2 Sheets--Sheet 1.

F. WANNIECK & H. KOEPPNER.

Valve-Gear.

No. 164,618. Patented June 15, 1875.

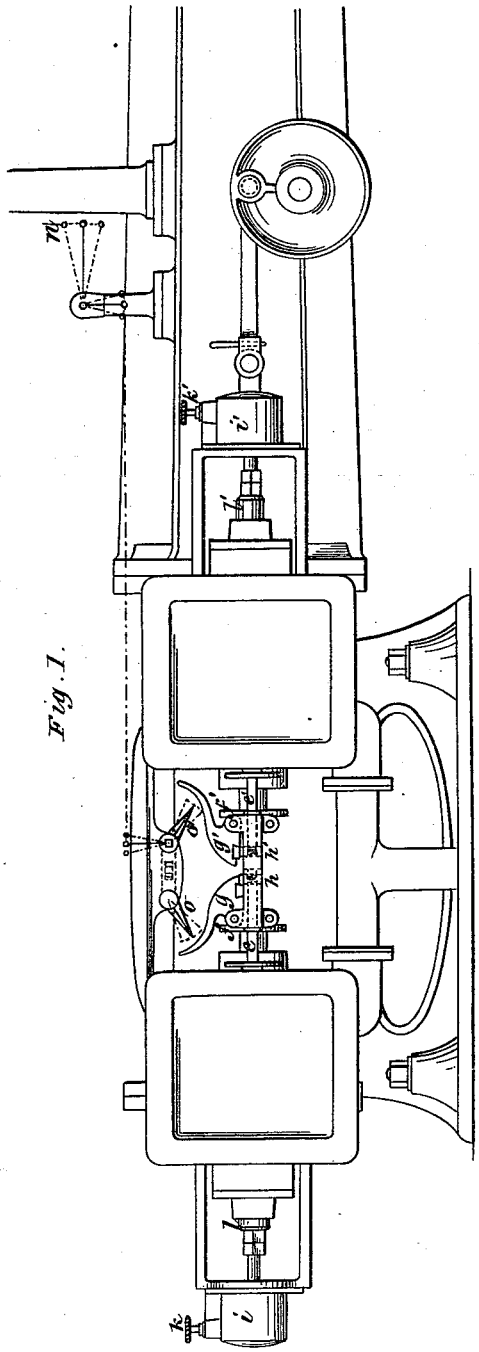
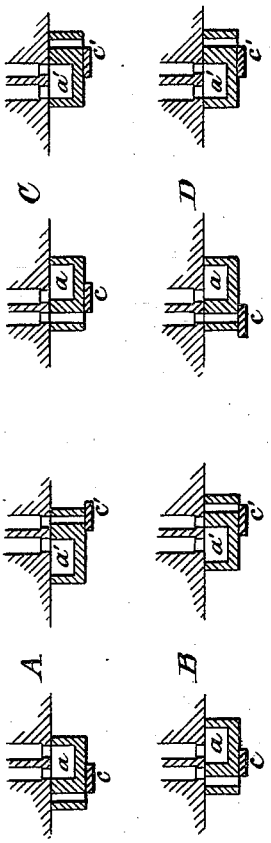


Fig. 1.



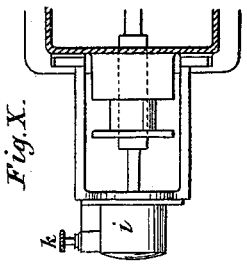


Fig. X.

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2 Sheets--Sheet 2.

F. WANNIECK & H. KOEPPNER.

Valve-Gear.

No. 164,618.

Patented June 15, 1875.

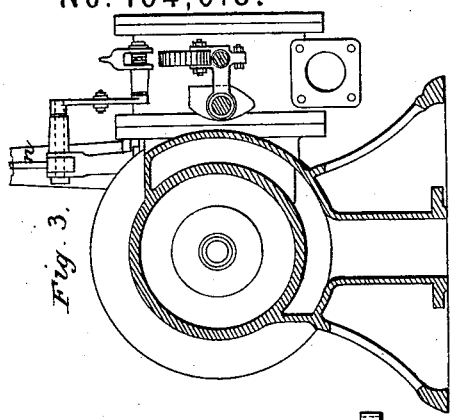

Fig. 3.

