

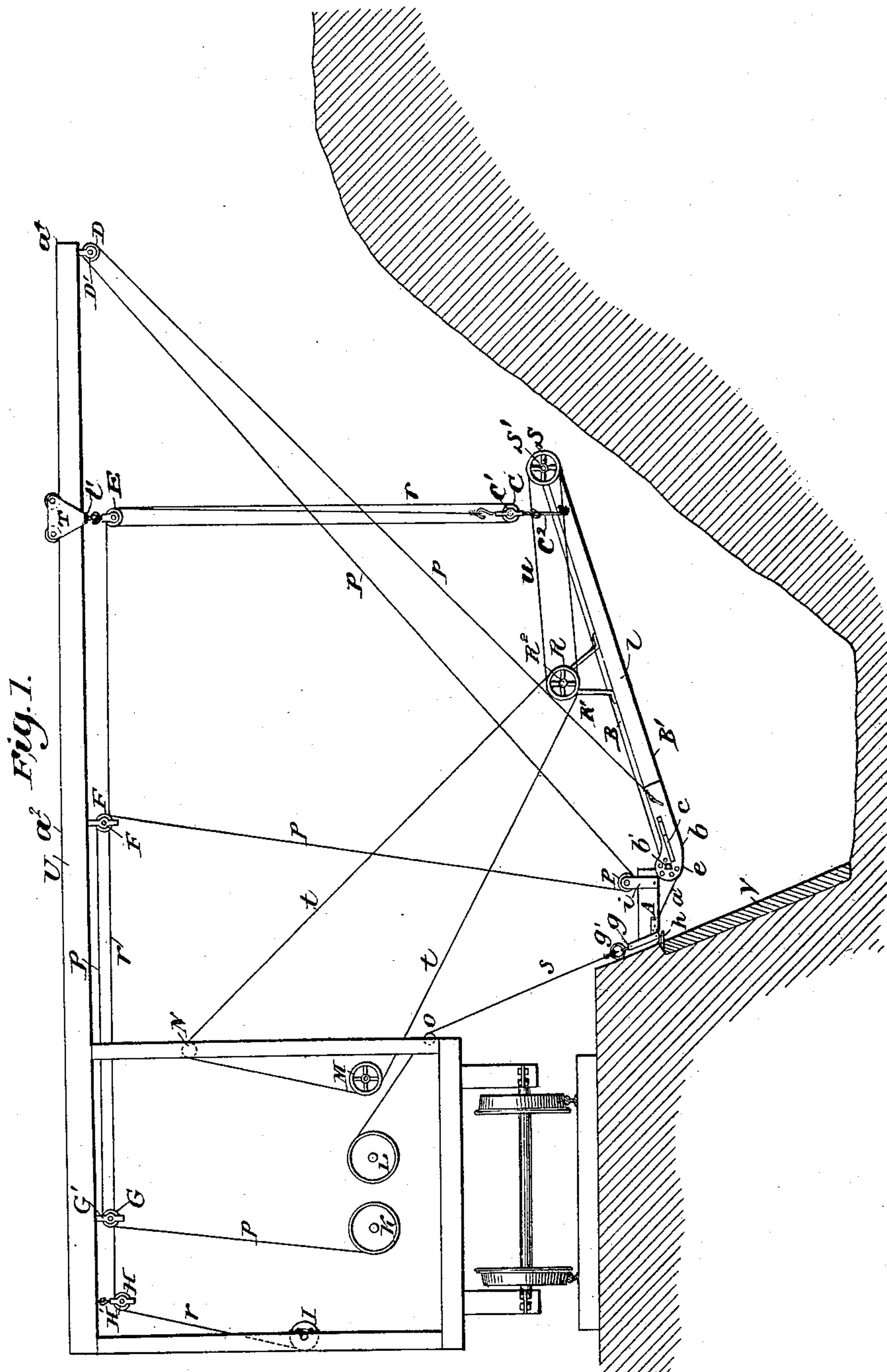
(No Model.)

3 Sheets—Sheet 1.

J. B. FAULKNER.
MACHINE FOR EXCAVATING, CONVEYING, AND DISTRIBUTING
CLAY UPON BALLAST KILNS.

No. 599,124.

Patented Feb. 15, 1898.



Witnesses.

H. Dyall
C. H. Martin

Inventor.

J. B. Faulkner
By Leroy A. Pahr
att.

(No Model.)

