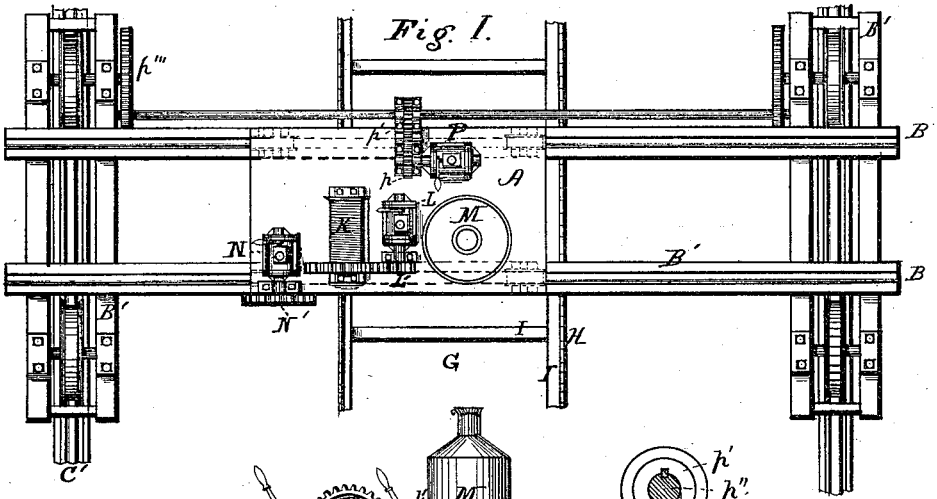
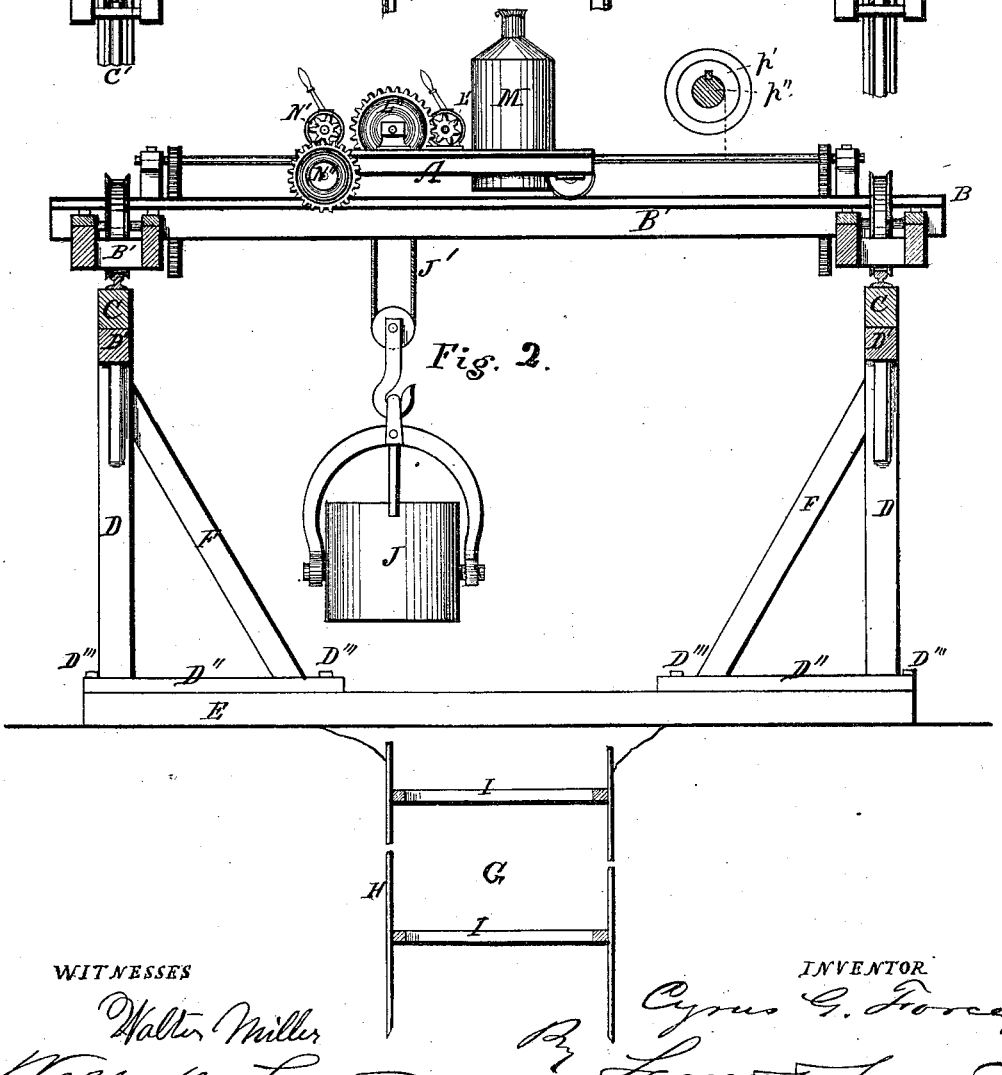
C. G. FORCE, Jr.

