

C. L. HOPKINS.
EXCAVATING APPARATUS.
APPLICATION FILED JAN. 27, 1909.

963,562.

Patented July 5, 1910.

2 SHEETS—SHEET 1.

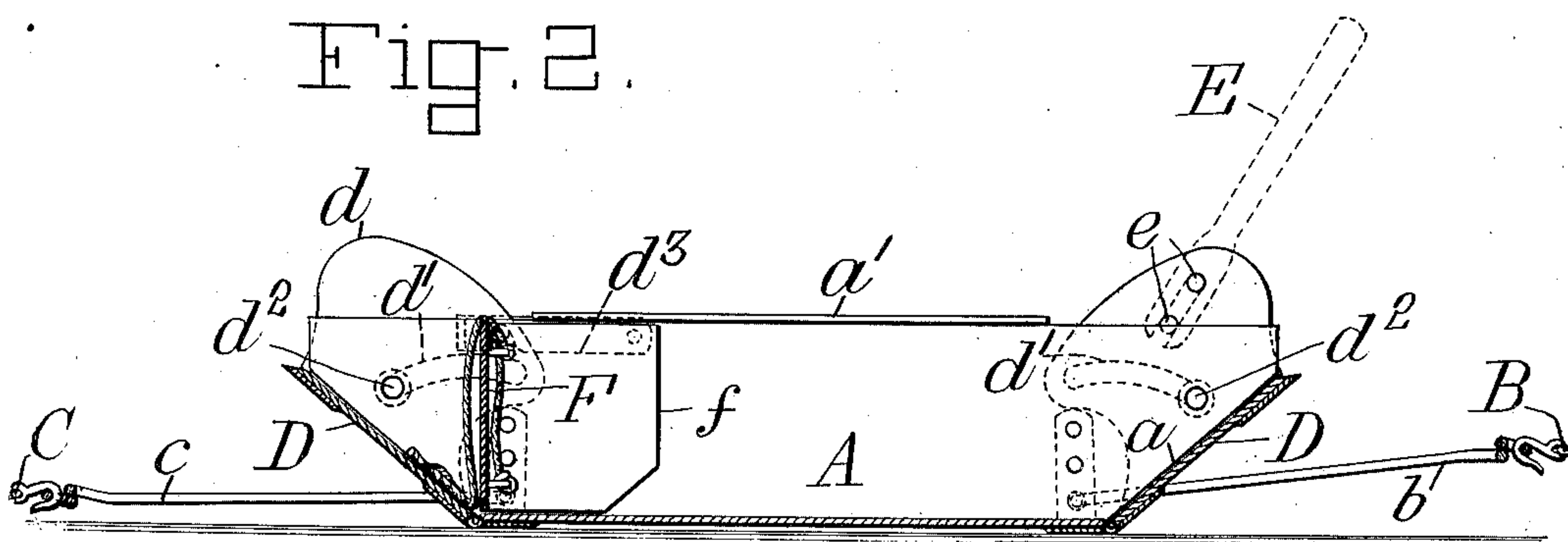
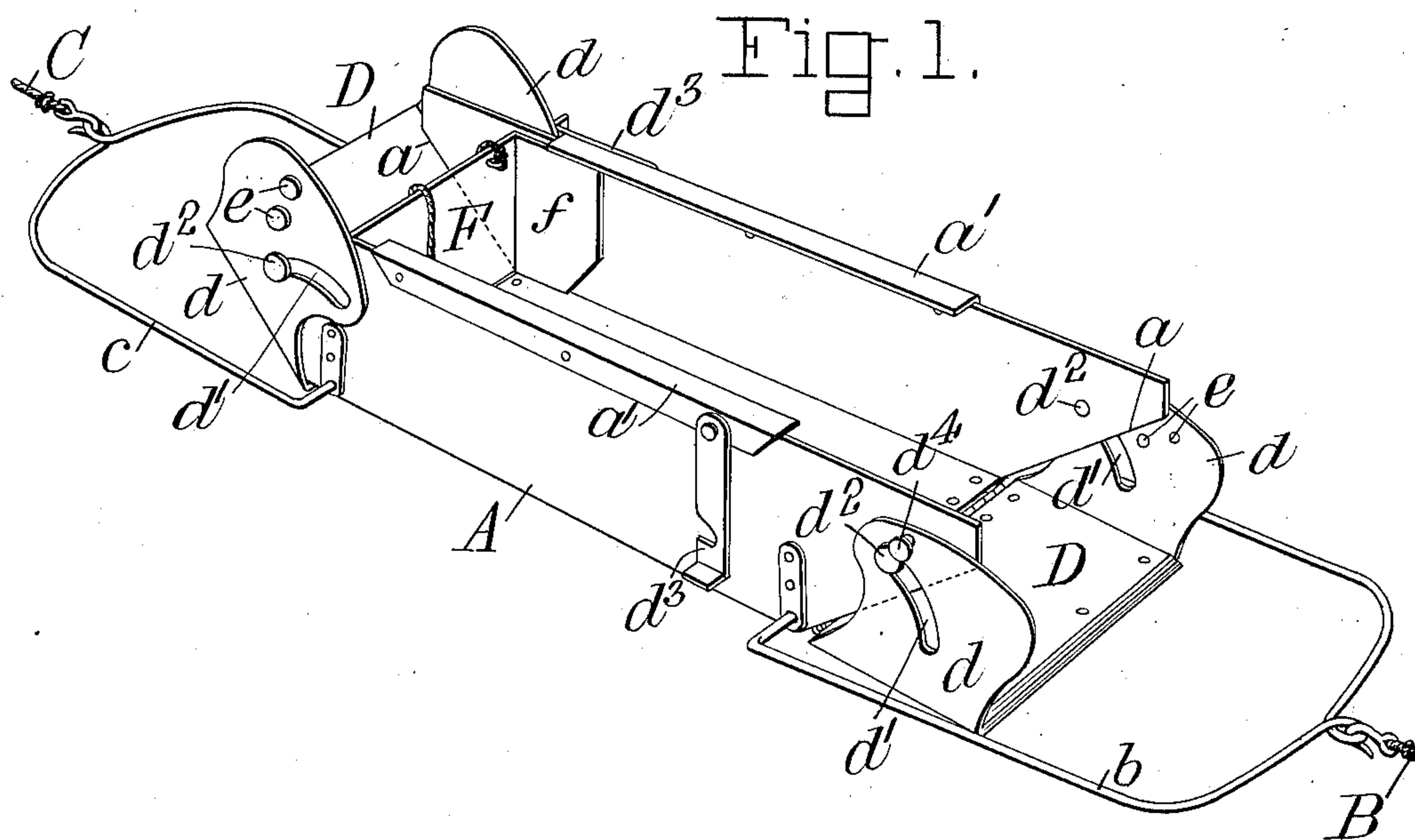
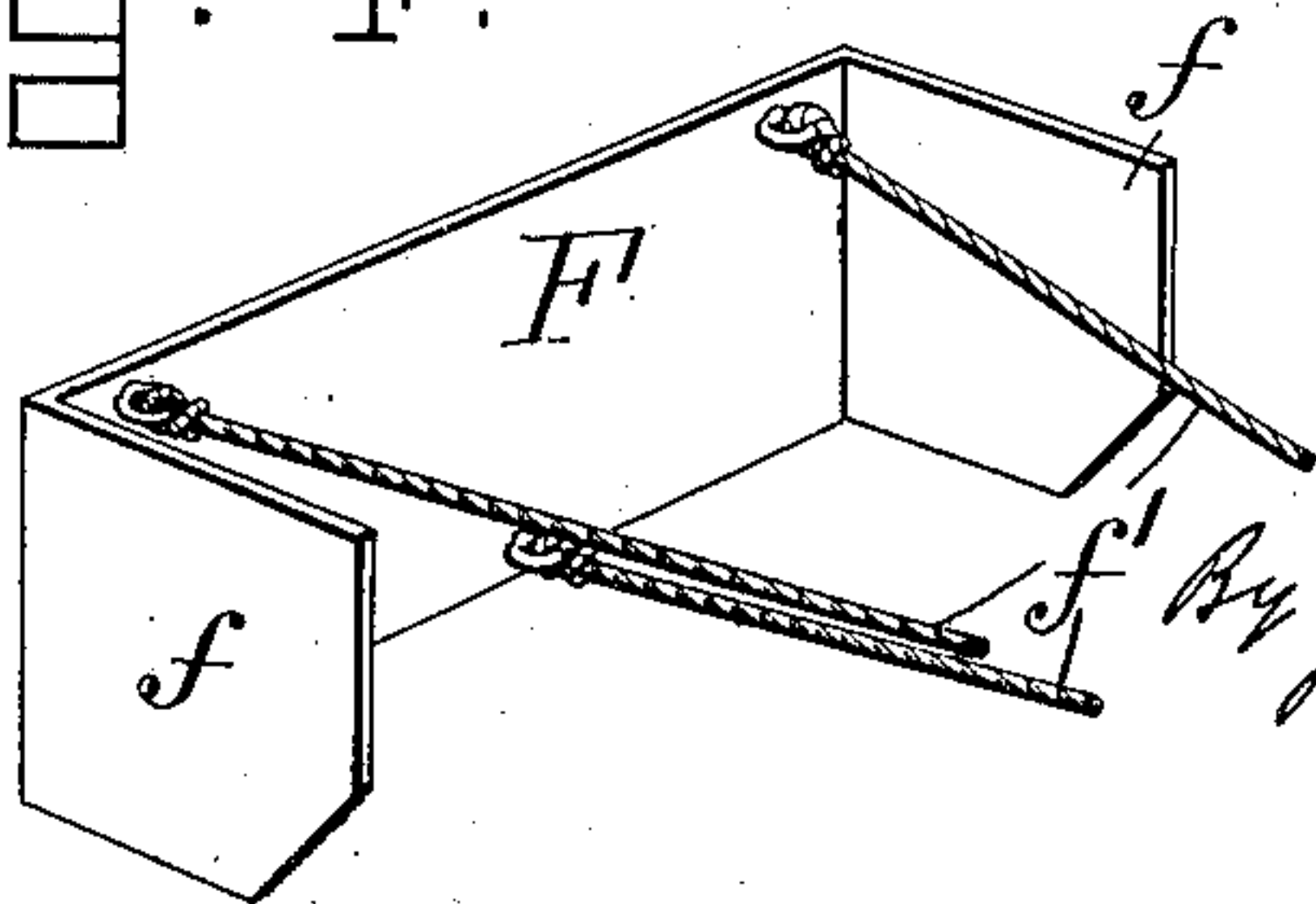