3 Sheets—Sheet 2.

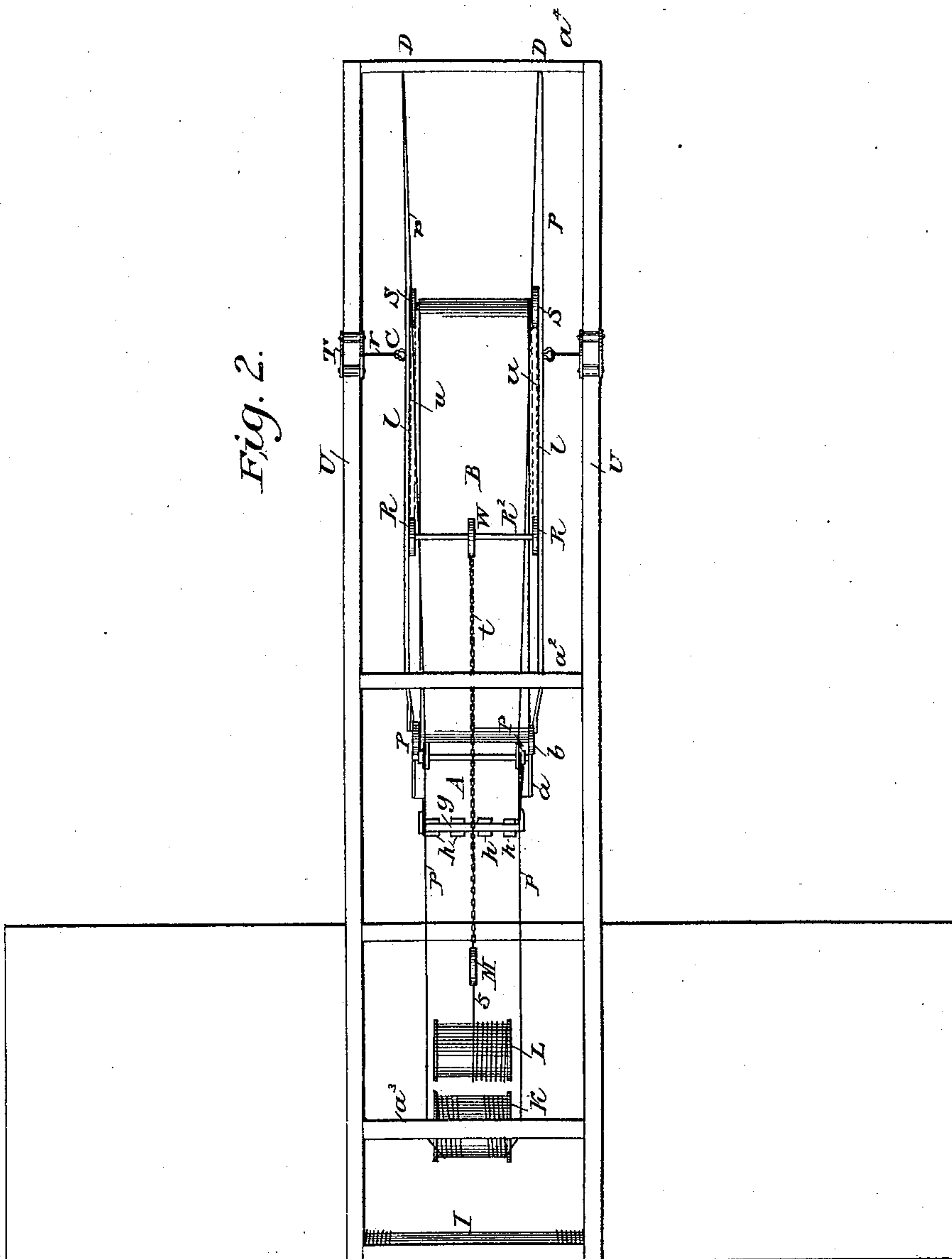
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Fig. 2.



Witnesses.

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(No Model.)

