No. 632,897. Patented Sept. 12, 1899.

C. C. COWAN.

COMBINED ENGINE AND DYNAMO ELECTRIC MACHINE.

(Application filed Mar. 18, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

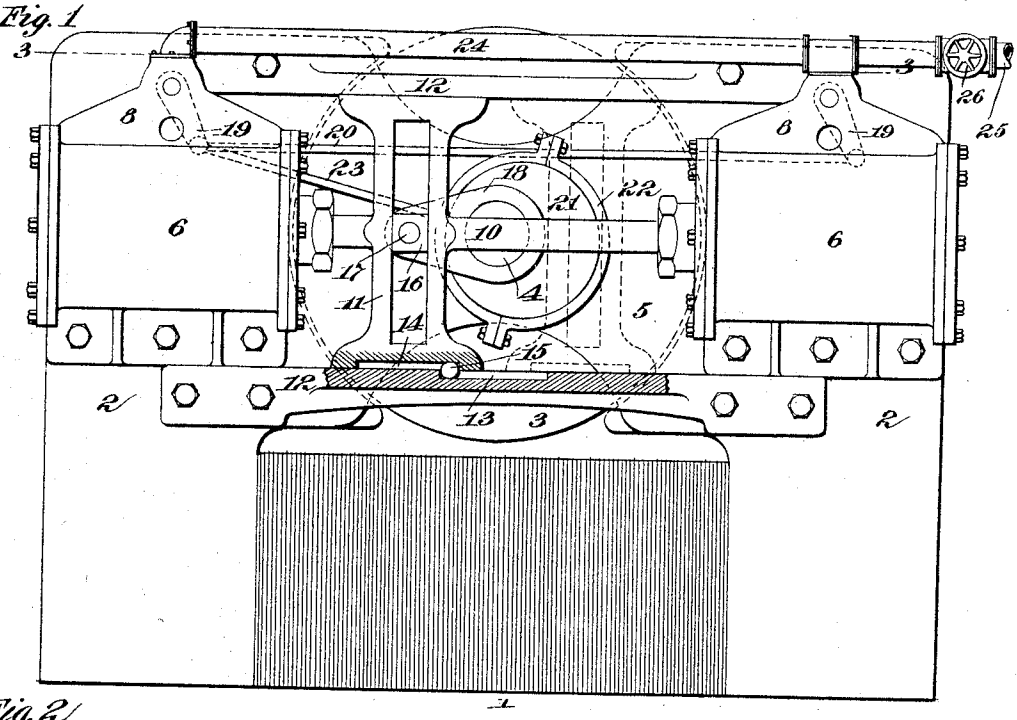
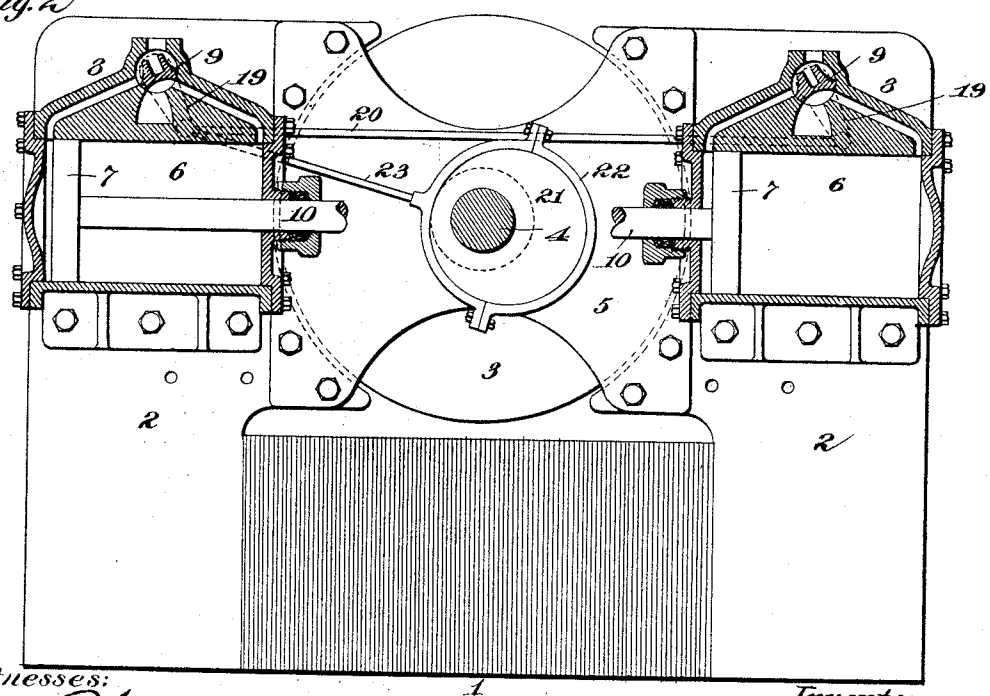