Fig. 4.



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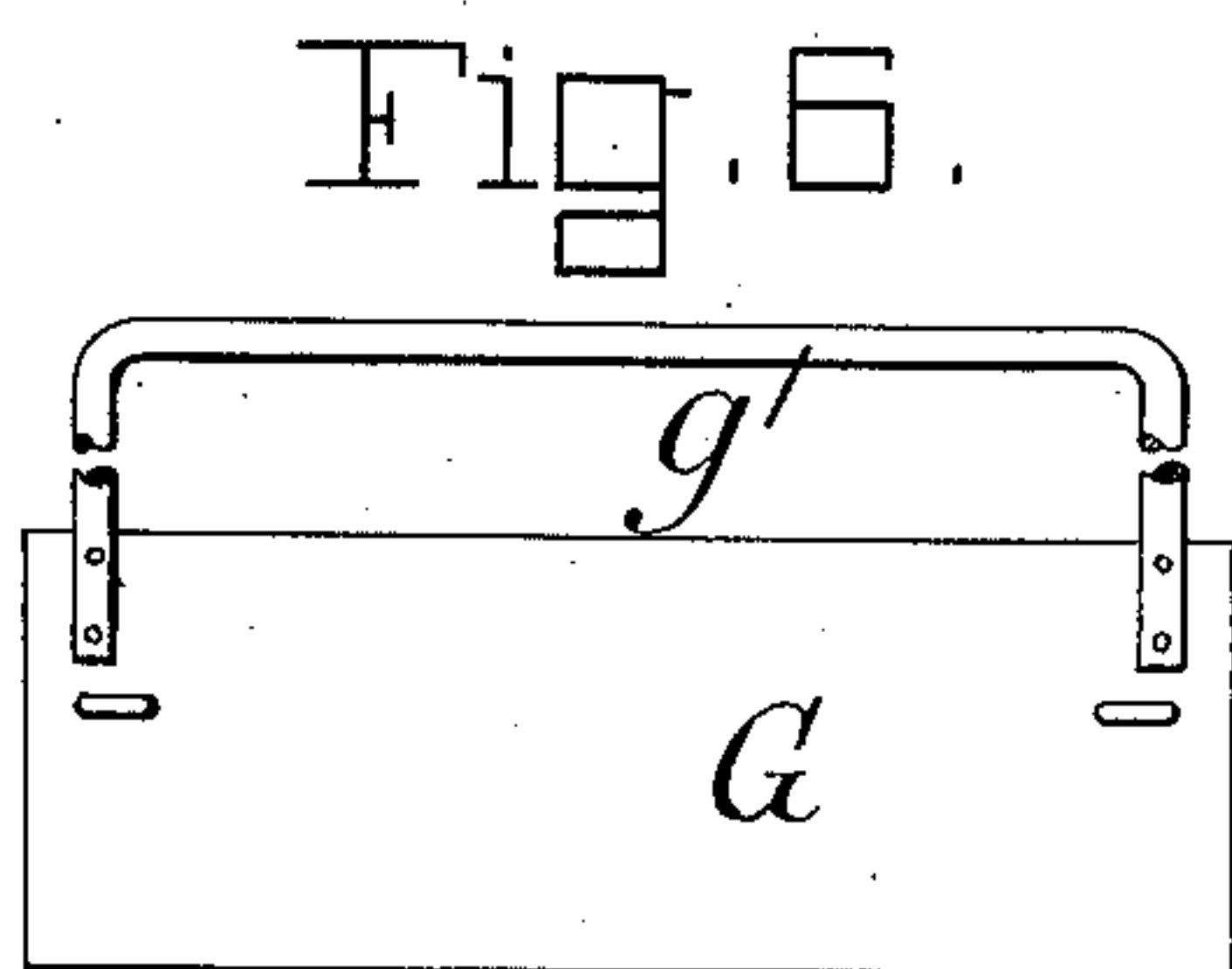
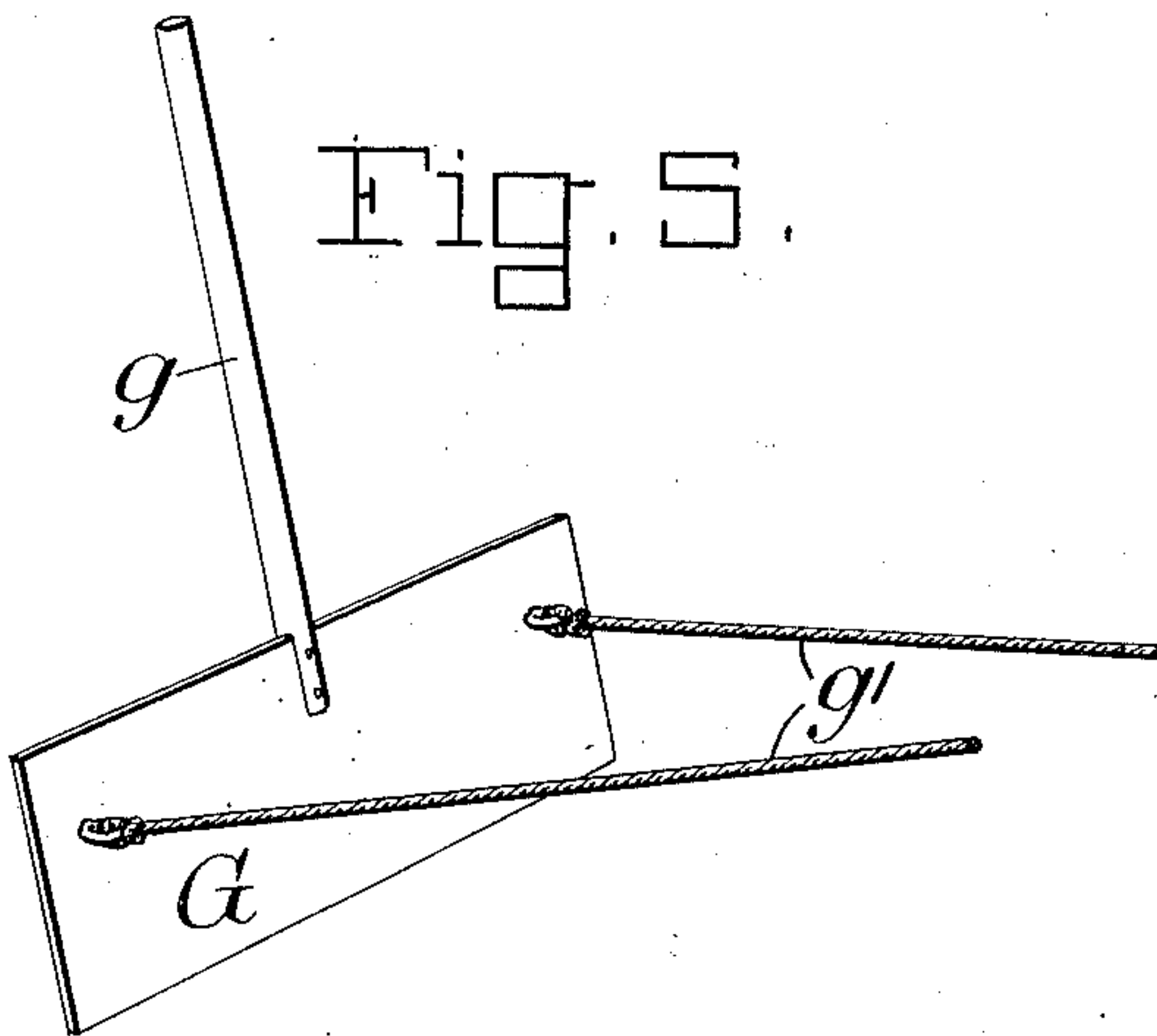