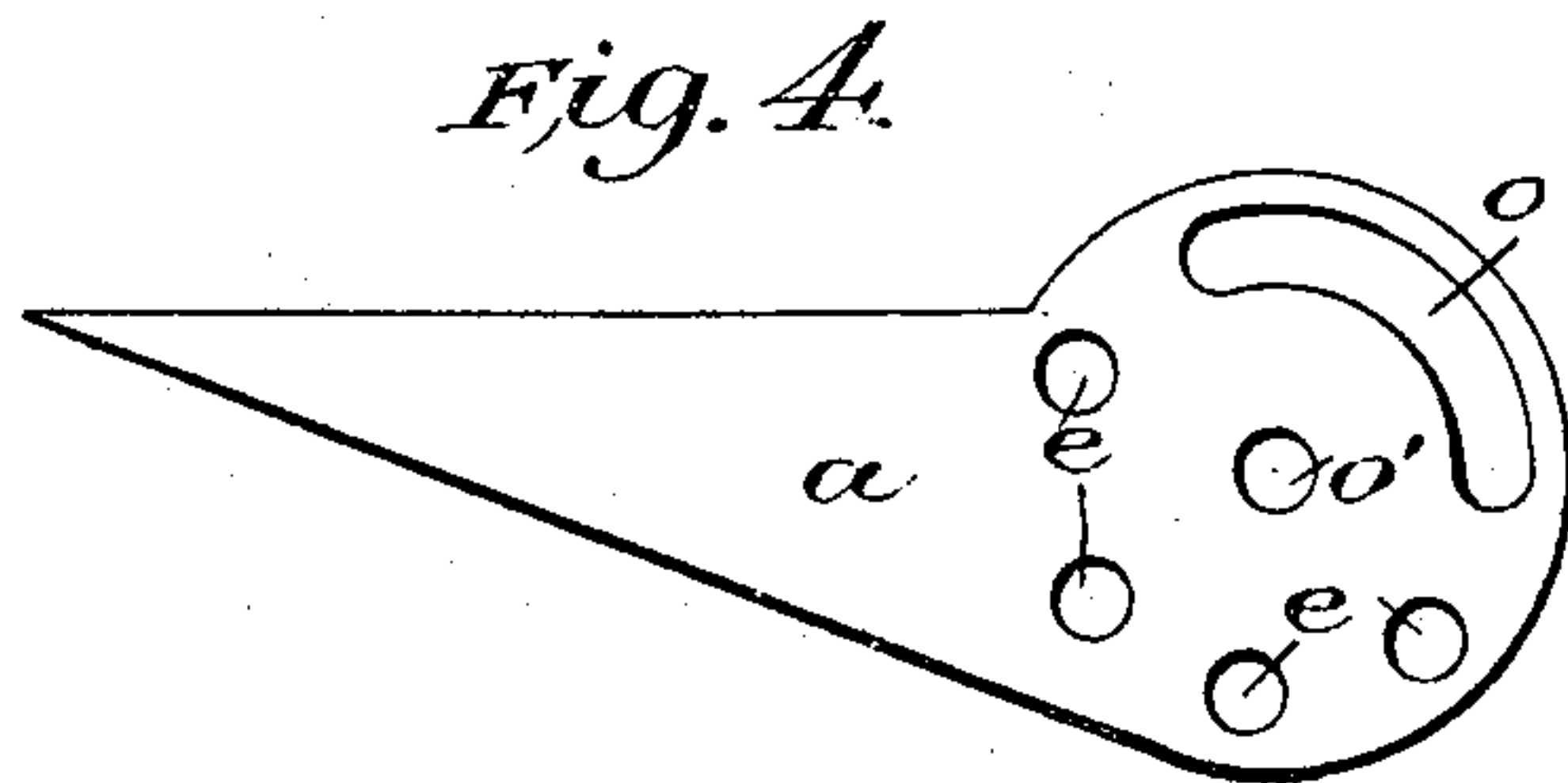
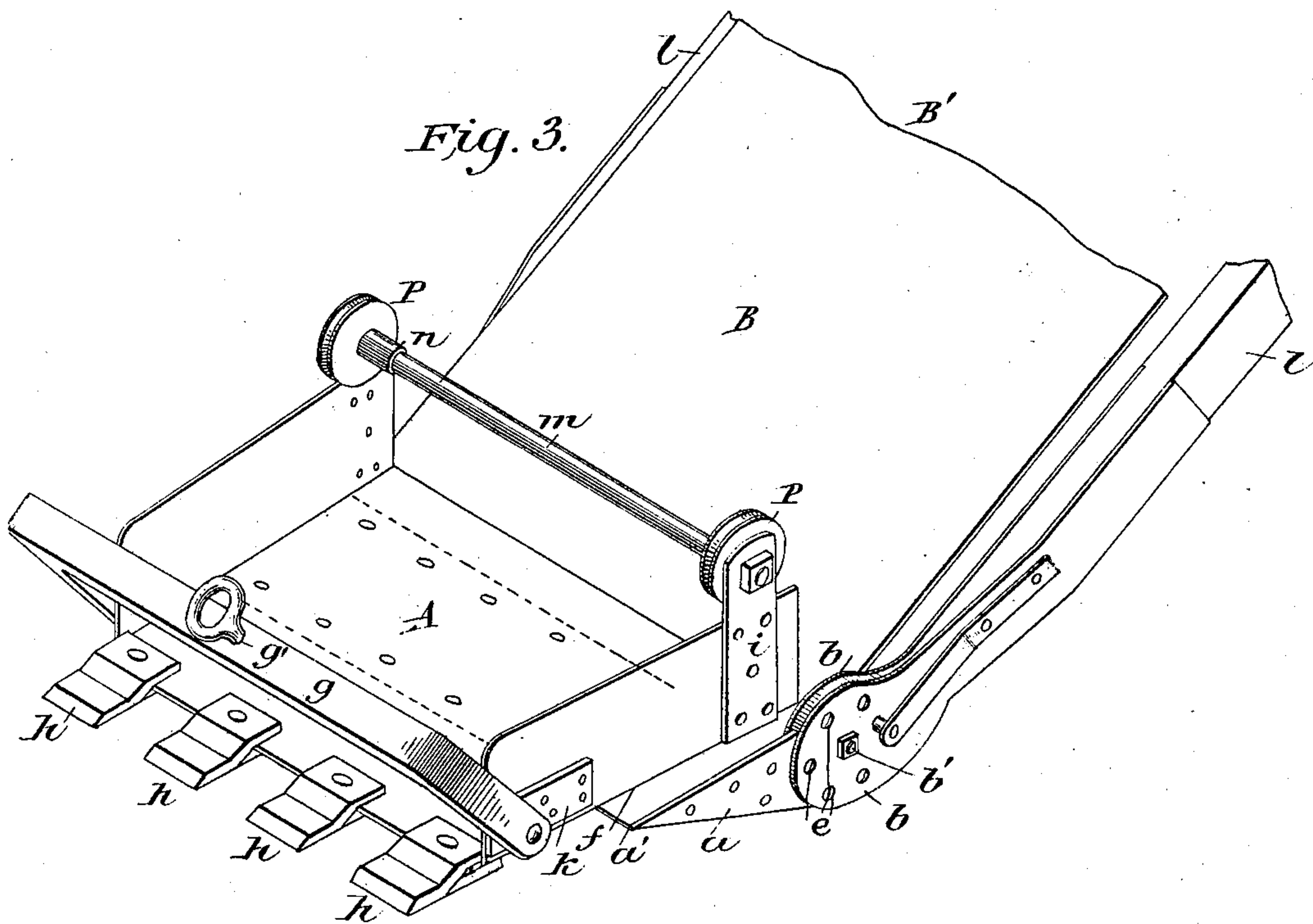
3 Sheets—Sheet 3.

