-brakes  
 120 have already been used; but it will be observed that no one of these arrangements has ever been allowed to apply the brakes automatically from each of the cars of a train by means of a single apparatus placed upon the  
 125 locomotive. It will be further observed that with my arrangement all storing-reservoirs and valve arrangement upon the cars may be dispensed with, the action of the air-ejector acting directly upon the vacuum-cylinders or elastic vessels 6, connected to the  
 130 brake-levers 7, and this automatical action being obtained by aid of a single apparatus placed upon the locomotive.

I claim—

1. In a vacuum-brake for railway-carriages  
in combination with the air-ejector, the ac-  
tuating-lever of the said air-ejector, the brake-  
5 pipe and the elastic vessels connected there-  
with, a vacuum-cylinder placed upon the  
locomotive, two vacuum-chambers in said  
cylinder, a piston separating said chambers,  
a rod connected to said piston, a transmitting  
10 device connecting the said rod with the ac-  
tuating-lever of the air-ejector, two pipes  
connecting each chamber of the said vacuum-  
cylinder with the brake-pipe, an auxiliary  
pipe extending the whole length of the train  
15 and connected with the pipe of the lower  
chamber of the vacuum-cylinder, a cock be-  
tween the said pipe and the brake-pipe, in  
order to separate the lower chamber of the  
vacuum-cylinder and the auxiliary pipe from  
20 the brake-pipe, a cock on the brake-pipe in  
order to cut all communication from this pipe  
with the air-ejector when the said ejector ex-  
hausts the air from the auxiliary pipe and  
the two chambers of the vacuum-cylinder, a  
25 double valve opening in opposite directions  
on the pipe connected to the upper chamber  
of the vacuum-cylinder, springs acting upon  
the said valves and a key keeping open the

upper of these valves during the exhaust of  
the air or both simultaneously for releasing 30  
the brakes substantially as described and for  
the purpose of starting automatically the air-  
ejector from each car and applying the brakes  
when air is admitted in the auxiliary pipe.

2. In a brake mechanism of railway-car- 35  
riages, in combination, a vacuum-cylinder,  
two chambers in said cylinder, a piston sep-  
arating said chambers, a rod connected to  
said piston and provided with a spring, a  
transmitting device connected to the rod of 40  
the piston, means for actuating the brakes by  
aid of said transmitting device, brake-pipes  
extending the length of train, auxiliary pipes  
connecting said pipes with the two cham-  
bers of the vacuum-cylinder, a tube pro- 45  
vided with two valves opening in opposite  
directions, springs acting upon said valves  
and a key keeping open either of the said  
valves or both of them simultaneously, sub-  
stantially as described. 50

In witness whereof I have hereunto set my  
hand in presence of two witnesses.

ANDRE KHOLODKOVSKY.

Witnesses:

P. W. FLAHERTY,

THOMAS E. HEENAN.