Excavating Apparatus.

No. 164,643. Patented June 22, 1875.

Fig. 1.





WITNESSES

Walter Miller

Wells W. Leggett

INVENTOR

Cyrus G. Force Jr.

By Leggett & Leggett.

Attorneys

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

CYRUS G. FORCE, JR., OF CLEVELAND, OHIO.

IMPROVEMENT IN EXCAVATING APPARATUS.

Specification forming part of Letters Patent No. **164,643**, dated June 22, 1875; application filed February 24, 1875.

To all whom it may concern:

Be it known that I, CYRUS G. FORCE, Jr., of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Machines for Making Excavations; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to that class of mechanism employed in making excavations where a bucket is carried by a car overhead, and is lowered into and drawn out from the said excavation through the medium of a steam engine or engines located upon the said car, and the said car being located upon a movable platform, whereby the said car, together with the bucket, may be shifted to a locality where it may be desired to dump the dirt.

My invention consists, first, in a portable trestle-work that supports the rails upon which the said movable platform traverses; second, in combining with the said car and movable platform a portable trestle, whereby the said mechanism is adapted to do the work required in making the excavations for sewers, laying of pipes, making of cuts, &c.; third, in combining, with the said car and movable platform, a portable trestle, the standards of which are seated in or upon sills that extend from the base of one standard across the excavation to the base of the other standard, whereby the structure is rendered rigid and not liable, by settling, to impair the gage of the track upon which the movable platform traverses.

In the drawings, Figure 1 is a plan view representing my invention. Fig. 2 is a section and elevation, representing my invention as it appears in use.

A is a car traversing in the track B of the movable platform B′. C are the stringers located at the top of the trestles, and which bear the tracks C′ upon which the movable platform traverses. D are the uprights that support the stringers C. D′ are corbels for giving additional strength to the structure. D″ is a sill into which the standards and its braces F are seated. E is a mud-sill, to which the said sill D″ may be attached, if desired. In some cases, however, where it is impracticable, or, from the nature of the earth, not desirable to employ the mud-sills E, the sills D″ may alone be employed, and will give to the structure a very good support. In cases, however, where the nature of the soil or earth composing the walls of the excavation is such as not to form a perfectly solid and rigid foundation for the said sills D″, then it will be necessary to employ the mud-sills E, so that no matter what slight settling may take place the standards D and their sills D″ will be displaced proportionately, so that the gage of the tracks C′ will remain unaltered. G is a sewer or any other excavation that is being carried forward. H represents sheet-piles; I, suitable braces for supporting the side of the walls. J is a bucket; J′, a wire or other cable, which passes around the drum K. The said drum is operated by a pinion, L′, upon the shaft of the rotary engine L, which receives its steam from the upright boiler M in any suitable manner. N is an independent rotary engine, receiving its steam from the same boiler, which, through the medium of its pinion *n*, which gears into a cog-wheel, *n′*, operates to turn the car-axle *n″*, and causes the car A to traverse from side to side upon the rails B. P is an independent rotary engine, which receives its steam from the boiler M, and, through the medium of its pinion *p*, gearing with a pinion, *p′*, which latter pinion is feathered into a groove in the shaft *p″*, serves to turn the cog-wheel *p‴*, which, in turn, causes the movable platform B′ to traverse upon the tracks C′.

