

(No Model.)

G. CAMPBELL.

FORGE.

No. 285,224

Patented Sept. 18, 1883.

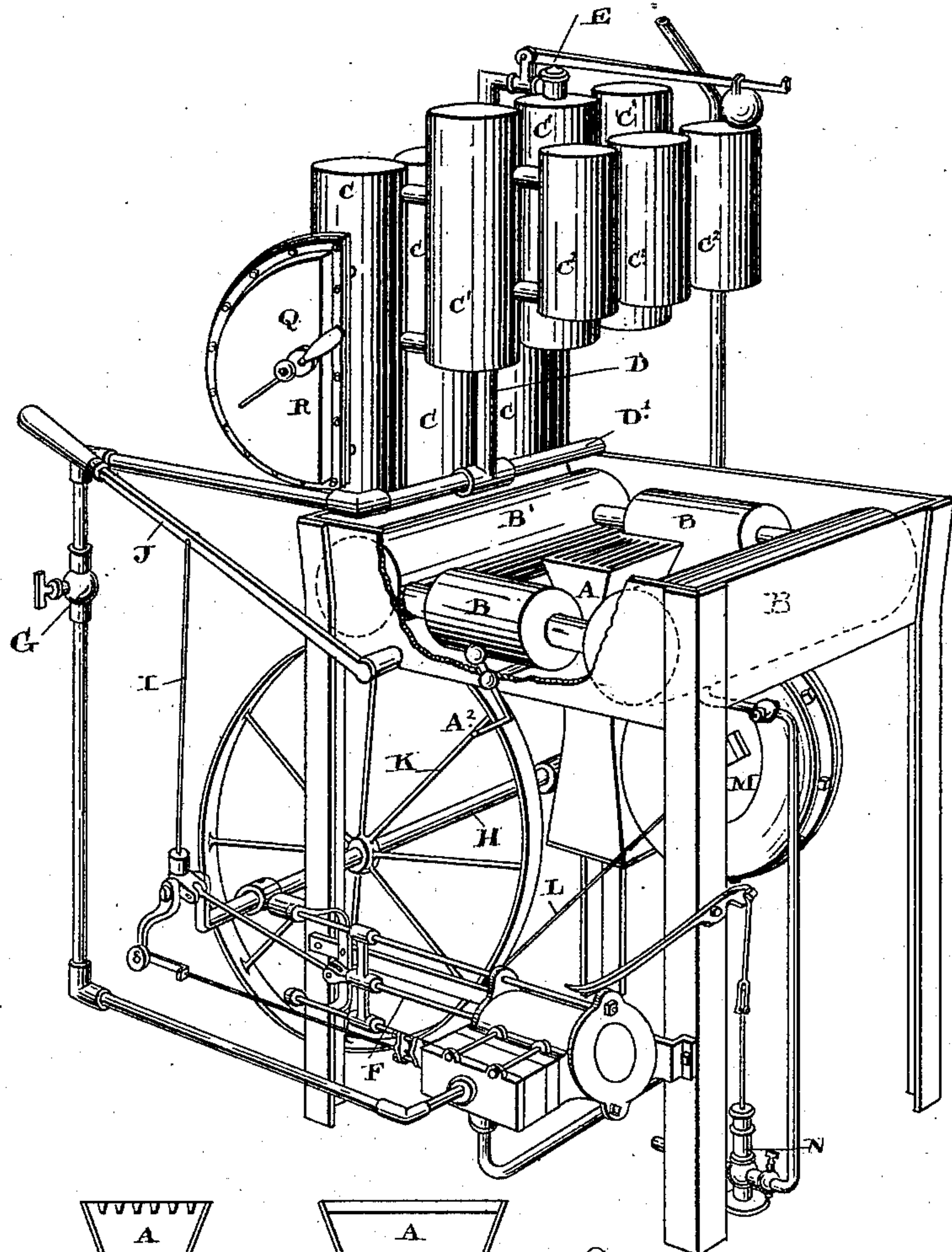
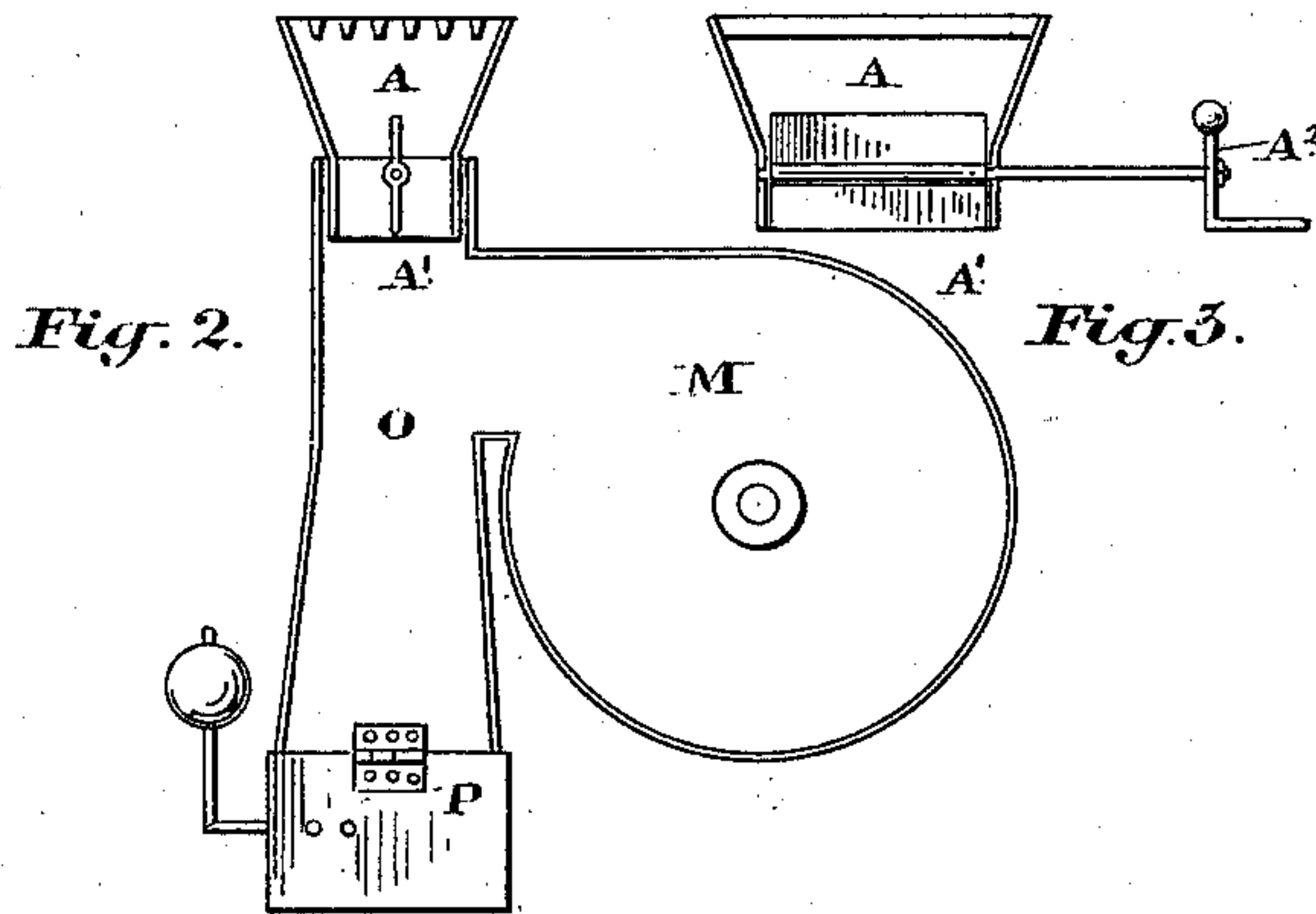


