(No Model.)

F. DARKIN.

COMPOUND DISK ENGINE.

No. 270,759. Patented Jan. 16, 1883.

Fig: 1.

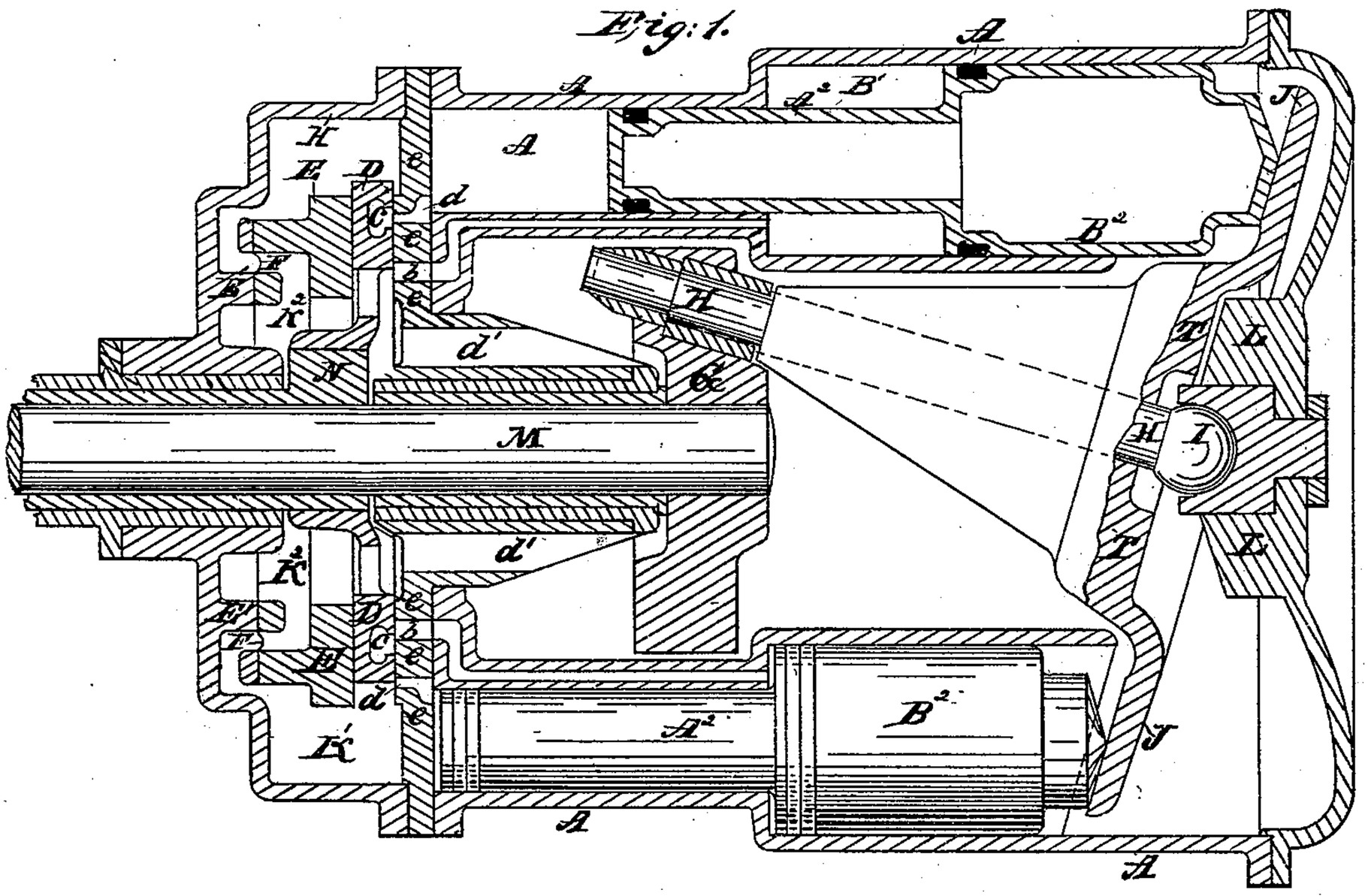
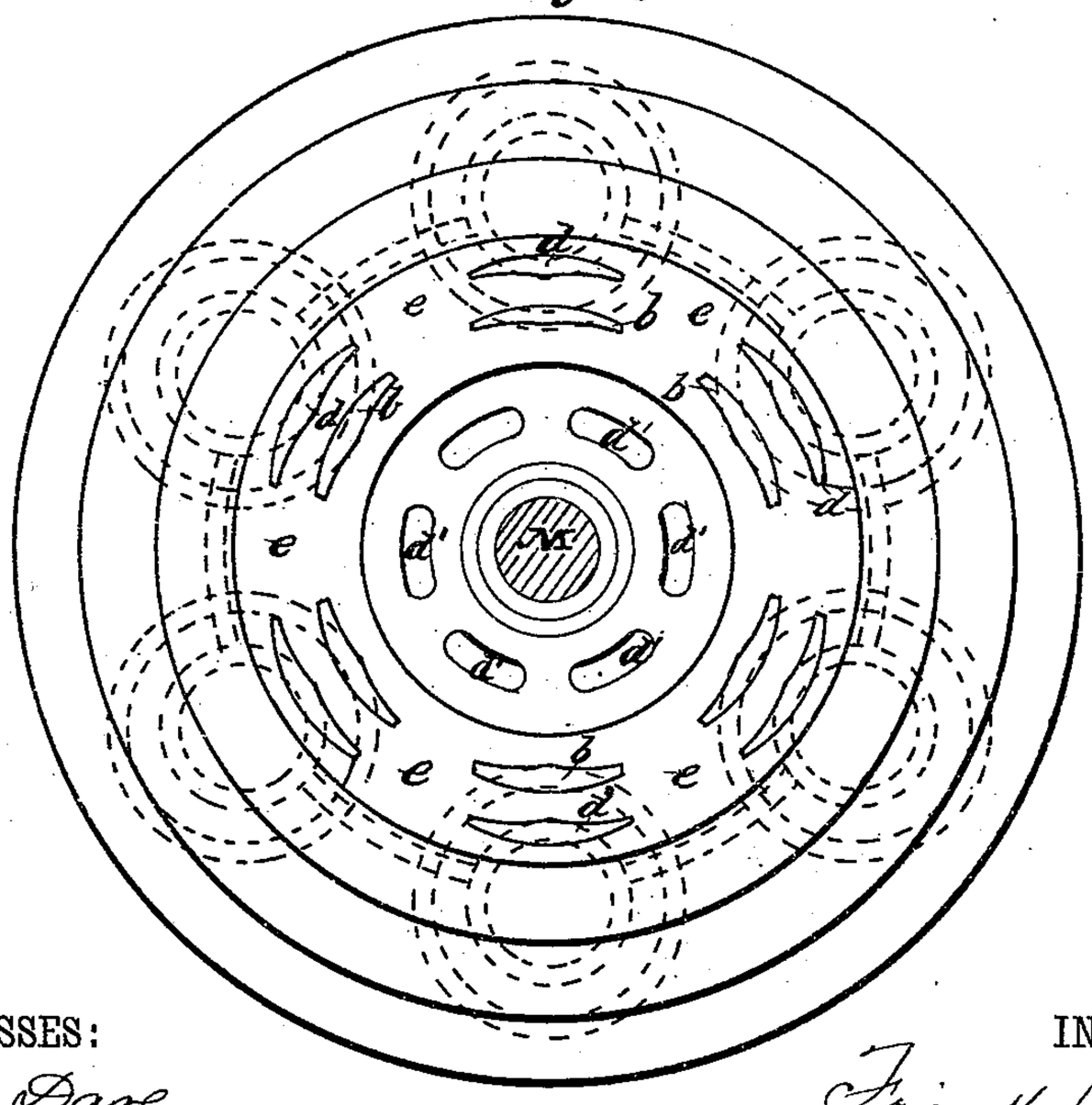


