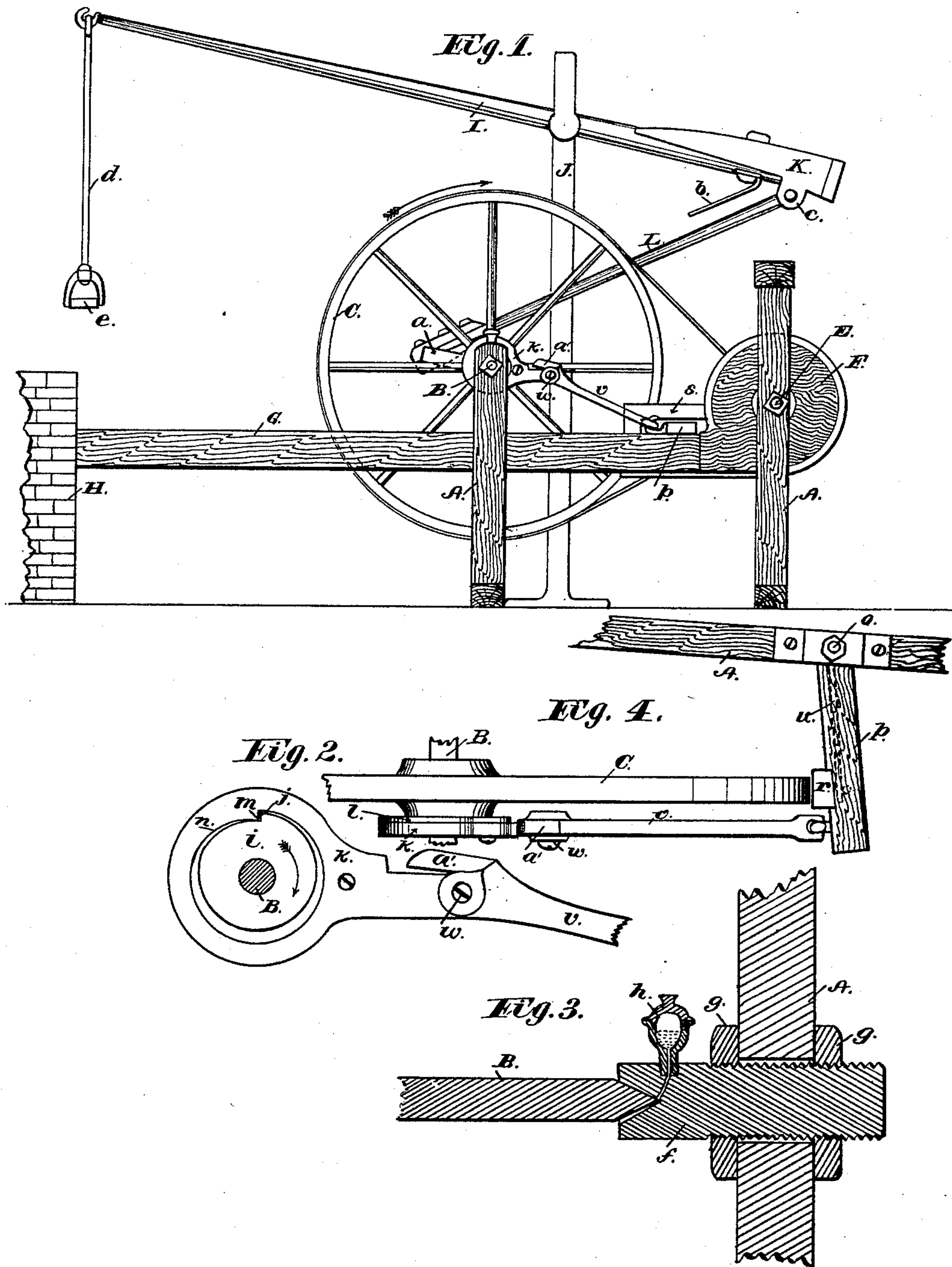


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Fan Apparatus for Forges.