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att'y.

UNITED STATES PATENT OFFICE.

JOHN B. FAULKNER, OF MOUNT PLEASANT, IOWA, ASSIGNOR OF ONE-HALF
TO CHASTAINE M. SNYDER AND GEORGE W. SNYDER, OF SAME PLACE.

MACHINE FOR EXCAVATING, CONVEYING, AND DISTRIBUTING CLAY UPON BALLAST-KILNS.

SPECIFICATION forming part of Letters Patent No. 599,124, dated February 15, 1898.

Application filed December 24, 1896. Serial No. 616,941. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. FAULKNER, a citizen of the United States, and a resident of the city of Mount Pleasant, Henry county, Iowa, have invented a new and useful Improvement in Machines for Excavating, Conveying, and Distributing Clay and other Materials upon Kilns for Burning Ballast, of which the following is a specification.

My invention relates to an improvement in the scraping, conveying, and distributing apparatus of a clay-ballast machine employed to excavate, lift, and deposit clay and other material upon a kiln for burning, and is operated by stationary power mechanism of the usual kind located upon a moving car consisting of drums, cables for driving them, and parallel booms extending from the top of the car and transversely thereof, to which are strung adjusting and suspension cables connecting the distributing-elevator and scraper with said drums and operating the same from said booms and adapted to raise and lower to any desired angle the scraper hinged on the lower or forward ends of a distributing-elevator.

My improvement is applicable to other purposes than ballast-burning; but its primary object is that of preparing a clay ballast for burning.

My present improvement consists in a scraper, scoop, or plow apparatus hinged on a distributing-elevator, as particularly shown, described, and claimed hereinafter.