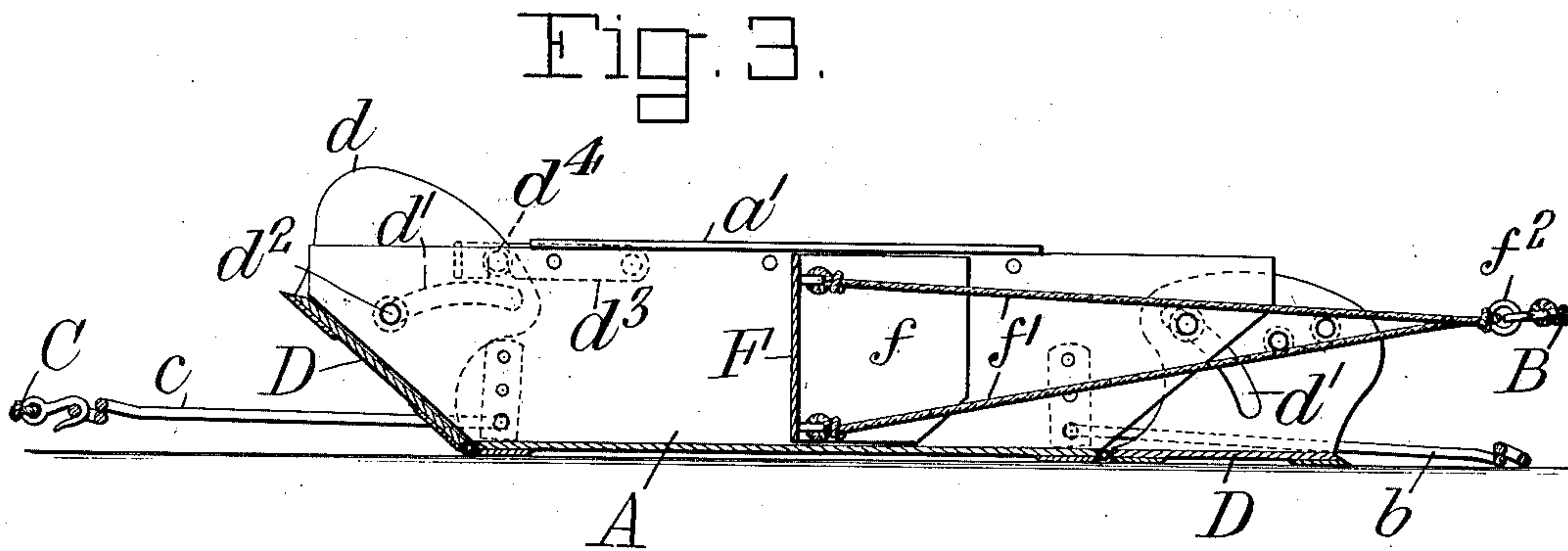
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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EXCAVATING APPARATUS.

