

No. 754,163.

PATENTED MAR. 8, 1904.

H. RICHTER.

GAS ENGINE.

APPLICATION FILED JULY 9, 1903.

NO MODEL.

Fig. I.

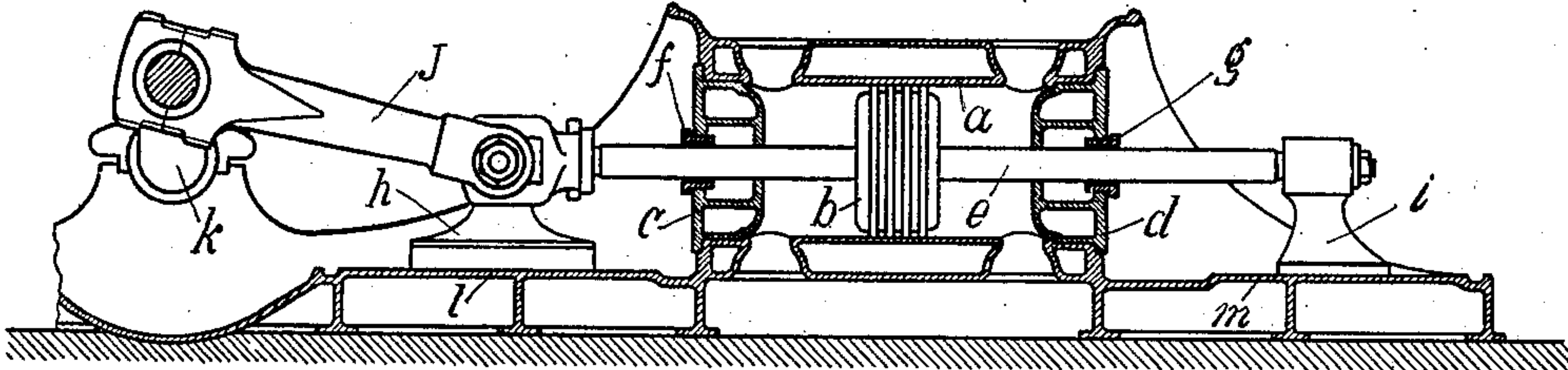


Fig. II.

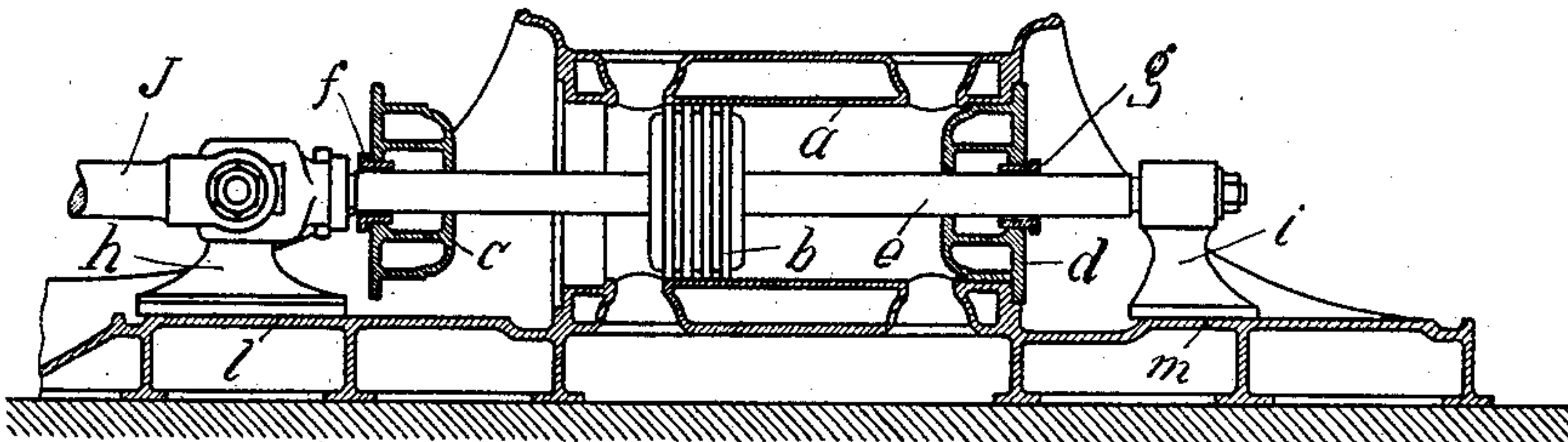
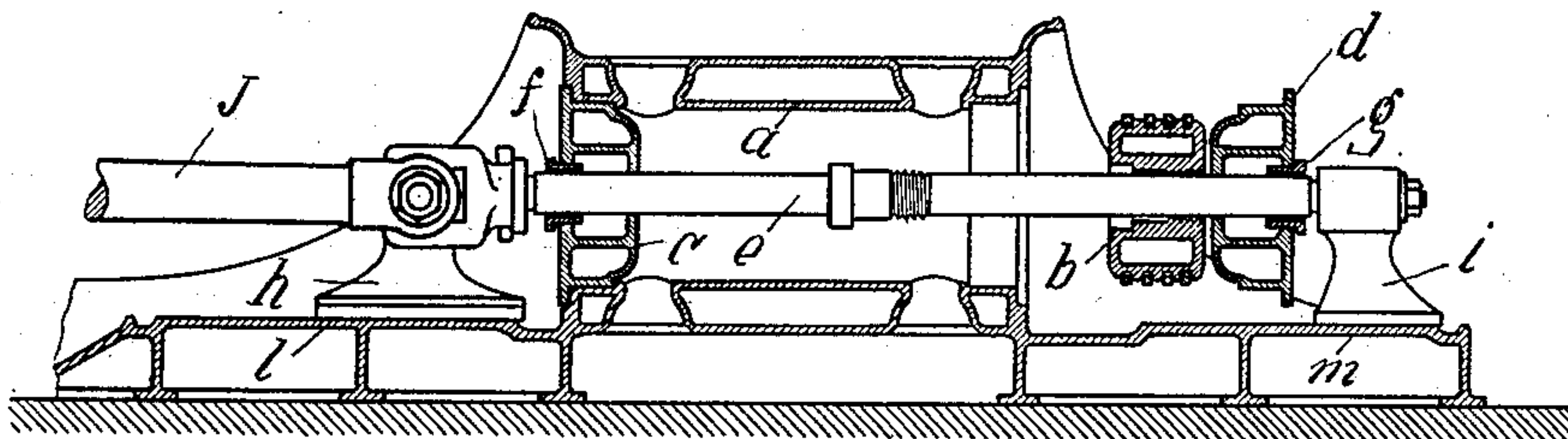