Fig. 2



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Fig. 3

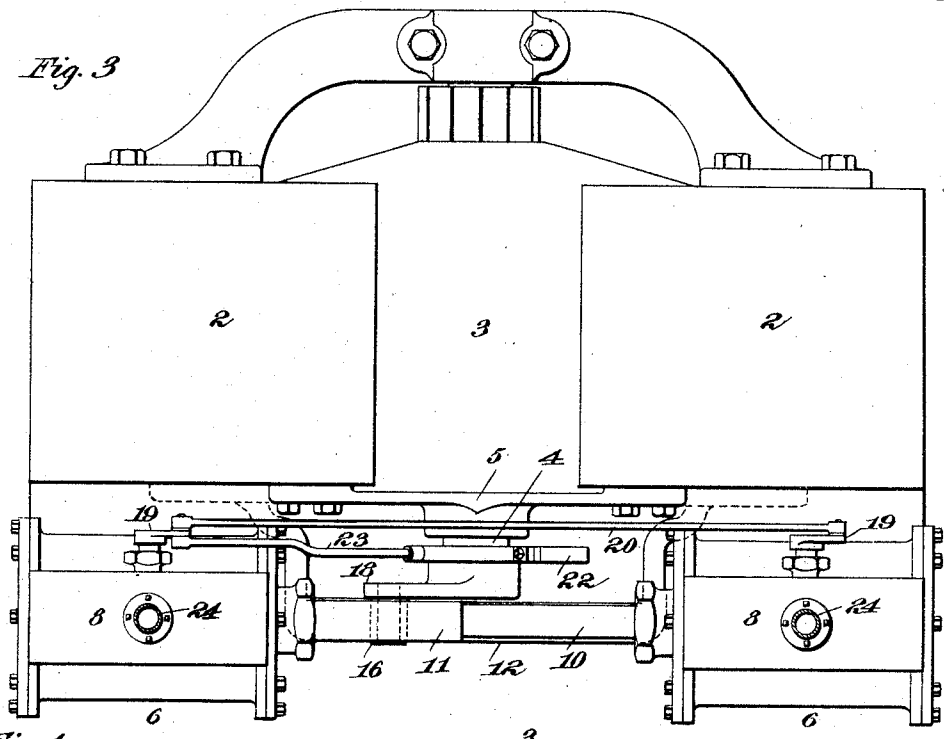


Fig. 4

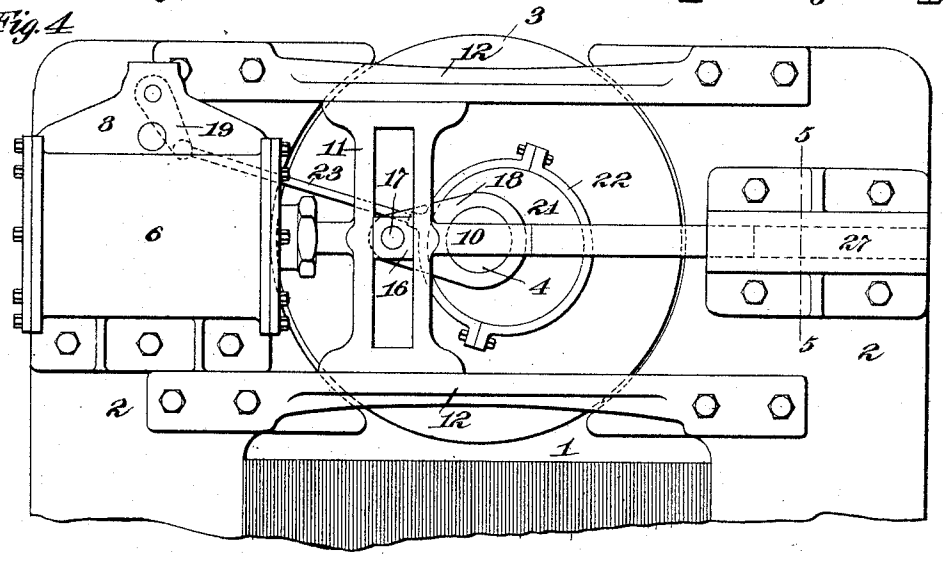
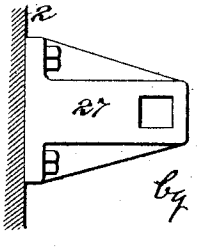


Fig. 5



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UNITED STATES PATENT OFFICE.