The operation of the device may be briefly described as follows: By the engines N and P the car is brought to its proper position over the place where the bucket is to be lowered to receive the dirt. The bucket is lowered by the engine L; it is filled with dirt, and is then raised up free from the excavation into about the position shown in Fig. 2; then, by means of the engine P, it is carried to a position where it may be dumped over the work that is already completed; or, if desired, it may be stopped at any point, and, by means of the engine N, it can be carried to one side and dumped.

In this way it is obvious that by a single

handling of the dirt it can be raised from the excavation and dumped upon the work that is already completed, as, for instance, in making a sewer, it may be lifted from that part which is being excavated and dumped upon that part of the sewer which has been completed ready for covering. In order that this may be effected and may be made practicable in carrying forward excavations, it is necessary to provide a portable trestle-work. Such a trestle-work is shown in Fig. 2, wherein the standards D, their braces F, and their sills D″ may be readily removed from the sill E by loosening the bolts D‴.

When it is desired to carry the trestle-work forward over the portion that is being excavated, it is only necessary to put in a new section of the portable trestle, or, in many cases, where a portion of the work is being covered as another portion is being excavated, the last section of the trestle over that portion of the work that is being covered can be removed and added to that end over the part that is being excavated.

In this way, with a limited number of trestles, the work can be carried forward with rapidity and ease. It is also apparent that it will be generally necessary, as heretofore stated, to employ the mud sill E, extending across the excavation, so as to maintain the proper gage of the tracks C′, upon which the movable platform B′ traverses.

It is also important that the said car A should be provided with rotary engines rather than reciprocating engines. All reciprocating engines operate with more or less jar. It is evident that such jarring, when in a locality connected with an excavation, such as shown in Fig. 2, would cause the walls of earth to crumble and fall in; or, if there be quicksand, as is the case to a greater or less extent in nearly all excavations, it would start the said sands to running, whereby would be caused a considerable delay, and often very great expense, as well as danger to the workmen.

I also deem it important that whether the cantle be provided with rotary or reciprocating engines, there should be a separate engine for each separate part of the work, which said engines may be operated independently of each other. In this way much time can be saved, because it is evident that the engines may be operated simultaneously. Thus, as soon as the bucket has been hoisted clear of the excavation, or even before it is quite clear, the engine P may be started, thus beginning its travel toward the dumping place, and while on its way the engine N may cause the car A to traverse to one side, so, if desired, the material may be dumped at the side of the work, and so, by employing a few buckets, the work may be carried forward continuously without delay.

I am not aware that a car of this nature has ever been provided with one or more rotary engines, whereby it is adapted to operate in connection with excavations. Nor am I aware that such a car has ever before been provided with separate engines for performing each separate portion of the work, whether the said engine be rotary or reciprocating.

I find this mechanism admirably adapted at the same time for drawing out sheet-piling that may have been driven on the sides of the excavation. For this purpose it is only necessary to detach the bucket and attach to the cable in place thereof a suitable grapple, whereby the sheet-piling is seized; then, through the medium of the drum K and the mechanism by which the cable is brought directly over the piling, the said piling can be drawn very rapidly.

What I claim as my invention is—

1. The combination, with the car A and the movable platform B, of a portable trestle, whereby the device is adapted to the carrying forward of an excavation, such as sewers, cuts, laying of pipes, &c., substantially as and for the purpose described.

2. The combination, with the movable platform B′ and the standards D, of the sills E, extending across the excavation at the bottom of each standard, and uniting the base of the said standards, whereby the gage of the tracks C′ is maintained, substantially as and for the purpose described.

3. The combination, with the movable platform B′ and the standards D, of the sills D″ and braces F, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CYRUS G. FORCE, JR.

Witnesses:

FRANCIS TOUMNEY,

THOMAS B. HALL.