Fig. 1.



Witnesses.

Lewis Tomlinson

J. B. Fetherstonhaugh

Inventor.

George Campbell
by *Donald C. Ridout* Atty.

UNITED STATES PATENT OFFICE.

GEORGE CAMPBELL, OF TORONTO, ONTARIO, CANADA.

FORGE.

SPECIFICATION forming part of Letters Patent No. 285,224, dated September 18, 1883.

Application filed April 3, 1883. (No model.)

To all whom it may concern:

Be it known that I, GEORGE CAMPBELL, a subject of the Queen of Great Britain, residing at the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Forges, of which the following is a specification.

The object of the invention is to utilize the ordinary heat of the fire in the forge for the purpose of creating a power to propel an engine arranged to drive the blower of the forge; and it consists, essentially, of one or more vessels containing water or other latent power, so arranged in connection with the forge that the heat from the fire ordinarily used in the forge will be directed against the said vessels, for the purpose of creating by its heat the water or other latent power into an active and effective force.

Figure 1 is a perspective view of a portable forge having an engine for driving its blower supplied with steam from boilers arranged to receive heat from the fire in the forge. Fig. 2 is a sectional detail of my improved tuyere-iron air-chamber and casing of the blower. Fig. 3 is a detail of the wind-valve used in the base of the tuyere-iron.

In the drawings like letters of reference indicate corresponding parts in each figure.

A is a grated tuyere-iron, situated in about the center of the forge. Around this tuyere-iron, close to the sides of the forge, are arranged three horizontal cylinders, B. These cylinders are connected together, as shown, to the back cylinder, B', connected to the vertical cylinder C. These vertical cylinders C extend over the back portion of the forge, and are connected, as shown, to the cylinders C', which latter cylinders are connected to and support the smaller cylinders C². The cylinders C' and C² extend farther over the fire than the vertical cylinders C, and are made smaller, as represented, so as not to interfere with the workman using the forge.

