

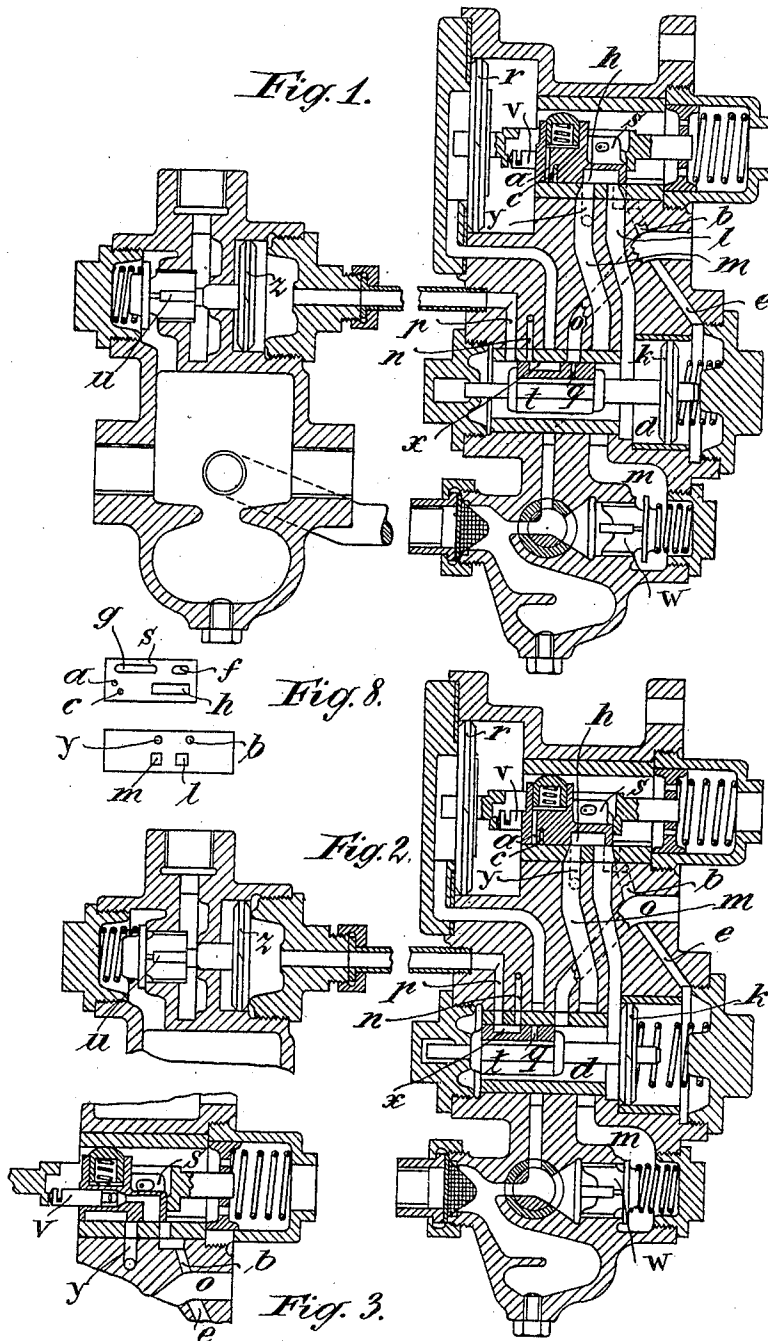
No. 812,752.

PATENTED FEB. 13, 1906.

G. KNORR.
DISTRIBUTING VALVE FOR AIR BRAKES.

APPLICATION FILED JULY 11, 1904.

2 SHEETS—SHEET 1.



Witnesses:
Arthur Thiergart.
Max Bensch.

Inventor:
Georg Knorr.
by F. J. Hoppen
Attorney.

