

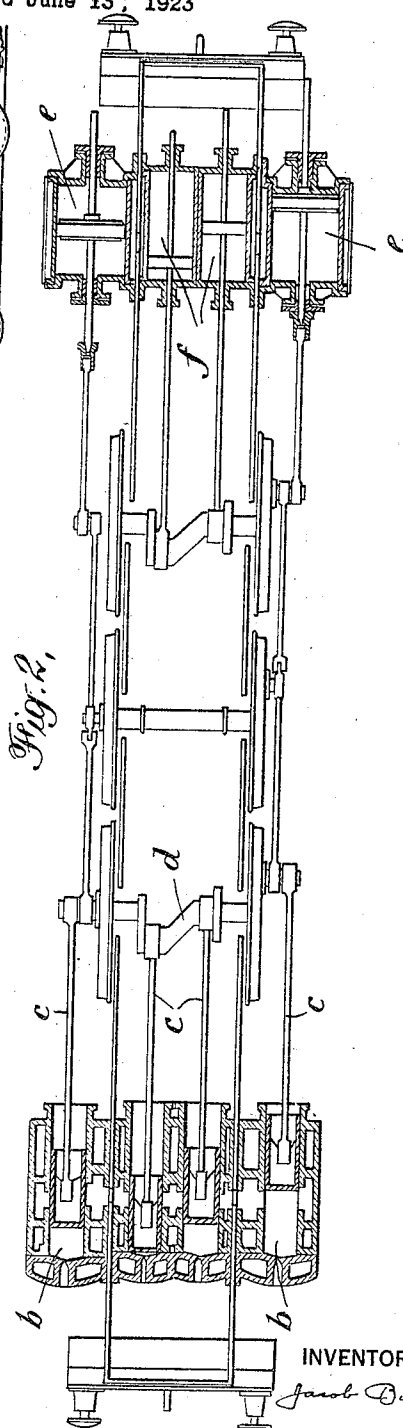
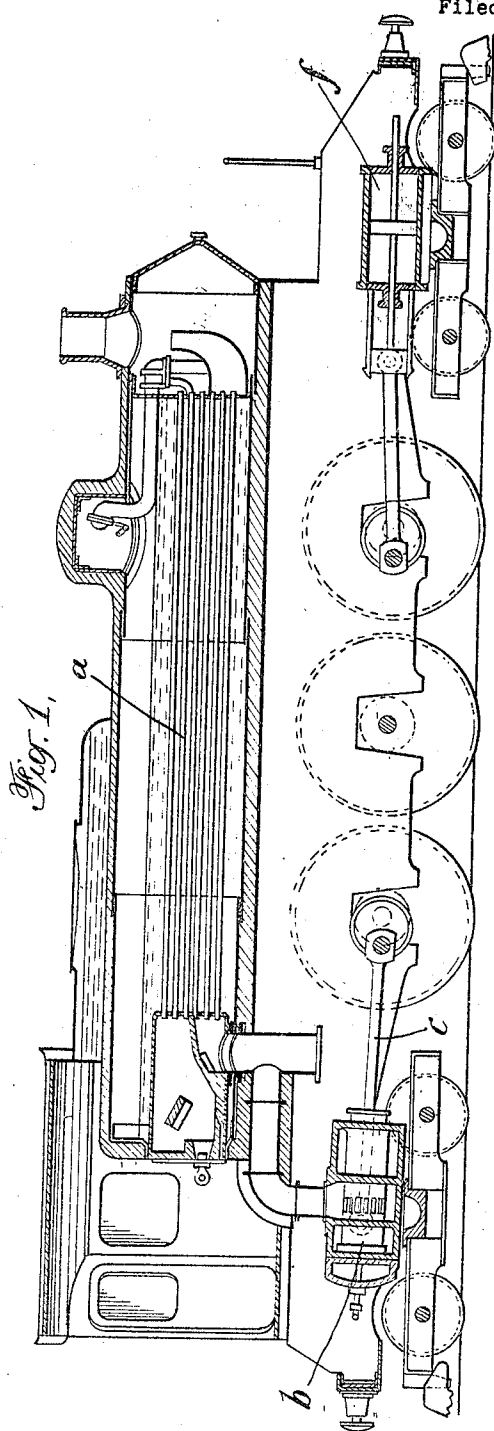
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J. BUCHLI

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LOCOMOTIVE DRIVEN BY STEAM AND INTERNAL COMBUSTION ENGINES

Filed June 13, 1923



INVENTOR

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LOCOMOTIVE DRIVEN BY STEAM AND INTERNAL-COMBUSTION ENGINES.