D is a steam-pipe leading from the top of the center cylinder, C', at which point the safety-valve E is situated. The vertical portion of the steam-pipe D connects with the horizontal steam-pipe D', which extends over the forge, in order that the steam passing from the

boiler C' to the engine F is superheated in its passage through the steam-pipe.

G is a throttle-valve for cutting off the steam from the engine F, which engine, as represented, is connected to the crank of the driving-shaft H.

It will be observed that the engine is located near the bottom of the frame and under the forge, which location not only economizes room, but prevents the shaking of the forge by the motion of the engine, which would result if the engine occupied a much higher position.

In order to operate the blower by hand when required, I employ a lever, J, which is arranged in such a position as to be convenient to the hand of the operator. A rod, I, connects the hand-lever J also to the crank of the driving-shaft H. On this shaft H, I key or otherwise fasten a driving-pulley, K, which is connected by the belt L to the pulley on the blower M. It will thus be seen that the blower may be worked either by the hand-lever J in the ordinary manner, or by the engine F when supplied with steam.

Before proceeding to describe in detail the other matters in connection with my improved forge, I may here describe the operation of the parts I have already explained.

For the purpose of illustrating my invention I will assume that the boilers B and C have been filled with water either by the hand-pump N, or in any other suitable manner. I build the fire in the ordinary way over the tuyere-iron A, working the blower by the handle J in the usual manner. By the time I have repaired my chisels or done some other small work the fire in the forge will have acted upon the boilers B and C sufficiently to create into steam a portion of the water contained in the boiler. When I find that sufficient steam has been generated to propel the engine, I turn on the throttle-valve G, which admits the steam into the engine, causing the engine to operate, and as it is connected, as described, to the driving-shaft H, the movement of the engine operates the blower M. I may here draw attention to the fact that the steam is generated by the surplus heat in the forge; that no greater fire is required than that used ordinarily, and that therefore the engine is driven without any cost of fuel. While it will be possible to work

the blower by hand without disconnecting the driving-shaft from the engine, it will be found better to uncouple the connecting-rod of the engine when the hand-lever is to be used alone.

5 It may also be mentioned here that although I prefer to use steam the boilers B and C might be arranged to contain air, which would be expanded by the heat from the forge, and might then be used for propelling the engine.

10 On reference to Fig. 2 it will be noticed that the tuyere-iron A has a grated top which is larger in diameter than the neck of the tuyere-iron which fits into the top of the air-chamber O. This air-chamber, it will be noticed,
15 communicates with the blower M, and has a hinged bottom provided with a weight designed to keep the said bottom closed. The ashes which fall through the grated top of the tuyere-iron A will gradually accumulate in
20 the air-chamber O. Before sufficient ashes have accumulated in the air-chamber O to overflow into the blower the weight of the said ashes will overcome the balance-weight on the hinged bottom P, causing the said bot-
25 tom to open, and thereby allow the accumulated ashes to escape from the air-chamber.

Another advantage of the hinged bottom P which may be mentioned here is that by open-
30 ing the bottom a draft of cold air may be admitted up through the tuyere-iron without working the blower. As it will be impossible to stop the engine as promptly as sometimes required in working the forge, I provide a wind-
35 valve, A', operated by the handle A², which projects outside the forge and is within easy access of the party using the forge.

Although I have shown my invention applied to a portable forge, it will of course be understood that all the parts described are
40 equally applicable to a stationary forge. I should, however, add that the bottom diameter

of the air-chamber is greater than its top, in order that the ashes and clinkers may fall freely through it. The weighted hinged bot-
45 tom not only allows the ashes to fall through, but also acts as a safety-valve for the escape of explosive gas which might generate in the blower.

Any novel feature herein shown or described and not claimed I reserve the right to make
50 the subject-matter of a separate application.

I am aware of English Patent No. 96 of 1879, and do not seek to cover in this application the construction and arrangement therein set
55 forth, the features of difference being fully pointed out in the following claims.

What I claim as my invention is—

1. The combination, in a forge substantially as described, with tuyere A, a blower, and an
60 engine, of a steam-generator made in sections— to wit, the horizontal cylinders B B B' and vertical sections C C' C², the sections B B B' arranged horizontally upon the four sides of
65 the tuyere, the vertical sections C connected therewith and arranged at the rear of the forge, and the shorter sections C' C² arranged
70 above the fire, said generator having safety and steam connections, all as and for the purposes set forth.

2. The combination, in a forge, with the
70 tuyere A, having valve A', of the blower-case opening into the air-chamber O below said valve, the chamber O below said opening be-
75 ing of downwardly-increasing dimensions, and the weighted valve P operating automatically to open and close said chamber O, as and for the purposes set forth.

Toronto, March 13, 1883.

G. CAMPBELL.

Witnesses:

CHAS. C. BALDWIN,

F. BARNARD FETHERSTONHAUGH.