Fig: 2.



WITNESSES:

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FRANK DARKIN, OF NEW YORK, N. Y.

COMPOUND DISK-ENGINE.

SPECIFICATION forming part of Letters Patent No. 270,759, dated January 16, 1883.

Application filed June 19, 1882. (No model.)

To all whom it may concern:

Be it known that I, FRANK DARKIN, a subject of the Crown of Great Britain, and residing at New York city, New York, have invented new and useful Improvements in Compound Disk-Engines, of which the following is a specification.

My invention has reference to compound engines of the same character as that for which Letters Patent were granted to me on the 21st day of June, 1881, No. 243,112, entitled "Improvements in Steam-Engines." The general construction of the engine is that adapted in the "West six-cylinder engine," patented June 29, 1875, No. 165,139. It consists of a series of cylinders arranged in a circle around the driving-shaft, the pistons being in the form of rams or plungers and operating on the surface of an oscillating disk or plate, which by means of a pin at its center gives motion to the crank.

My improvements are as follows: I propose to compound the engine by adding to the closed end of each cylinder an extension of smaller diameter than the cylinder proper, and to form a similar extension upon each piston, the cylinder of smaller diameter to be used as a high-pressure cylinder, and the annular area of the main cylinder to form the expansion or low-pressure cylinder, the proportions being such that the area of the extension or high-pressure cylinder is less than the annular area of the low-pressure cylinder. My method of steam-distribution is similar to that proposed in my former plan of compounding, the ports of the high-pressure cylinders forming an outer or larger circle on the port-face, and the ports of the low-pressure cylinders forming an inner or smaller circle.

The accompanying drawings illustrate my improved method of compounding the West engine.

Figure 1 is a longitudinal section of the engine, showing its general construction, with the high and low pressure cylinders and my method of steam-distribution. Fig. 2 is a view of the port-face.

A represents the shell or main casting containing the series of compound high and low pressure cylinders, (marked respectively A′ and B′.)

A^2 represents the small or high-pressure portion of each piston, and B^2 the large or low-pressure portion, the high-pressure portion or tail-piece A^2 of each piston fitting into one of the extension or high-pressure cylinders, A′, and the low-pressure or main portion B^2 of each piston fitting into one of the larger or low-pressure cylinders, B′.

e represents the port-face, in which are the ports *a*, forming a larger or outer circle and communicating with the high-pressure cylinders A′, and the ports *b*, forming a smaller or inner circle and communicating with the low-pressure cylinders B′.

D represents the valve, which is circular in form and contains an annular cored channel, *c*, which establishes communication between the steam-ports *a* and *b* of the high and low pressure cylinders A′ and B′.

E represents the balance-ring, which fits over the valve, and which by its connection with partition E′ by the flexible diaphragm F prevents communication between the steam-chamber K′, surrounding the valve, and the exhaust-space K^2, formed by the inside of the valve and balance-ring. The shaft carries the eccentric N, by which the valve is made to work eccentrically upon the valve-face. As represented in Fig. 1, high-pressure steam is entering the small cylinder at the bottom of the figure from steam-space K′, and low steam is entering the large cylinder at the bottom from the small cylinder at the top of the figure through channel *e*, while the large cylinder at the top is exhausting into space K^2 and passages *d′*.

In operation the steam is admitted first by the outside edge of the valve D, through the ports *d*, to the high-pressure cylinders A′, from which it is discharged into the annular channel *c* in the valve D, through which it passes to the ports *b*, and through them to the low-pressure cylinders B′, from which it is finally discharged into the exhaust-space K^2, and thence by suitable passages, *d′*, into the main body of the engine, from which it escapes by the exhaust-pipe.

The larger ends of the compound pistons A^2 and B^2 terminate in blunt conical points, which operate on the surface of the disk J, at the center of which is the crank-pin H, supported at its base by the ball-and-socket joint I and the

rolling surfaces L and T. The crank-pin H fits into the crank G, and thus transmits motion to the shaft M. An advantage of this compound arrangement is that the back-pressure which necessarily exists on the smaller pistons effectually maintains such contact of the pistons with the disk on the back-stroke that the rattling of the simple arrangement is prevented without the excessive compression sometimes resorted to in that form of engine for preventing the noise due to the intermittent contact between the pistons and disk.

What I claim, and desire to secure by Letters Patent, is—

In a disk-engine, a series of low-pressure cylinders the rams or pistons of which act directly on the disk, and a series of high-pressure cylinders the rams of which form extensions of the aforesaid rams, with means of steam distribution from the high-pressure to the low-pressure cylinders, the arrangement being such that the back-pressure on the high-pressure cylinder maintains the contact of the rams with the disk to prevent rattling, substantially as described.

FRANK DARKIN.

Witnesses:
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