No. 223,280.

Patented Jan. 6, 1880.



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# UNITED STATES PATENT OFFICE.

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## FAN APPARATUS FOR FORGES.

SPECIFICATION forming part of Letters Patent No. 223,280, dated January 6, 1880.

Application filed December 1, 1879.

*To all whom it may concern :*

Be it known that I, JOHN C. DEUBNER, of Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Fan Apparatus for Forges; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an improvement in fan-driving apparatus for blacksmiths' forges; and it consists, generally, of a large fly-wheel mounted on a crank-shaft, and connected by a belt with the fan-pulley. An overhanging pivoted lever is connected at one end to the crank of the fly-wheel by a pitman-rod, and is operated by pulling a pendent rod or cord hung from the opposite end.

The object of my invention is to insure speed, light running, and noiselessness of the parts. The novelty consists in the construction, combination, and arrangement of the parts composing the apparatus, as will be herewith set forth and specifically claimed.

In the accompanying drawings, Figure 1 is a side elevation of my improved apparatus. Fig. 2 is an enlarged elevation of the eccentric. Fig. 3 is an enlarged sectional view of the pivot-bearing. Fig. 4 is an enlarged plan view of the brake.

Corresponding letters of reference refer to like parts in all the figures.

A represents any suitable frame-work, composed of upright and connected posts or beams, as shown. Between the forward pair of these posts is pivoted the horizontal crank-shaft B, carrying the fly-wheel C, as represented. This wheel should be of rather large diameter—about forty inches would be sufficient—and it carries a belt, which passes over the pulley of the fan-shaft E in the manner seen. This pulley should be very small, not to exceed one inch in diameter, so that great speed is imparted to the fan in its casing F, which is of the usual or any suitable construction. A conduit, G, conveys the blast to the forge H.

To drive this apparatus I employ a lever-beam, I, which is hung by pivots to an upright, J, or to any suitable frame-work pendent from the ceiling of the smithy. This beam is over and parallel with the plane of the fly-wheel, as represented, and its pivot is at a point about

one-third of its length from the rear end. Upon the rear end of this beam is a metal counterpoise or weight, K, which performs a function to be explained farther on.

A pitman-rod, L, connects the crank *a* to bearing-ears *c*, attached to the under side of the counterpoise K, as represented, and just in front of these bearing-ears is rigidly bolted or otherwise fastened an inclined metal spring, *b*, as seen in Fig. 1.

A pendent rod or cord, *d*, connected at its upper end to the front end of the lever I, has upon its lower end a swiveled handle, *e*, as represented. This handle hangs within easy reach of the smith, so that he can stand at his forge and move around to shift his tools without loosening his hold upon the handle. By simply drawing down the handle successively the fly-wheel is caused to revolve in the direction of the arrow, and great speed is given to the fan.

To avoid friction and insure the light running of all the parts, I employ the bearings shown in section in Fig. 3 for the crank-shaft, the fan-shaft, and the beam I. These consist of cylindrical steel blocks *f*, threaded at each end and inserted through openings in the uprights A, from each side of which they project, as shown. The inner faces or ends of these blocks have conical excavations or recesses, into which the pointed conical ends of the above-mentioned shafts fit, as represented. The blocks *f* are held in place in their sockets and are adjusted by means of the nuts *g*, screwed upon each of their projecting ends. By means of the oil-cups *h* the lubricant is conveyed into the recessed bearings, as shown in Fig. 3. As each of the shafts is supported upon these conical pivots, which can be adjusted to a nicety, the friction is reduced to a minimum, and but very little power is required to run the apparatus.

Another essential feature of my apparatus consists of a braking device, which always compels the fly-wheel to revolve in one direction. (Indicated by the arrow.) This device is constructed and applied as follows: Upon the crank-shaft B is keyed or otherwise fitted a steel cam-disk, *i*, Fig. 2, having a tooth or shoulder, *j*, as shown, and surrounding this disk is a steel head-piece, *k*, to which is fitted



a retaining-piece, *l*, confined in a circumferential slot either in the hub of the fly-wheel or in its crank-shaft. The bore of this head is eccentric, as shown, with a notch or shoulder, *m*, arranged directly over the center of the crank-shaft. Just behind this shoulder is a segmental recess, *n*, whose office will be explained farther on.

