

May 16, 1933.

F. BREDENBREUKER

1,908,729

INTERNAL COMBUSTION LOCOMOTIVE

Filed Nov. 25, 1931

2 Sheets-Sheet 1

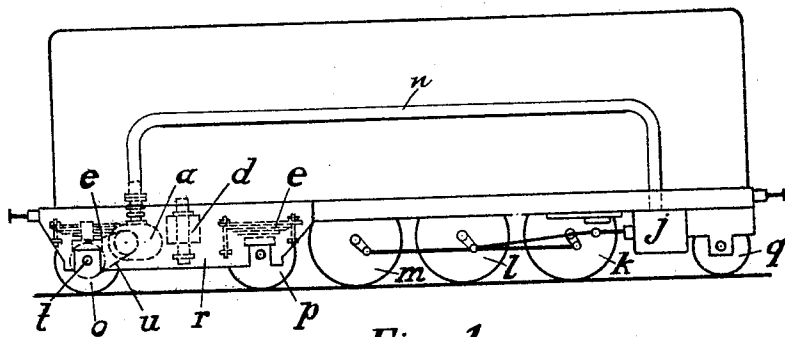


Fig. 1

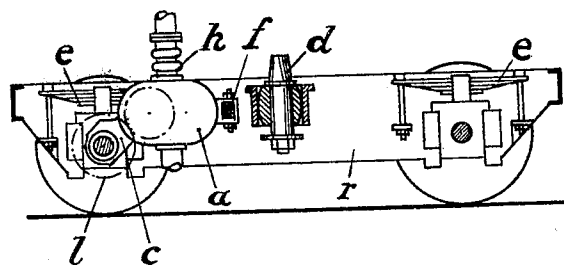


Fig. 2

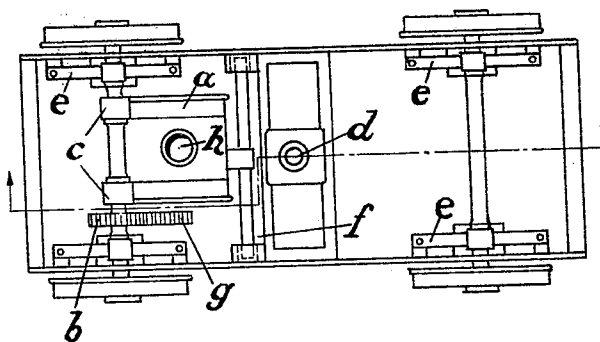


Fig. 3

Inventor:

Fritz Bredenbreuker

May 16, 1933.

F. BREDENBREUKER

1,908,729

INTERNAL COMBUSTION LOCOMOTIVE

Filed Nov. 25, 1931

2 Sheets-Sheet 2

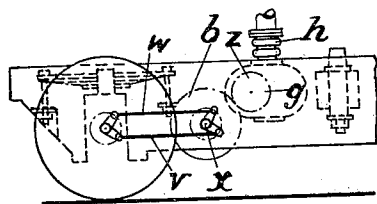
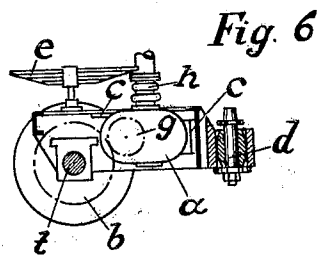
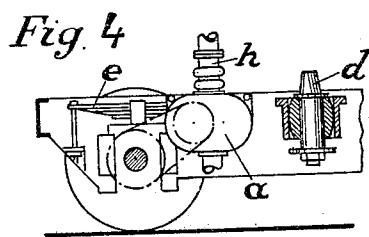


Fig. 5

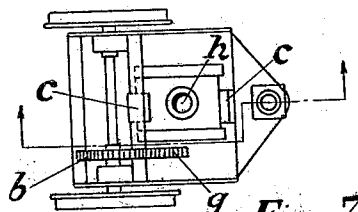


Fig. 7

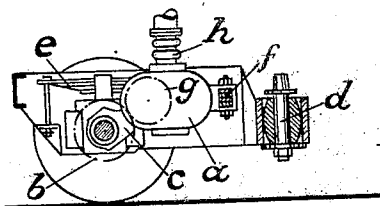


Fig. 8

Inventor:

Fritz Bredebreuker

UNITED STATES PATENT OFFICE

FRITZ BREDENBREUKER, OF COLOGNE-DEUTZ, GERMANY, ASSIGNOR TO HUMBOLDT-DEUTZMOTOREN A. G., OF COLOGNE, GERMANY

INTERNAL COMBUSTION LOCOMOTIVE

Application filed November 25, 1931, Serial No. 577,316, and in Germany December 17, 1930.

The present invention relates to two-stroke Diesel locomotives with a direct drive of the engine on the axles.

Hitherto the scavenging blower, when it was not driven by a separate motor, was combined with the main driving engine to form a unit engine group, for which a common crank shaft was usually employed.

Lack of space and difficulty in supervision due to the combined assembly may make this arrangement very disadvantageous. In accordance with the present invention, the blower is separated from the driving engine and its drive is derived from one of the axles.

This separation has the advantage, in addition to the possibility of a more favourable distribution as regards weight and space, of better accessibility to the engine for the purpose of assembly, repair and supervision etc.

This is advantageous, particularly for the main engine, because the cylinders and driving parts can then be placed laterally outside the frame as in steam locomotives; also the castings are simpler than those required for a combined arrangement. The requirement that the blower must deliver quantities of air corresponding to the speed of revolution of the driving engine is also fulfilled in this separated arrangement, since even

when driven from a running axle (not a driven axle) through the agency of rail friction the transmission ratio is uniform. The last mentioned drive offers particular advantages. The transmission ratio of the drive of the blower which usually runs at a higher speed of revolution is more favourable, since on account of their smaller diameter, the running wheels already have a higher speed of revolution than the driving wheels. Further if the driving wheels slip, the running wheels maintain a speed corresponding to the travelling speed and therefore a lesser amount of air is delivered to the accelerating engine. The speed of revolution of the engine consequently will immediately drop and thereby diminish the slipping. The blower can be built, for example, in a bogie or running underframe with the result that a good utilization of space is obtained and the transmission of the vibra-

tion of the driving engine and frame to the blower is avoided. The air piping from the blower is taken to the locomotive frame by way of a movable pipe connection of a kind known per se. According to the type of running frame or bogie employed, there are employed for driving the blower either toothed wheels, chains or coupling rods, the possibilities of which are considered more particularly in the description of the drawings. In bogies having two axles two blowers can also be fitted.

The scavenging blower according to this invention does not come into operation until the locomotive has attained a suitable speed. At low speeds during starting or at heavy load, scavenging air is supplied by means of an auxiliary scavenging blower driven by an external source of energy.

Various ways of fitting the blower in accordance with the invention are illustrated by way of example in the accompanying drawings, in which

Fig. 1 is a general view of the locomotive,

Figs. 2 and 3 show on a larger scale the mounting of the blower on a bogie or truck in longitudinal section and in plan respectively,

Figs. 4 and 5 show other ways of mounting the blower in a two axle bogie or truck, which is illustrated only in part,

Figs. 6 and 7 illustrate a longitudinal section and plan respectively of a single-axle running under-frame with the blower mounted in it, and

Fig. 8 shows a form of mounting differing again from the previous forms.

Referring to the side elevation of the locomotive shown in Fig. 1, *j* is a working cylinder externally disposed laterally of the locomotive frame, which directly drives the axles of the wheels *k*, *l* and *m*. A pair of running wheels is shown at *q*, and *o* and *p* are each a pair of wheels of the rear bogie *r*, which can turn about the pivot *d*. The blower *a* which is fixed in the sprung bogie or truck *r* is driven from the running axle *t* by means of the chain *u*. The pressure piping or conduit *n* leads to the air distribution chambers

of the main cylinder by way of the movable tubular connection *h*.