CHARLES C. COWAN, OF MEMPHIS, TENNESSEE, ASSIGNOR TO THE WHITFIELD COMPANY, OF SAME PLACE.

COMBINED ENGINE AND DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 632,897, dated September 12, 1899.

Application filed March 18, 1899. Serial No. 709,564. (No model.)

To all whom it may concern:

Be it known that I, CHARLES C. COWAN, a citizen of the United States, residing at Memphis, in the county of Shelby and State of Tennessee, have invented a certain new and useful Improvement in a Combined Engine and Dynamo, of which the following is a specification.

My invention relates to various new and useful improvements in combined engines and dynamos of the general type described and claimed by me in my application for Letters Patent filed September 14, 1898, numbered serially 690,900.

In combined engines and dynamos of the type which I have invented and which I describe in said application an engine is secured or attached directly to an element of the dynamo—such, for example, as to one of the poles thereof or to the yoke connecting the pole-pieces—said engine being removable from the dynamo either in whole or in part. In my present invention I provide a dynamo of any suitable type and mount in line with the armature-shaft thereof one or more engine-cylinders removably secured directly to the dynamo. Preferably two engine-cylinders will be employed, bolted to the two pole-pieces of the dynamo diametrically with respect to the armature-shaft, a single reciprocating piston-rod connecting the pistons of said cylinders and actuating the crank on the armature-shaft. By means of this construction I secure a combined engine and dynamo which can be built very cheaply, which will be effective in use, which can be readily set up and taken apart, and which will be portable and compact in construction.

In order that my invention may be better understood, attention is directed to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a side elevation of a well-known form of dynamo equipped with my present improvements, two engine-cylinders being shown; Fig. 2, a section taken through the armature-shaft and eccentric; Fig. 3, a section on the line 3 3 of Fig. 1; Fig. 4, a detail elevation illustrating a modification wherein only a single engine-cylinder is used, and Fig. 5 a section on the line 5 5 of Fig. 4.

In all of the above views corresponding parts are represented by the same numerals of reference.

The dynamo illustrated in the drawings is, as stated, of a well-known type, comprising a single energizing-core 1 and two pole-pieces 2 2, mounted at the extremities of said core. The armature 3 is carried on a shaft 4 and rotates between said pole-pieces. The shaft is mounted in bearings formed in bracket-arms 5, connecting the two pole-pieces, whereby a very strong and efficient construction is secured. Preferably two engine-cylinders 6 6 are bolted to the pole-pieces 2 2 diametrically with respect to the armature-shaft 4. These engine-cylinders are of any suitable construction and are provided with pistons 7 therein and with valve-chests 8 8, controlled by valves 9 9, to admit the steam properly to the cylinders. The pistons 7 7 are connected together by a single connecting-rod 10, which reciprocates back and forth in a line with the crank of the armature-shaft 4. The connecting-rod 10 is formed with a slide-head 11 therein, the passage therein extending at right angles to the path of movement of the said connecting-rod. Preferably the slide-head 11 is mounted in two horizontal guides 12 12, connecting the pole-pieces, as shown. In order to reduce friction to a minimum, I consider it desirable to make use of a ball-bearing for the lower guide with a horizontally-arranged dynamo or for both guides when a vertical apparatus is employed. The lower face of the slide-head 11, Fig. 1, may therefore be provided with a groove 14, a similar groove 13 being formed in the adjacent guide 12 and a ball 15 being mounted therein. The extreme positions of the slide-head are shown in full and dotted lines in the drawings, from which it will be clear that the ball 15 will move throughout the entire length of both grooves, while the latter are moved with respect to each other. Mounted within the slide-head 11 is a slide 16, carried on a pin 17, formed on a crank 18 on the dynamo-shaft 4. The valves 9 are preferably semirotary valves of the well-known type and are actuated by arms 19 19, connected together by a rod 20, so that they operate in synchronism. An eccentric 21 is mounted on the dynamo-shaft 4, be-

tween the bracket 5 and the crank 18. Engaging with said eccentric 21 is an eccentric-strap 22, connected by a rod 23 to one of the arms 19 of the valves 9 9. Steam is admitted to the two valve-chests 8 8 through a pipe 24, connecting said valve-chests and to which a pipe 25 leads from the steam-supply, the last-mentioned pipe being provided with a throttle-valve 26 therein. Any desirable form of governor may be used.