Fig. III.



WITNESSES

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UNITED STATES PATENT OFFICE.

HANS RICHTER, OF NUREMBERG, GERMANY.

GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 754,163, dated March 8, 1904.

Application filed July 9, 1903. Serial No. 164,865. (No model.)

To all whom it may concern:

Be it known that I, HANS RICHTER, engineer, a subject of the German Emperor, residing at Nuremberg, in the Empire of Germany, (whose full postal address is 15 Gleisbühlstrasse, Nuremberg, aforesaid,) have invented certain new and useful Improvements in and Connected with Gas-Engines, of which the following is a specification.

As it has been found very expensive to thoroughly clean blast-furnace gases which are intended to be employed for feeding large gas-engines, so that no solid residuals can be deposited in the interior of the cylinders, it appears preferable to renounce such a careful cleansing of the gas and instead to arrange for the necessity of frequently cleaning the interior of the cylinders. Now in order that this cleaning shall not entail too great a loss of time the whole arrangement of the gas-engine must be such that as few parts as possible have to be unfastened or taken down and more particularly the use of a crane dispensed with when it is desired to render the interior of the cylinder accessible and to withdraw the piston. While the latter in single-acting cylinders open toward the crank-shaft and may be drawn without further trouble, where double-acting cylinders are employed—that is to say, cylinders closed at both ends—a new arrangement of the cross-head slideways and the cylinder-covers is necessary, which new arrangement forms the object of the present invention.

In the accompanying drawings a gas-engine is shown in which the interior of the cylinder is made accessible in this manner, Figure 1 being a vertical cross-section. Fig. 2 shows another sectional view with the cylinder-cover removed, and Fig. 3 a view with the piston run out.

A double-acting cylinder *a*, in which a piston *b* travels, is closed at the front end by a cover *c* and at the rear end by a cover *d*. The round openings, which may be exposed by the removal of these covers *c* and *d*, have a larger diameter than the piston *b*. The latter is carried by a piston-rod *e*, running right through, which is carried to the outside through both covers *c* and *d* and is tight-wash-

ered by means of stuffing-boxes *f* and *g*. The two ends of the continuous piston-rod *e* are in firm but removable connection with the front cross-head *h* and the rear cross-head *i*. The connecting-rod *j* for transmitting the movement to the crank-shaft *k* is linked to the former cross-head. The cross-heads *h* and *i* slide on guides or bearing *l* and *m*. The slideway *l* lies lower than the cover *c*, and the same exactly applies for the slideway *m* and the cover *d*. When the interior of the cylinders is to be cleaned, more particularly at the front end of the cylinder, the crank is turned to the front dead-point and then the front cylinder-cover *d* screwed off and pushed along the piston-rod *e*, Fig. 2. The rear cylinder-chamber may then be made accessible in a similar manner. In case also the piston itself is to be withdrawn the connection between the cross-heads and the piston-rod is released, and then the piston is drawn out through the front or rear cylinder-aperture, preferably the latter, because of avoiding the necessity of dismounting the connecting-rod.

Of course another arrangement may be adopted by which the connection between piston *b* and piston-rod *e* may be released from the outside, and consequently the piston may be drawn along the piston-rod without releasing the connection between the cross-heads and the piston-rod, Fig. 3.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed as communicated to me by my foreign correspondents, I declare that what I claim is—

In a double-acting four-stroke gas-engine, a base, a cylinder mounted thereon, a removable cylinder-head at each end, a piston-rod projecting through each cylinder-head, a piston carried by said rod, and a cross-head connected to the rod at each end and having a sliding connection with the base below the bottom of the cylinder, substantially as described.

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

HANS RICHTER.

Witnesses:

MARTIN OFFENBACHER,
OSCAR BOCK.