In the larger scale Figures 2 and 3 of the bogie or truck carried by the springs *e*, the blower is again represented by *a*. The blower is revolvably supported on the axle in the two bearings *c* and on the opposite side upon the spring *f*, which is carried in pockets in the frame of the bogie or truck *r*. This form of mounting enables toothed wheels *b* and *g* to be used for driving the blower, and if necessary a countershaft can be interposed in order to obtain a sufficiently high blower speed.

In the bogie or truck according to Fig. 4, the blower is connected fast to the bogie, as indicated in the general arrangement according to Fig. 1, and the bogie, owing to the chain drive *u*, permits swinging of the spring frame. In the side view according to Fig. 5, the blower is fixed in the same manner, and the possibility of a yielding movement of the springs is given by a double coupling rod drive, the rods of which are indicated by *v* and *w*. In addition a counter-shaft *x* is arranged between the final toothed wheel drive *b* and toothed wheel *z* of the blower. The running frame according to Figs. 6 and 7 is supported by the spring *e* against the main frame, while the axle *t* is not resiliently journalled. In this case again a simple toothed wheel drive *b* and *g* can be provided for the fixed blower. In the section according to Fig. 8 the running frame is held against its axle by the spring *e*. The blower is fitted in the same way as in Figs. 2 and 3, and is supported at one side on the axle by the bearing *c* and on the other side in the spring *f*.

I claim:

1. In a locomotive, a driving axle, a running axle, a two-stroke internal combustion engine, driving connections between said engine and said driving axle, a rotary scavenging blower for said engine separated therefrom, a conduit for connecting the scavenging blower with the scavenging ports of said engine, and means for actuating said blower from said running axle.

2. In a locomotive, a driving axle with driving wheels thereon, a running axle with wheels thereon of smaller diameter than said driving wheels, a two-stroke internal combustion engine, a beam transmission system connected between said engine and said driving axle, a rotary scavenging blower for said engine separated therefrom, a conduit for connecting the scavenging blower with the scavenging ports of said engine, and means for actuating said blower from said running axle.

3. In a locomotive, a driving axle, a truck carried by said locomotive, a running axle on said truck, a two-stroke internal combustion engine, driving connections between said engine and said driving axle, a rotary scavenging blower for said engine mounted on said

truck, a conduit for connecting the scavenging blower with the scavenging ports of said engine, and driving connections between said running axle and said blower.

4. In a locomotive, a driving axle, a running axle, a two-stroke internal combustion engine, driving connections between said engine and said driving axle, a rotary scavenging blower for said engine separated therefrom, bearing means for supporting one side of said blower upon said running axle, a spring bar extending parallel to said axle for supporting the other side of said blower, a conduit for connecting the scavenging blower with the scavenging ports of said engine, and driving connections between said running axle and said blower.

5. The combination in a locomotive as set forth in claim 4 wherein said last mentioned driving connections comprises toothed gear wheels upon the running axle and said blower.

6. In a locomotive, a driving axle with driving wheels thereon, a truck carried by said locomotive, a running axle resiliently mounted on said truck having wheels thereon of smaller diameter than said driving wheels, a two-stroke internal combustion engine, driving connections between said engine and said driving axle, a rotary scavenging blower for said engine fixedly mounted on said truck laterally of the plane of movement of said resiliently mounted axle, chain drive connections between said running axle and said blower, and a conduit for connecting the scavenging blower with the scavenging ports of said engine.

7. In a locomotive, a driving axle with driving wheels thereon, a truck carried by said locomotive, a running axle resiliently mounted on said truck having wheels thereon of smaller diameter than said driving wheels, a two-stroke internal combustion engine, driving connections between said engine and said driving axle, a rotary scavenging blower for said engine mounted on said truck, a conduit for connecting the scavenging blower with the scavenging ports of said engine, and driving connections between said running axle and said blower comprising a crank shaft and a double crank drive extending thereto from said running axle, said crank shaft extending in parallel with said resiliently mounted running axle, and laterally of the plane of movement thereof.

In testimony whereof I affix my signature.

FRITZ BREDENBREUKER.