963,562.

Specification of Letters Patent.

Patented July 5, 1910.

Application filed January 27, 1909. Serial No. 474,535.

To all whom it may concern:

Be it known that I, CHARLES L. HOPKINS, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Excavating Apparatus; 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 appertains to make and use the same.

This invention relates to apparatus for excavating and transporting earth and other materials by a scoop or scraper operated by power through cables; and the invention is particularly adapted for use in the construction of earth embankments such as levees, dikes, dams or similar structures, or for grading purposes and also any kind of excavation work where ground is to be made at opposite ends of the run of the scoop.

A general object of the invention is to provide a practicable system including a scoop or scraper in connection with oppositely-operated cables whereby the scraper can be loaded and transported by hauling it in one direction and unloaded and returned by hauling it in the opposite direction.

A more particular object is to provide, in conjunction with a cable-transported scoop or receptacle, positive load-discharging means therefor operated by the cables, whereby the loaded scoop can be drawn to the dumping place and its load pushed or scraped therefrom and the scoop returned to the loading place while maintaining its upright position throughout its operations.

Another object is to provide an improved scoop or scraper, or what may be termed an excavating and transporting receptacle, particularly adapted for the carrying out of the foregoing functions.

A further object is to provide a scoop that will load itself when drawn either forward or backward; and by means of which the earth can be scooped and transported by both runs of the scoop, and the excavation economically carried on between opposite embankments or dumping or unloading places.