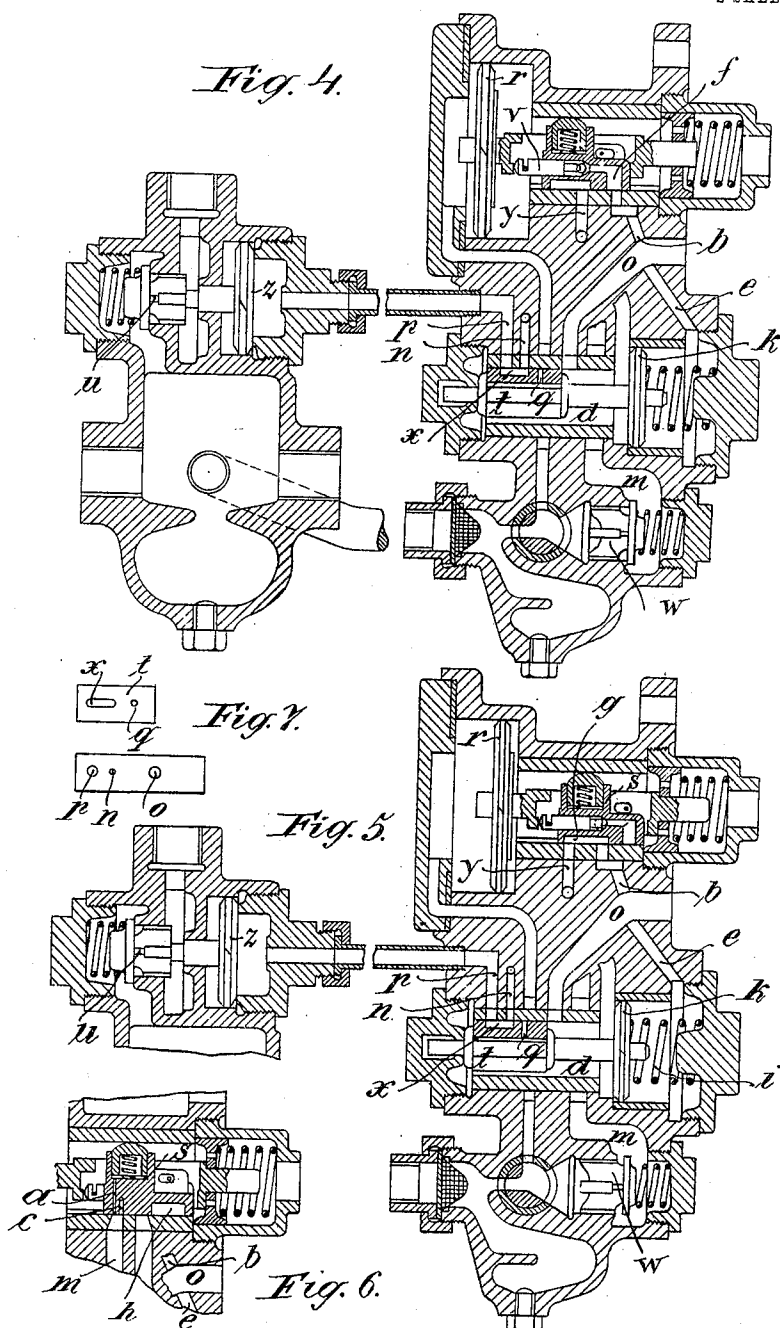
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Attorney.

UNITED STATES PATENT OFFICE.

GEORG KNORR, OF BRITZ, NEAR BERLIN, GERMANY.

DISTRIBUTING-VALVE FOR AIR-BRAKES.

No. 812,752.

Specification of Letters Patent.

Patented Feb. 13, 1906.

Application filed July 11, 1904. Serial No. 216,171.

To all whom it may concern:

Be it known that I, GEORG KNORR, manufacturer, a subject of the King of Prussia, German Emperor, residing at No. 49 Jahnstrasse, Britz, near Berlin, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Distributing-Valves for Air-Brakes, of which the following is a specification.