To make more clear the character and purpose of my invention and the defects now existing in machinery used for this purpose, it may be stated that the machines now in use may be divided into two classes in which the clay is deposited on the kilns in buckets or scoops hoisted by cables and dumping their load and excavating therefrom or toward the car—those by which the clay is plowed or scooped by mechanism attached to and traveling alongside of the car or operated therefrom as the car moves longitudinally along the face of the kiln, the material excavated being deposited upon the kiln by elevators carrying endless belts. In either of these classes of ballast-machines many defects have long been observed, and it is to remedy these

that I claim my improvement is most highly efficient. In machines of the first class, where scoops or buckets are employed to deposit clay upon the kiln by cables or winding-drum mechanisms, the clay or earth is dumped upon the kiln in solid masses and in such undistributed and irregular heaps as to make the burning of the earth or clay evenly highly difficult. By depositing such large and uneven masses upon the kiln an efficient and even admixture of coal and other fuel with the clay is prevented, with the result that the coal burns in an irregular and uneven way, producing inferior ballast of varying qualities and excellence, while much of the mixture of coal and clay is not burned at all, but which latter condition cannot be discovered until the kiln is opened or when it is too late to remedy the defect. In machines of the class where clay is plowed or scooped by mechanism traveling alongside the face of the kiln and thence deposited on the kiln by conveyor-belt the chief defect is that a kiln so prepared by a machine moving along the whole face of the kiln necessitates the maintenance of fire upon the entire face of the work. This fire must be kept alive over the entire breast and length of the kiln, and it is constantly exposed to the weather and elements and, being at any time in no way protected, a sudden rain or a change in the wind at any time may subject the entire face of the kiln carrying this exposed fire to extinguishment or impairment. This method also requires the use of a large number of men to pull the fires and keep them efficient over a wide area of exposed surface, and even with this aid the fires are commonly unequal, burned out in places, partially burned in others, and covered up and completely smothered in other places.

In the practical employment of the foregoing machines it is substantially impossible to ascertain in advance the amount of fuel required to properly burn the kiln, because by the methods employed in the operations of said machines a great per cent. of the fuel is lost in the attempt to maintain fires over great superficial areas and often without the control of the most careful workmen. The cost of ballast is thus rendered uncertain in

advance, with the result that the burning of clay ballast is usually carried on with great risk both to the contractor and the owner of the ballast. It is to overcome these and other defects in existing apparatus for ballast-burning that my invention is designed. I dispense with all bucktes, swinging scoops, as well as plowing mechanism traveling along-side of the car, as in the Jesse Stubbs patent, No. 537,319, and the B. F. Dailey patent, No. 556,078. I complete, as I proceed, large sections of kiln, preventing the existence of wide superficial areas of exposed fire, and by my apparatus lessen the labor employed, as well as greatly economize in the use of coal and other fuel.

My improvement therefore is one which combines the elevator carrying a coal-distributing belt hinged on a scoop or scraper or plowing apparatus wherein the plow or scraper excavates laterally to the traveling car and cuts or dislodges the clay or earth in suitable condition and pieces for clay ballast and deposits or feeds the clay or earth upon the elevator carrying a distributing-belt, which receives and transports the earth outward or transversely of the cutting edge of the scraper and deposits the same at any desired angle from the breast of clay operated upon and upon the kiln. I attain these results by the following mechanism, illustrated in the accompanying drawings, in which—

Figure 1 is an end view of my entire apparatus, the end of the car being removed to disclose the drum mechanism for winding and unwinding the cables. Fig. 2 is a view showing the outwardly-extending booms, the elevator swung between the same, and the location of the floor of the car of the drum-winding mechanism as seen from a point above the car. Fig. 3 is a perspective diagrammatic view of the scoop with its pivotal attachment to the elevator, with the locking device for holding the scoop at an angle. Fig. 4 is a view of the hinge with the slot *o* and the perforations to hold the locking-pin *d*.

A is a scraper or scoop of sheet metal, preferably, and in one piece, with vertical sides, but constructed with particular reference to its being broader at its rear or distributing end than at its cutting or receiving end. On the cutting end of the scraper I attach teeth *h h h h*, beveled to a cutting edge and secured to the scraper firmly in any approved manner. A reinforcing-plate *k* is vertically secured to either side of the scraper at its lower forward end, into which is journaled a bail *g*, provided with a swivel *g'*, to which is secured draft-cable *s*. Vertical plates or standards *i i* further reinforce the sides of the scraper and are journaled at their upper ends to receive a transverse shaft *m*, upon which are mounted loosely grooved sheaves *P P*, held in place by collars *n n*. Securely bolted or riveted to the bottom of scraper A is a plate *f*, its outer edges bent downward to form wedge-shaped sides *a' a'*. Bolted to the outer faces of