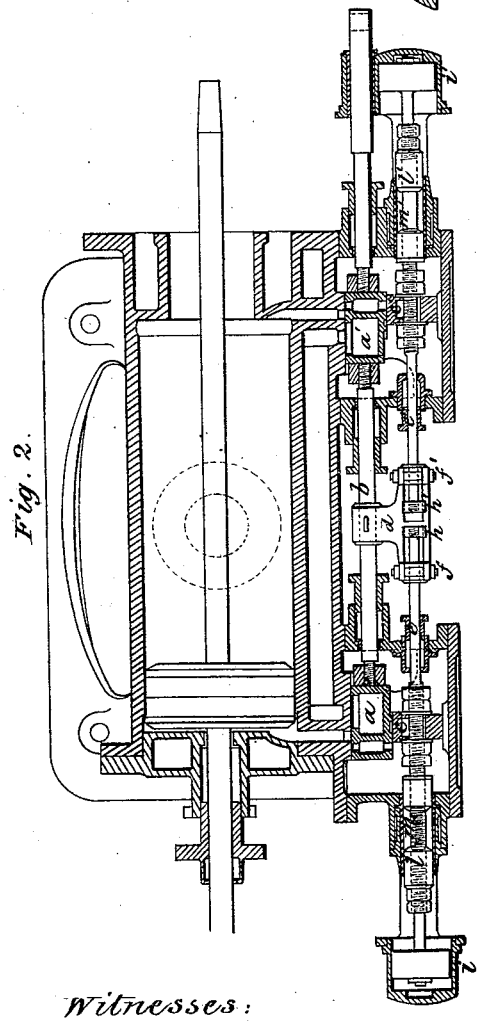

Fig. 2.

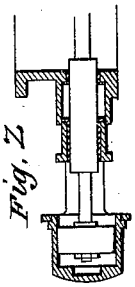

Fig. 7.

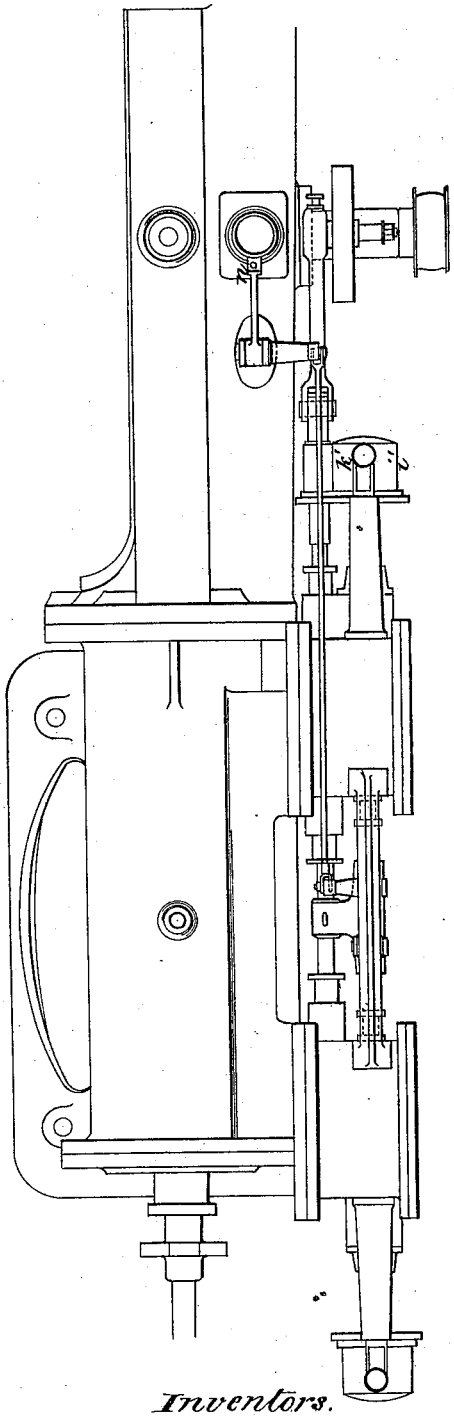

Fig. 4.

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by atty Houck

UNITED STATES PATENT OFFICE.

FRIEDRICH WANNIECK AND HERMANN KOEPPNER, OF BRÜNN, AUSTRO-HUNGARIAN EMPIRE.

IMPROVEMENT IN VALVE-GEARS.

Specification forming part of Letters Patent No. **164,618**, dated June 15, 1875; application filed March 23, 1875.