The invention stated in general terms comprehends an improved receptacle or scoop, and further a positive load-ejecting or discharging means in the form of a tail-gate slidably mounted in the receptacle, or in

lieu of such tail-gate a cable-actuated shovel-scraper to be used at the place of unloading. The load is ejected or pushed out of the scoop by hauling the same backward while its tail-gate or the shovel-scraper is held stationary, or by hauling the tail-gate or shovel-scraper forward in the scoop while the latter is restrained.

The invention comprehends further a scoop having an adjustable front and an adjustable rear constituting opposite and similar cutting-ends, whereby the scoop will be self-loading when drawn or hauled in either direction with its advancing cutting-end depressed; while the said cutting-ends when raised will enable the scoop to glide freely and unimpeded over the ground both to the place of unloading and back to the place of loading.

The invention also contemplates the equipment of the scoop with bails for attachment of the draft cables and for controlling the position of the scoop in its opposite runs.

In the accompanying drawings, the invention is illustrated in its application to the construction of an earth embankment of the levee type. The material generally used to form a levee is the alluvial soil deposited along a river. Dry soil of this character can be readily discharged from a receptacle by merely dumping it, but when wet the soil sticks like putty to the scoop and thus resists discharge, causing a loss of time and of money in the construction work. By the use of the sliding tail-gate, or the cable-operated shovel-scraper, the load is positively ejected or pushed or scraped out of the scoop, and hence whether wet or dry the soil can be unloaded with despatch and with a consequent saving of time and reduction of operating expenses.

Referring to the drawings, which are to be taken as a part of this specification: Figure 1 is a perspective view of a scoop embodying the invention and shown with one cutting-end in depressed position. Fig. 2 is a vertical longitudinal section of the scoop showing both cutting-ends raised. Fig. 3 is a view similar to Fig. 2 but illustrating the manner of ejecting the load by a relative movement of the tail-gate and scoop. Fig. 4 is a detail perspective view of the sliding tail-gate. Fig. 5 is a detail perspective of the shovel-scraper employed in lieu of the tail-gate. Fig. 6 is an elevation showing the shovel-scraper provided with a handle-

bar whereby several persons may aid in directing its movements.

A denotes the scoop or scraper adapted to be hauled back and forth by the draft cables B and C which are alternately pulled in opposite directions by any suitable power-controlled mechanism such as a drum or drums adapted to wind one cable while letting out the other. A practicable cable and power system that may be used in this connection is set forth in my other application, Serial No. 474,534, of even date herewith for apparatus of a similar character. The attachments of the cables B and C to the scoop are or may be by means of bails *b* and *c* pivotally-connected to the opposite ends of the scoop and preferably near its bottom, the cables are detachable from the respective bails, being provided with hooks engaging eyes in the bails. By means of the pivotal attachment of the bails at the opposite ends of the scoop, the latter is by the restraining effect of the rear cable prevented from possible tilting or overturning forward under pull of the forward-draft cable when loading.

The scoop A is an open-topped and preferably elongated receptacle with longitudinal sides and open at both ends. Its sides are preferably extended beyond the bottom at each end, such extensions having inclined edges *a* which slope upwardly from the bottom of the scoop. As aforesaid, both ends of the scoop are adjustable cutting-ends. Each of said cutting-ends D is what may be considered a hinged or pivoted extension of the scoop-bottom, provided with a front knife-edge and having lateral upright extensions or flanks *d* which embrace and are adjustably connected to the sides of the scoop. Functionally both adjustable ends are the same; that is, whichever way the scoop is hauled, its advancing cutting-end when lowered and drawn against the ground will cause the scoop to load itself, and when raised will present an upward incline which will cause the scoop to ride freely over the ground and over obstructions. The cutting-edges may be formed on the hinged-members or may be separate pieces secured thereto. For bracing and limiting the hinged cutting ends in their pivotal movements, segmental slot and pin connections are provided between the sides of the scoop and the flanks *d*; the segmental slots being indicated at *d'* and engaged by headed pins *d''* projecting from the sides of the scoop. For holding the cutting-ends in elevated position, catches *d'''* pivoted to the sides of the scoop are adapted to be swung over and to engage pins or studs *d''''* on the flanks. In the drawings the latch for one end is shown on one side of the scoop, and the latch for the other end at the opposite side. The respective flanks *d* opposite the respec-

tive latches are shown having a brace of studs *e e* adapted to be detachably engaged by a forked lever E, shown in dotted lines in Fig. 2, for manipulating the cutting-ends.