the sides *a' a'* is a metal plate of the general form, as shown in Fig. 4, and forms a part of a hinge whose counterparts are plates *b b*, and being provided with suitable journals are adapted to move pivotally upon shaft *b'*. The downwardly-bent edges of the bottom plate *f*, secured to the hinge part *a*, besides reinforcing the bottom of the scraper are designed to reinforce the rear end of the scraper A, so that the distributing end of the scraper may at all angles be held normally above the elevator-belt B, so as to prevent interference with the free movements of the belt and also to cause the cutting end of the scraper to incline downward. Side plates *b b* are also perforated to admit of the insertion of the locking-pin *d*, which is intended to engage fully the slot *o* in hinge *a* and also the perforations *e e e e*.

The hinge *a*, pivotally connecting the scraper A with the elevator B' by operation of the slot *o* in the disk forming the rearward portion of the hinge *a*, Fig. 4, adapts itself to any angle which the elevator B' may assume. As the elevator B' is elevated and carried outward by the action of the regulating-cables *p p p p* the rotation of the slot *o* around the locking-pin *d* serves as a guide to the lock-pin, by which the angle of the cutting edge of the scraper A is fixed and determined. The scraper may be secured at any desired angle by dropping the spring locking-pin *d* into any of the perforations *e e e e*, or may be secured by the insertion of a pin in said perforations by hand. In order to more fully accommodate and secure the practical co-operation of the different parts, the elevator frame-pieces *l l* are beveled at their sides, near their lower ends. To the beveled portion of the sides *l l* I attach the bent side plates *b b* by bolts secured transversely thereto and therein and upon the inner and outer sides of said elevator-frame *l l*. On the outer faces of the plates *b b* I attach the lock-spring *c*, which carries lock-pin *d* upon its inner face. The partially-disk-shaped plates *b b* at their lower ends complete the hinge, which, pivoted on the transverse shaft *b'*, permits the floor or bottom of the scraper to extend slightly over above the carrying-face of the elevator-belt B. The scraper A, swung from and pivoted, as I have described, to and by the transverse shaft *b'*, thus becomes, in fact, part of the elevator apparatus itself.

The lower end of a draft-cable *s*, attached by a wrapped loop to the bail-swivel *g'*, passes upward and over a roller *O'* to a friction-drum L, mounted on the car and connected by suitable gearing with the power mechanism for driving said drum located upon the car.

Adjusting-cables *p p*, wound upon the drum K, pass upward and over sheaves G G, pendent in hangers G' G', thence outward over sheaves F F', and thence downward and under the sheaves P P, loosely mounted on the transverse shaft *m*, thence upward and outwardly over sheaves D D, pendent in hang-

ers D' D', and thence back to the forward end of the elevator B', and are there secured by wrapped loops to each side thereof to an eye in side plates *b b*. Suspension-cables *r r*, fastened and wound upon a drum I, pass thence upward around sheaves H H, pendent from hangers H' H', thence outwardly along the lower sides of the transverse booms U U, and over the double sheaves E E, which are suspended by hangers from trolleys or carriers T T, mounted upon and adapted to move longitudinally upon said transverse booms U U. Thence said cables *r r*, passing over said double sheaves E E, are carried down and around sheave C, thence back and downwardly, and are fastened to a swivel-hook fixed in the upper part of the shell-blocks *c' c'*, carrying sheaves C C.

The elevator B' consists of the usual side pieces braced underneath by bars across and fastened on the sides and is supplied with the usual belt-carrying rollers at either end thereof of belt-carrying drums. The driving-belt B of the elevator B' is driven by sprockets R R, mounted upon standard-brackets R' R', mounted upon the side pieces of the elevator B'. A sprocket-chain *u* gears together said wheels *s s* and R R. A sprocket-wheel W is geared upon the transverse shaft R² on the standards R' R' and is geared by a sprocket-chain to a sprocket-wheel M, mounted on the car, said chain *t* being carried over the idler N. The idler N may be set between springs and made movable therein in such manner as to take up the slack in the sprocket-chains, or the sprocket-chain *t* may be shortened or lengthened automatically to overcome and accommodate itself to the changing positions or lateral adjustments of the elevator by a spring or weight mechanism of any approved kind, which need not be more particularly described here.