10 This invention relates to improvements in distributing-valves for air-brakes of the kind in which for the purpose of quickly actuating the brakes in case of danger the air contained in the air-conduit is made to pass either into
15 the braking-cylinder or into the open air, so as to obtain by one means or the other the great diminution of pressure, as well as quick propagation of that diminution. Brakes of such a kind are known, as are also the distributing-valves employed in said brakes, as well as feature of same to pass from their position of rest into normal working position and from this into the position of emergency quicker in the first or front portion or half of
20 the train than in the second or rear portion or half of the same. This particularity of the valves in question is made use of in my present invention for the purpose of braking all the cars of a train not only at a time, but
25 uniformly, as well as with constant power and perfect certainty, the means for these effects consisting in letting a certain greater amount of air pass into the braking-cylinders of the second or rear portion or half of
30 the train than into those of the first or front portion or half of the same as soon as the valves when passing from their position of rest to their position of emergency have just arrived in that position which they occupy
35 when being in their normal one.

The constructional features for attaining the effect in question consist of certain arrangements and combinations of parts as are fully described hereinafter, and in order to
40 make my invention more clear I refer to the accompanying drawings, in which similar characters denote similar parts throughout the several views, and in which—

50 Figure 1 is a longitudinal section through the distributing-valves and the dust-collector of a braking apparatus constructed according to my invention, the position of the parts being that they assume when, in a case of emergency, a sudden braking is initiated,
55 all the parts in this figure, as well as in Figs. 2 to 7, inclusive, being shown in section. Figs.

2 and 3 show the same parts in that position which they have assumed when the aforementioned braking is completed. Fig. 4 shows the parts in their normal position. Fig. 60 5 shows them in the position they assume when thrown out of action, and Fig. 6 shows the parts when made ready for another application. Figs. 7 and 8 are diametrical representations of the slides *t* and 5 and of the 65 seats of said slides.

To make the brake ready for action, compressed air is introduced into the main conduit, and in consequence hereof the distributing-piston *r*, Fig. 4, is displaced to the 70 right, Fig. 5. At the same time this air opens the release-valve *w* and passes through the channel *m*, as well as through the channels *a* and *c* of the slide *s*, Figs. 6 and 8, into the auxiliary air-reservoir. In this position the 75 cavity *g* in the slide connects the brake-cylinder with the outer air by means of the channels *b* and *y*, and also the channel *e* is connected with the space behind the piston *k*, so that the spring *i* can press the piston *k*, as 80 well as the slide *t*, to the left—i. e., into the position of rest, Fig. 5.

If an ordinary braking shall be brought about by means of a slow reduction of pressure in the conduit, the pressure in the auxiliary air-reservoir causes a gradual displacement to the left of the distributing-piston *r* 85 with the slide *s*, Fig. 4. In consequence hereof, first, the graduation-valve *v* is lifted off its seat in the slide *s*, and thereafter this 90 slide is displaced in such a way that its aperture *f* arrives over the channel *b*, so as to open for the compressed air from the auxiliary air-reservoir a way through the channel *b* to the brake-cylinder and through the channels *e* 95 and *c* behind and in front of the piston *k*, so that the latter is not actuated by the air and the braking is initiated in known manner.

If in a case of emergency a sudden and powerful decrease of pressure is brought 100 about, the pressure of the air within the auxiliary air-reservoir drives the piston *r* with the slide *s* into the left-end position in which the air passing from the auxiliary air-reservoir through the channel *b* to the brake-cyl- 105 inder is slowly throttled, Fig. 3. Owing hereto the distributing-valves *s*, located in the front portion of the train, pass quicker away over the normal braking position than is the case in the rear portion of the train, so 110 that in this portion a larger quantity of compressed air passes from the auxiliary air-res-