Pivoted upon the frame-work at *o* is a brake-beam, *p*, carrying on its front face a rubber brake-shoe, *r*, which is in line with the periphery of the fly-wheel which it is intended to brake. This beam projects through a guide-arm or cross-head, *s*, as represented, and is held back and away from the fly-wheel by a subjacent spring-bar, *u*, fastened at one end by the bolt *o*, and bearing at its free end against a stud or projection upon the under side of the brake-beam, as shown. A link-arm, *v*, connected to the front end of the brake-beam, extends forward, and is pivoted to an extension of the head-piece *k* at *w*. An overlapping knee-piece, *a'*, projects beyond the pivot of the arm *v*, and rests upon the extension of the head to form a toggle-joint, as shown.

Now, the operation of my apparatus is as follows: By grasping the handle *e* and drawing down the beam *I* the fly-wheel begins to revolve, and when the crank stands nearly upright the pitman comes in contact with and compresses the spring *b*, so that as soon as the upper dead-center is reached the reaction of this spring upon the pitman completes the revolution of the wheel and carries it always beyond the lower dead-center. The handle *e* has been carried up in the meantime by the oscillation of the beam *I*, and it is only necessary to draw it down again to repeat the same operation. By this construction and arrangement it is only necessary to successively draw upon the handle in order to cause the continuous revolution of the fly-wheel and fan. Whenever the handle is released the spring *b*, acting as before described, carries the wheel around until it is past the dead-center, and thus leaves it always in a position ready to start.

By means of the adjustable pivot-bearings before described nearly all friction is overcome, so that very little power is required to run the apparatus, and any degree of speed can be obtained.

All noise and jar of the parts are obviated by my delicate and precise arrangement of the parts, and a most desirable fan-motor is obtained.

So long as the fly-wheel revolves in the direction of the arrow the braking apparatus performs no function, as the cam-shoulders pass each other without contact; but as soon as, by any mischance, the wheel starts to revolve backward, the cam-shoulders lock together and the head *k* turns, and, drawing upon the brake-beam, brings its rubber shoe in instant and tight contact with the periphery of the fly-wheel, thus checking it instantly. The subjacent spring *u*, by its reaction, draws back the brake-beam and throws the crank into starting position again.

This braking apparatus is a very essential improvement, and while I have described it in relation to a fan-motor, still it is capable of use upon any class of machinery which has a treadle and crank-shaft, as sewing-machines, lathes, and foot-powers of various descriptions. In each of these machines some special adaptation and arrangement of the parts might be necessary; but such could be effected without departing from the principal herein illustrated.

Having thus fully described my invention, I claim—

1. In a fan-motor consisting of a fly-wheel connected by a belt to the fan-pulley and an overhanging oscillating beam connected at one end to the crank of the fly-wheel, the bearings for the fly-wheel crank-shaft, the fan-shaft, and oscillating beam, consisting of adjustable conically-recessed blocks and corresponding conical bearings upon the ends of the shafts, as and for the purpose specified.

2. In combination with a fly-wheel and crank-shaft, a spring brake-beam pivoted at one end and connected at the other end to said shaft by a toggle-arm and cam-disk and collar, whereby, when said fly-wheel revolves in one direction, the brake is held away from its periphery, but when it starts to revolve in an opposite direction a lock is formed, which automatically sets the brake and checks the wheel, as specified.

3. In a fan-motor, the combination, with the lever-beam *I* and pitman *L*, of a spring, *b*, arranged between the two, whereby the crank is prevented from stopping on a dead-center, as specified.

Witness my hand this 28th day of August, A. D. 1879.

JOHN C. DEUBNER.

Witnesses:

CHAS. M. PECK,  
W. C. THOMPSON.