The operation of my invention is as follows: A railway-track is laid along the length of the proposed kiln, and upon this track is operated a car carrying the excavating and conveying mechanism, already described, and power to operate the car and said mechanism. A core or rick of wood and coal fuel is laid out in short sections of any desired and safe length, so that it may be covered and finished up in a day's or more work of the machine. From time to time I lay out more fire rick or core in sections along the whole line of the proposed kiln until a continuous kiln is created, but do not fire the same until I have completed the sections before laid out. Excavation is then begun at any point on the line of the proposed kiln, and with the elevator swung between the booms, which project transversely from the car over the proposed kiln or ground to be excavated, and set to any desired angle above the earth to be excavated, so as to properly distribute the earth, I apply power to the drums K and L, and by winding up the first, K, and allowing the second, L, to unwind the cables *p p* by the action of

the drum *k* tend to and do draw the elevator B' away from the car and outward and upward in a general direction toward the sheaves D D: As the cables *p p* withdraw the elevator, with its attached scraper, outward and upward the travelers or trolleys T T, with their pendent sheaves E E, supporting the suspension-cables *r r*, move outward upon the track or upper surface of the transverse booms U U, and with the desired digging angle secured said travelers come to rest and remain stationary. As cables *p p* are wound in the draft-cable *s* is released, which permits the elevator carrying the scraper A to swing outwardly and away from the car at a desired distance from the car. As the draft-cable *s* is released the scraper turns by its own weight. Cables *p p* being now released, the point of the scraper sweeps downward and backward until it touches the earth at a point where it is desired excavation should begin. The scraper A turning upon shaft *b'* the guide-slot *o* permits the scraper to drop downward until the locking-pin *d* is arrested in its revolution in the slot *o*. At this time the scrapers and elevators are on a right line, with the scraper pointing downward. In practice it will sometimes be necessary to cause the point of the scraper to fall below the end of the elevator at some considerable angle, and to accomplish it I lift the locking-pin *d* and adjust the scraper by hand. The superimposed weight of the elevator pressing downward upon the scraper forces the scraper-teeth into the earth at the depth I desire, power is applied to the drum L, the draft-cable S is wound thereon, the drum K is released sufficiently for the purpose, the draft-cable is wound upon the drum L, and the scraper is drawn through the earth toward the car, cutting a shallow trench, while the carriers T T by the normal operations of the suspension-cables *r r* in the double sheaves E E move toward the car along and upon the booms U U, and when the scraper has reached the limit of its inward stroke drums K and L are again released, the scraper is dropped again into place, and by the same operation is drawn toward the car in the same trench as before. As the earth is forced past the point of the scraper it moves backward behind the sides of the scraper A toward the elevator-belt B, with which it engages, and is by it carried upward along the elevator and finally thrown out of the elevator upon the fuel rick or kiln.

In the foregoing specifications of my improved and combined scraper and clay elevator and conveyer I have confined myself to a description of one scraper and elevator apparatus; but in the practical operation of my invention it will be noticed it will be practicable to have at least four separate drum, scraper, and conveying machines, so that elevators of different lengths may be employed to facilitate the burning of kilns of any desired height; but the general construction

and equipment of the several elevating and excavating mechanisms will be generally similar to the one described herein, excepting that the elevators of course must be of different lengths.

Having now described my new and improved scraping and elevating apparatus, what I claim as new, and desire to protect by Letters Patent, is—

1. In a clay excavating and conveying machine the combination upon a moving car with transverse booms located above the power machinery on said car, of winding and unwinding drums K, and L, carrying adjusting-cables, *p, p*, wound upon drums K, with a draft-cable *s*, wound upon drum L, the suspension-cable *r, r*, wound upon drum I, passing upward over sheaves H, H, and outwardly over sheaves E, E, in hangers *f, f*, suspended from carriers T, T, and downward from the sheaves E, E, to sheaves C, C, under sheaves C, C, and back to double sheaves E, E, over the latter and downward, and fastened to an eye in shell-block C', said shell-block C', carrying a hanger C², all in combination, and adapted to support a distributing-elevator B', to which is hinged a scraper point or bit A, automatically adjustable to said elevator, at any digging angle, and adapted to excavate upon any angle or line transversely to a moving car, and deposit earth so excavated, backward and outward upon a distributing-elevator B' substantially as described.

2. In a clay excavating and distributing machine the combination with winding and unwinding drums, carrying adjusting-cables *p, p*, hangers with sheaves supporting said cables, said cables passing over sheaves and downwardly under sheaves P, P, loosely mounted upon shaft *m*, adjusting-cable *p, p*, carried upward and outward at a tangent passing over sheaves D, D, said cable being thence brought back and attached to side plates *b, b*, suitable supports for the outer end of the distributing-elevator, said adjusting-cables and supports being adapted to support a distributing-elevator carrying upon its inner or car end a pivoted and automatically-adjustable scraper A, provided with a cutting edge adapted to engage and excavate earth by a swinging movement of the elevator and attached scraper toward the car and at right angles thereto and substantially as described.