A tail-gate F retains the load in transit and ejects it from the scoop at the desired place of unloading. This is done as aforesaid by means of the sliding of tail-gate relative to the scoop. The tail-gate is shown provided with angularly-disposed side-members or flanks *f*, the forward lower corners of which cut off obliquely to the bottom of the scoop. The sides of the scoop are or may be provided with inwardly-extending flanges *a'*. Said flanges provide guides overlying the side-members *f* of the tail-gate, the lower edges of which rest upon the bottom of the scoop. A rope or cable *f'* is attached to the tail-gate and has an eye *f''* for engagement by the hook of either of the main draft cables. Preferably said rope or cable *f'*, or bridle connections therefrom, connect to three points of the tail-gate; two of the rope-lengths being attached at opposite ends and near the top of the tail-gate, and the third being medially attached near the bottom.

The operation generally stated is as follows: Assume that Fig. 1 shows the scoop about to start in the direction in which it will be hauled by the cable B which will therefore be temporarily a forward-draft cable. During the initial travel the front cutting-end D being depressed will enter the ground and cause the earth to be gathered into the scoop. When the scoop is full or loaded, said front cutting-end is then raised and held by its latch *d'''*; and during the continued hauling by the forward-draft cable B the upward inclination of the front of the scoop keeps its cutting-edge out of the ground and enables the scoop to mount upon and ride over ordinary obstructions as well as to be readily drawn over mud and soft ground. When the place of unloading is reached, the pull upon the forward-draft cable B is discontinued and said cable is detached from the bail *b* and connected to the tail-gate F by hooking it to the rope or cable *f'* of said tail-gate. If the rearward-draft cable C be now restrained and the forward-draft cable B be pulled the scoop will remain stationary and the tail-gate will be pulled forward and if desired entirely out of the scoop. Thus the load is ejected or pushed out of the scoop, deposited in front of it, and the scoop cleaned by means of the scraping action of the tail-gate. As will be readily understood, the same results can be obtained by restraining the forward-draft cable B while drawing the scoop backward by pull of the rearward-draft cable C, in which event the tail-gate is held relatively stationary and the scoop is drawn away from it until finally the tail-gate is out of the

scoop. The oblique corners of the side-members *f* of the tail-gate enable it to mount the front cutting-end while elevated; therefore when desired the tail-gate can be pulled
 5 out of the scoop over the raised cutting-end. During the forward haul the tail-gate is however prevented from passing out the rear of the scoop by the seating of the side-members *f* between the flanges *a'* and the
 10 bottom of the scoop, which form guide-ways for said side-members. These guide-ways prevent the tail-gate from being turned and pushed up the rear elevated cutting-end by the in-coming earth. After the load has
 15 been ejected, the scoop in its normal upright position can be readily returned to the place of loading by pull of the rearward-draft cable C, for the rear cutting-end being secured in raised position the return of the
 20 scoop will be free and unimpeded. If however the scoop is used for excavating between two embankments, or for grading or otherwise working between opposite places where the ground is to be filled in or raised,
 25 the tail-gate can be replaced in the scoop in reverse position, and, the other or rear cutting-end being depressed at the beginning of the rearward haul, the same operations of loading, transporting and finally ejecting
 30 the load can be performed in precisely the same manner under pull of the rearward-draft cable C. In other words, the tail-gate F can be placed in the scoop so as to face either end and be operated by either of the
 35 draft-cables according to the direction in which the scoop is being hauled.

The shovel-scraper G shown in Figs. 5 and 6, which is adapted to fit slidably within the scoop and transversely thereof, and which
 40 also has a bridle rope or cable *g'* connected to its opposite ends and is provided with a suitable handle *g*, may be used for ejecting the load, where the scoop is used without a tail-gate, in the following manner: When the
 45 scoop is used without the tail-gate, the earth loads into the scoop over its depressed front cutting-end, which is raised in due time, and the load is held in the scoop by the opposite or rear elevated cutting-end. When the
 50 place of unloading is reached, the cable by which the scoop was hauled is disconnected and attached to the bridle *g'* and the shovel-scraper is then inserted in the back of the scoop and held by the handle *g* inclined
 55 backwardly or away from the front discharging end of the scoop. The said cable is now operated and will draw the shovel-scraper down into the load; the shovel-scraper is then brought to an upright position and in
 60 such position is pulled throughout the scoop and pushes out the load and carries it onward as far as desired. During this movement of the shovel-scraper, the scoop is restrained by the other cable; and, as stated
 65 in the description of the tail-gate, the shovel-

scraper could be restrained by one cable and the scoop moved relatively thereto with the same result. When the load has been pushed out of the scoop by the shovel-scraper, the latter can be used to distribute the soil over
 70 the ground by holding it at the proper inclination while it is dragged ahead by the cable; or if desired to leave the load in one place the handle of the shovel-scraper can be quickly let fall when the load has been carried to the desired point. Where the scoop
 75 is used for excavating, hauling and unloading during both of its opposite runs, there may conveniently be one of the shovel-scrapers at each of the places of unloading,
 80 to be used respectively when the scoop reaches its opposite destinations. The handle of the shovel-scraper may be an upright bar as in Fig. 5 or a yoked cross-bar as in Fig. 6.