5 reservoir into the braking-cylinder—that is to say, behind the piston *k*—than is the case in the front portion of the train. At any rate, however, the brake-cylinder, or, more precisely, the space behind the piston *k*, does not receive as much compressed air as is necessary to balance the pressure of the compressed air getting to the front side of the piston *k* through the opened valve *w*, the channel *m*, the cavity *h* of the slide, and the channel *l*, Fig. 1, so that the piston *k* is quickly moved to the right-hand end position and at the same time the slide *t* opens the channel *p* to the push-piston *z* at the dust-collector, whereas at the same time the channel *q* in the slide *t* connects the slide-chamber *d* with the brake-cylinder and permits a slow entrance of air into the brake-cylinder from the conduit, as well as from the reservoir, in consequence of which the brakes are gradually applied. The pressure acting upon the push-piston *z* causes the opening of the escape-valve *u*, Fig. 1, through which large quantities of air from the conduit escape into the atmosphere, in consequence of which a strong decrease of pressure in the conduit is brought about, said decrease being sufficient to displace the distributing-valves of the nearest brake-cars into the position of emergency even in the case where a considerably large number of cars without brakes, but with brake-conduits, exist. The small aperture *g* in the slide *t* causes pretty soon a decrease of pressure in the conduit and in the slide-chamber *d*, whereas the pressure in the brake-cylinder increases so that after one or two seconds in which all the distributing-valves in the train have assumed the other position the slide *t* is pushed by the piston *k* into its former position, Fig. 2, while at the same time the compressed air escapes into the atmosphere behind the push-piston *z* through the cavity *x* in the slide *t* and through the channel *n*, whereafter the exit-valve *u* is closed by means of its spring. This change of position of the piston with the slide occurs quicker in the rear portion of the train than in the front portion of the same, the reason being the slower movement of the distributing valves from the normal position into the position of emergency, as well as the passage of a greater quantity of air from the reservoir through the channel *b* to the brake-cylinder and through the channel *e* into the space at the right side of the piston *k*. Owing to all this, the change of position of the slides *t* occurs pretty much simultaneously through-

out the whole train and the rear cars are prevented from running upon the front cars in consequence of the slight passage of air from the conduit and the slow passage of air from the reservoir to the brake-cylinder.

In order to avoid the slide *t* of the emergency-brake and the distributing-slide *s* to get too great dimensions, the air of the conduit is conducted by the slide *t* in the case of an emergency not immediately into the outer air, but is employed as a means for actuating the push-piston *z* at the dust-collector, so that the large sectioned escape-valve *u* is opened and a quick decrease of pressure in the conduit is produced.

I am aware of the braking apparatus described and shown in the United States Patents Nos. 496,200 and 693,949, and do not claim any of the combinations and arrangements of parts therein published and thereby protected, but

What I claim, and desire to secure by a Patent of the United States, is—

1. In a device for simultaneously applying all the brakes of a train uniformly and with equal pressures in cases of emergency, the combination with the piston *k*, the cylinder of the same and the main distributing-valve, of means for connecting the front side of said piston with the compressed-air conduit, and a spring *i*, adapted to displace the piston until the pressure of the air at both sides of the piston is the same, an air-escape valve consisting of a forcing-valve *u*, and a spring pressing open said valve, a piston *z* connected with said valve and adapted to be displaced by the conduit-air in cases of emergency, substantially and for the purpose as described.

2. In a device for simultaneously applying all the brakes of a train in cases of emergency, the combination with the piston *k*, the cylinder of the same and the main distributing-valve, of means for connecting the front side of said piston with the compressed-air conduit, and a spring *i*, adapted to displace the piston until the pressure of the air at both sides of the piston is the same, an air-exit channel *p* terminating into the open air and an auxiliary slide *t* adapted to act upon said channel, substantially and for the purpose as described.

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

GEORG KNORR.

Witnesses:

HENRY HASPER,
 WOLDEMAR HAUPT.