Instead of making use of two cylinders 6 6, as described, a single cylinder alone may be employed, as shown in Fig. 4. In this case the connecting-rod 10 at the end opposite the cylinder may be extended and arranged to work in a guide 27, made perfectly rectangular in cross-section, as shown in Fig. 5, so as to maintain the slide-head 11 always in the plane of rotary movement of the slide 16. The guide 27 may obviously be dispensed with or it may be used instead of the guides 12. It will furthermore be apparent that with a double-cylinder arrangement the guides 12 may be omitted, the cylinders themselves serving to properly guide the reciprocating parts.

The operation of my invention in either of its forms is readily apparent. Steam being admitted to one or both of the cylinders reciprocates the connecting-rod 10 back and forth, turning the armature-shaft 4 through the slide-head 11, slide 16, and crank 18. The rotation of the armature-shaft operates the valves through the eccentric 21.

It will be of course understood that instead of applying one or both engine-cylinders to the pole-pieces of a dynamo the said engine-cylinders may be removably carried by any other element thereof to which they may be conveniently and effectively secured—such, for example, as one of the yokes which connects the pole-pieces.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. The combination with a dynamo-electric generator, its armature-shaft and a crank thereon; of a pair of power-cylinders removably mounted on said dynamo, pistons working in said cylinders, a piston-rod common to both pistons, and means operated by said piston-rod for rotating the aforesaid crank, for the purpose set forth.

2. The combination with a dynamo-electric generator having vertically-extended pole-pieces or shoes, an armature revoluble between said pole-pieces, the armature-shaft, and a crank thereon; of a pair of power-cylinders removably mounted on said pole-pieces, pistons working in said cylinders, a piston-rod common to both pistons, and means operated by the piston-rod for rotating the aforesaid crank, for the purpose set forth.

3. The combination with a dynamo-electric generator having vertically-extended pole-pieces or shoes, an armature revoluble between said pole-pieces, the armature-shaft and a crank thereon; of a pair of power-cylinders removably mounted on the vertical faces of the pole-pieces, pistons working in said cylinders, a piston-rod common to both pistons, and means operated by said rod to rotate the aforesaid crank, for the purpose set forth.

4. The combination with a dynamo-electric generator, its armature, armature-shaft, and a crank thereon; of a pair of power-cylinders removably mounted on said dynamo, pistons working in said cylinders, a piston-rod common to both pistons, means operated by said rod for rotating the aforesaid crank, a valve mechanism controlled from the armature-shaft, and suitable distributing and exhaust ports controlled by the valves of said mechanism, substantially as and for the purpose set forth.

5. The combination with a dynamo-electric generator having vertically-extended pole-pieces or shoes, an armature revoluble between said pole-pieces, a horizontal shaft for said armature, and a crank on said shaft; of a steam-engine removably mounted on the vertical faces of the pole-pieces with its piston-rod in a plane perpendicular to the axis of rotation of the armature-shaft, and means operated by said piston-rod for revolving the crank on said shaft, for the purposes set forth.

6. The combination with a dynamo-electric generator, having vertically-extended pole-pieces or shoes, the armature revoluble between said poles, the armature-shaft and a crank thereon; of a pair of power-cylinders mounted on the vertical faces of the pole-pieces, pistons working in said cylinders, a piston-rod common to both pistons and having a cross-head, guides for said cross-head, and a block on the crank-pin of the aforesaid shaft having sliding motion on guides in said cross-head, substantially as and for the purpose set forth.

7. The combination with a dynamo-electric generator having vertically-extended pole-pieces, the armature revoluble between said pole-pieces, the armature-shaft, and a crank thereon; of a pair of power-cylinders mounted on the vertical faces of the pole-pieces, pistons working in said cylinders, a piston-rod common to both pistons, a cross-head formed integral with the piston-rod, guides for the cross-head, a rolling bearing in the lower guide, and a block on the pin of the aforesaid crank, sliding in ways in the cross-head, substantially as and for the purposes set forth.

This specification signed and witnessed this 2d day of December, 1898.

CHARLES C. COWAN.

Witnesses:
B. H. FINLEY,
FRED. H. JONES.