3. In a clay excavating and distributing machine, the combination with winding and unwinding drums, of elevator and scraper adjusting cables supported upon sheaves in hangers pendent from transverse booms projecting from the car with an elevator and scraper hinged together, and winding and unwinding drums, operating a draft-cable attached to a scraper-bail and adapted to draw said scraper and distributing-elevator toward the car substantially as described.

4. In a clay excavating and distributing machine the combination of the scraper A, with open ends adapted to deliver clay or

other material upon a conveying-belt transversely of the cutting edge of the scraper, reinforcing tilting piece *f*, fastened to scraper A, the sides of plate *f*, bent downward to form faces for hinged pieces *a, a*, slots *e, e*, and locking perforations in hinged pieces *a, a*, journals and bearings *e' e'* adapted to receive the outer ends of shaft *b'*, plates *b, b*, bent to conform to and receive the bevel ends of elevator sides *l, l*, and journaled to receive the outer ends of shaft *b'*, spring *c*, carrying upon its inner face, locking-pin *d*, a hinge consisting of parts *a, a*, plates *b, b*, scraper A, with its rear or distributing end projecting over and above conveyer-belt B, transverse belt-supporting rollers, adapted to revolve upon a shaft between the sides *l, l*, of the elevator-frame and support conveying-belt B, substantially as described.

5. In a clay excavating conveying and distributing machine, the combination of the scraper hinged or pivoted upon a shaft having suitable bearings in opposite sides of an elevator-frame transversely of its length with a drum or roller mounted on said shaft adapted to support a clay-distributing belt, with the bottom of said scraper so constructed as to project at its rear end over and above said belt, means to drive said belt, the belt adapted to convey upon its surface material excavated outwardly and away from the excavating edge of the scraper, means for suspending the conveying-elevator from booms attached above the elevator and upon a movable car and extending transversely thereof as described.

6. In a clay excavating and distributing machine the combination of a scraper hinged to a conveying-elevator adapted to deliver material excavated upon a distributing-belt transversely of a breast of clay or other material, with standards R' R' fixed upon the side pieces of the conveying-elevator, said standards having at their upper ends, bearings for the transverse shaft R², sprocket-wheels S, S, upon a transverse shaft journaled in the side of elevator B', sprocket-chains to drive sprocket-wheels R, R, and S, S, a sprocket-wheel W, upon shaft R², between the sides of elevator B' and above the conveyer-belt thereon and adapted to turn said shaft R² by means of a sprocket-chain, geared to sprocket-wheel M, and connected by suitable means with the power mechanism on the car; mechanism for driving the sprocket M, a belt-supporting drum mounted upon a shaft having bearings in the sides of elevator B' at its upper and outer ends adjusting regulating and elevator and scraper supporting cables carried upon sheaves suspended from booms projecting transversely of a movable car, draft-cables *s*, operated by means of winding and unwinding and scraper-filling drums, trolleys or carriers mounted on said booms to automatically adjust the regulating and suspension cables, a scraper hinged at its rear end to the forward or car end of a conveying-elevator, means for automatically adjusting

said scraper at any digging angle, said means being the adjusting-cables p, p , and r, r , and a draft-cable s , a scraper hinged to a distributing conveyer or elevator, and adapted to
5 be drawn when in position for excavating toward the car by means of draft-cable s , substantially as shown and described.

7. In a clay excavating, conveying and distributing machine the combination of a movable car upon a track longitudinal to a bal-
10 last-kiln, power mechanism mounted upon the car for winding and unwinding friction-drums, booms extending transversely of the car and above the power mechanism thereon,
15 carriers adapted to travel longitudinally of said booms having downwardly-dependent brackets, carrying cable-supporting sheaves, sheaves supporting hangers fastened and dependent from the lower side of said booms

supplied with cable-adjusting sheaves there- 20
in, scraper and elevator supporting and adjusting cables, operated by means of friction-drums, a scraper hinged to a shaft adapted to revolve in its bearings transversely of an
elevator-frame, the bottom of said scraper 25
projecting over and above the surface of a distributing-belt, a drum upon shaft b' , to support a clay-distributing belt, means to drive the belt said means being preferably a
sprocket and chain, cables for adjusting and 30
suspending the elevator and scraper from said booms, cables for drawing the scraper and elevator when in position for excavating toward the car substantially as described.

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