Application filed June 13, 1923. Serial No. 645,204.

To all whom it may concern:

Be it known that I, JACOB BUCHLI, a citizen of Switzerland, residing at Baden, Switzerland, Felsenstrasse 2, have invented certain new and useful Improvements in Locomotives Driven by Steam and Internal-Combustion Engines, of which the following is a specification.

In locomotives driven by steam and internal-combustion engines it has already been proposed to arrange a group of at least two cylinders at the front of the boiler and a similar group at the back of the boiler in a common frame, the cylinders working on driving axles which are coupled together. This arrangement has the advantage of giving a uniform turning moment with a large output and at the same time making the working cylinders and valves easily accessible. The steam and air cylinders required for the locomotive can conveniently be built together with the two internal-combustion cylinder groups in suitable grouping.

The object of the present invention is to effect an improvement in such locomotives by uniting all the internal-combustion cylinders into one group at the front or at the back of the boiler and working directly on one driving axle, while all the steam and air cylinders are grouped together at the other end of the boiler and work on another driving axle.

A locomotive constructed according to this invention is shown in the drawing.

Fig. 1 shows the locomotive in longitudinal section, Fig. 2 in cross section. The boiler *a* is, contrary to standard locomotive practice, constructed with low-lying fire-box and grate in order that the driving gear of the rear cylinder group may be arranged at that place. At the back of the locomotive the internal-combustion cylinder group *b* is arranged, which, with its coupling rods *c*, works directly on the driving axle which is constructed as crank-shaft, while, at the front of the locomotive, the steam cylinders *e* and the air cylinders *f* are arranged beside

each other. This arrangement has the advantage that the stresses in the frame due to the great piston power of the internal-combustion cylinders are always in one and the same direction and at one and the same spot, so that a strengthening of the frame will be required only at one end, and the turning moment on one axle is balanced directly and without transmission through intermediate rods.

In order to attain as uniform a turning moment as possible in the crank circle, the cranks of the internal-combustion cylinders are conveniently set at 90 degrees to each other.

In order that the driving wheels may not limit the dimensions of the internal-combustion cylinders, it is desirable to arrange the internal-combustion cylinders within the common frame at such a spot where it is possible to increase the distance between the side frames.

For attaining smooth running of the locomotive the internal-combustion cylinders are preferably arranged as horizontally as possible, the shocks which are unavoidable from such cylinders being thereby directed horizontally and bending stresses in the frame consequently avoided.

I claim:

1. In a locomotive of the type described, a frame, a group of at least four internal-combustion cylinders arranged in said frame at one end and working directly without intermediate rods on a driving axle, and at the opposite end of said frame only steam or air cylinders or both, the two cylinder groups being connected to each other through the driving wheels by coupling rods.

2. In a locomotive of the type described, a frame, a group of at least four internal-combustion cylinders arranged in said frame at one end and working directly on a driving axle with the cranks set at 90 deg. to each other.

3. In a locomotive of the type described,

a frame, a group of at least four internal-combustion cylinders arranged in said frame at one end and working on the driving axles which are formed as crank-shafts for the 5 internal-combustion cylinders. at the opposite end of the frame only steam 10 or air cylinders or both.

In testimony whereof I have affixed my signature in presence of two witnesses.

JACOB BUCHLI.

4. In a locomotive of the type described, a frame, a group of at least four internal-combustion cylinders arranged substantially horizontally in said frame at one end, and

Witnesses:-

B. KNOPFLI,
CHR. WILKINSON.