To all whom it may concern:

Be it known that we, FRIEDRICH WANNIECK and HERMANN KOEPPNER, both of Brünn, in the Austro-Hungarian Empire, have jointly invented a new and useful Self-Acting Expansion Link-Motion for Steam-Engines; and we hereby declare that the following is a full, clear, and exact description of the same.

The principle designed to make the degree of feeding a steam-engine dependent on the regulator, as it is brought about, for instance, in Corliss' and Sulzer's engines, is of eminent importance, but has found only a limited application, because all constructions made hitherto are too complicated and costly.

This invention relates to a peculiar construction which is adapted to remedy the above inconveniences, the new construction being theoretically as correct, but cheaper, less complicated, and more durable than all constructions made hitherto after the said principle.

In the accompanying drawing, Figure I is a front view, Fig. II a sectional plan, Fig. III a transverse section, and Fig. IV a top view, of our new construction.

Similar letters of reference indicate corresponding parts.

The parts A B C D represent the most important phases of the slide-valve motion. *a a'* are ordinary flat expansion-valves as employed, for instance, in Meyer's well-known expansion. *d* is a cross-head, fixed upon the valve-rod *b*, but movable upon the expansion valve-rods *e e'*, and bearing two latches, *g g'*, turning on the bolts *f f'*, the under part of the latches being provided with hooks. Hardened-steel cheeks *h h'* are fixed on the ends of the expansion valve-rods *e e'* and within the cross-head *d*. On the opposite ends are pistons, moving air-tight in the cylinders *i i'*, and the back stroke of which may be regulated by the adjusting-screws *k k'*. *l l'* are leathered or otherwise packed pistons, which are fixed on the rods *e e'*, but movable in the boxes *m m'*, and closing air-tight toward the valve-chests. The boxes *m m'* communicate with their respective valve-chests, the object being to allow the steam in said chests to exercise pressure against the pistons *l l'*. *n* is a rod connected with the regulator, and transmitting, by means of levers and rods, the up-and-down motion of the regulator to the butt-pins *o o'*.

It is obvious that if the two slide-valves *a* and *c*, which are represented in their middle position, are supposed in their lowest position A, the steam-port in the distributing slide-valve *a* is quite opened, and the latch *g* falls down behind the steel cheeks *h*, and is hooked thereon. When a forward motion of the slide-valve *a* to the right hand takes place the slide-valve *c* is forced to participate in the motion of the slide-valve *a* without changing its position with respect to the latter until the latch *g* butts against the pin *o*, and is disengaged with its hooks from the steel cheek *h*, and consequently thrown out of gear. At this moment the steam-pressure transmitted from the valve-chest to the piston *l* will cause the expansion-slide valve *c* to spring back, and consequently shut off the steam-port in the slide-valve *a*. The said disengaging and shutting off will take place sooner or later, according as the pin *o* is in a lower or higher position, respectively, to the latch *g*, and the said position being dependent on the regulator, the degree of feeding or expansion is also dependent on the situation of the regulator. Any steam-engine provided with such a link-motion will therefore measure automatically the quantity of steam required for working. When the expansion slide-valve *c* has been thrown back, the distributing slide-valve *a* advances under the slide-valve *c* until the end of its travel, and then returns to the beginning of its travel. The steam-port in the slide-valve *a* becomes again free from the expansion slide-valve, the latch *g* falls with its hooks behind the steel cheek *h*, and the working begins again.

It is understood that the above dispositions concern both sides of the cylinder. It will be understood that we do not limit ourselves to the precise details indicated in the drawing, as these details are capable of being modified without departing from the essential characteristics of this invention; as, for instance, a mechanism, Fig. X or Fig. Z, may be employed instead of the steam-tight pistons movable in the chests *m m'*.

The above-described new and peculiar dis-

position of self-acting expansion link-motion is designed to obtain in the most simple and cheapest way, and without springs, weights, or other similar contrivances, all the advantages offered by Corliss' and Sulzer's more complicated link-motions.

We claim the protection of the law on the following points:

1. The combination of the movable butt-pins or stops *o o'*, the main valve-rod cross-head *d*, and latches *g g'*, with the expansion-valves *e*, pistons *l*, and boxes *m*, in direct communication with the steam-chest, said parts being constructed and arranged for joint operation, as shown and described.

2. In combination with the expansion-valve, and piston connected therewith, and operated on by steam-pressure to return said valve to its normal position, the means herein shown and described, whereby the back stroke of said expansion-valve and piston is regulated.

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HERMANN KOEPPNER.

Witnesses:
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