The shovel-scraper has been described in
 85 connection with the scoop. It may however be used independently of the scoop as an implement for grading or smoothing off surfaces. The implement shown in Fig. 5 is adapted for use by one person: whereas the
 90 form shown in Fig. 6 is perhaps the better adapted for handling by two or more workmen, especially in the case of a large apparatus for moving great quantities of earth.

It will be understood that the invention
 95 may be applied to other purposes and transportation of various materials. It should also be understood that I do not confine myself to any specified embodiment, but reserve the right to such modifications in details of
 100 construction and arrangement as may be within the spirit and scope of my invention, as set forth in the following claims.

Reference is hereby made to my application, Serial No. 474,534, for patent of even
 105 date herewith, for a system and apparatus of a similar character wherein I have set forth a power and cable system to which the scoop or scraper herein set forth is equally
 110 applicable. The disclosure in my other application in reference to the power and cable system may therefore be made a part hereof.

I claim as my invention and desire to secure by Letters Patent:

1. In excavating apparatus, the combination of a scoop, power-mechanism and cables operated thereby and connected to the scoop for hauling it in opposite directions, and means operated by said cables for ejecting the load from the scoop without dumping. 120
2. In excavating apparatus, the combination of a scoop, power-mechanism and cables operated thereby and connected to the scoop for hauling it in opposite directions, the scoop having opposite scooping ends and
 125 maintaining its normal position during both its runs, and means operated by said cables for ejecting the load from the scoop at the ends of its runs.
3. A scoop having its end closure or tail- 130

gate movable to operate as a pusher to eject a load from the scoop.

4. The combination of a scoop with opposite draft-cables for hauling it forward and backward, and a load-ejector adapted to push the load from the scoop and operable by said cables.

5. The combination of a scoop and a load-ejector adapted to move forward in the scoop and push out its load, said ejector adapted to be operated by the reverse pull of cables one being connected to the ejector and the other to the scoop.

6. In an apparatus of the character described, the combination with a scoop, of a load-ejector movable within the scoop and adapted to push out its load, draft-cables attached to opposite ends of the scoop, the cable by which the scoop is hauled to the place of unloading being adapted to be disconnected from the scoop and attached to said load-ejector which is thereby caused to operate by pulling one cable while restraining the other cable.

7. A scoop having lateral inside guide-ways and a slidable tail-gate adapted to operate as a load-ejector and having angular side-members working in said guide-ways and maintaining the position of said tail-gate.

8. A scoop having its forward end adapted to be inclined upward and having lateral inside guide-ways, and a tail-gate operable as a load-ejector and having side members working in said guide-ways and adapted to ride up said inclined end.

9. A scoop having its forward end adapted to be inclined upward and having lateral inturned flanges, a tail-gate operable as a sliding load-ejector and having angular forwardly-extending side-members working between said flanges and the bottom of the scoop, said side-members having their lower forward corners oblique or beveled to ride up said inclined end which extends beyond the said flanges.

10. A scoop adapted to be hauled and to operate forward and backward and having opposite adjustable cutting-ends adapted to be raised at an upward inclination.

11. A scoop adapted to operate when hauled either forward or backward and having opposite cutting-ends and a tail-gate movable from end to end of the scoop.

12. A scoop adapted to travel forward and backward and having opposite cutting-ends hinged or pivoted to the scoop and adjustable to an inclination either above or below the plane of the bottom of the scoop, and means for securing the cutting-ends in their elevated positions.

13. A scoop adapted to travel in opposite directions and having opposite cutting-ends hinged or pivoted to the scoop and adjustable to an inclination above the plane of the bottom of the scoop, and a tail-gate mounted in the scoop to move longitudinally thereof to push out material contained in the scoop, the tail-gate and the scoop having cooperating portions which hold the tail-gate in proper position when on the bottom of the scoop and permit said tail-gate in its load-ejecting movement to mount and ride along the inclined forward or discharge-end but prevent the tail-gate from mounting the inclined opposite or rear end.

14. A scoop having opposite cutting-ends and adapted to be hauled backward and forward and provided with bails connected at its opposite ends and adapted for draft-cable attachment.

15. The combination with a scoop, of a load-ejector movable longitudinally of the scoop and adapted to push out the load, and draft-cables detachably connected to opposite ends of the scoop and either draft cable adapted to be detached from the scoop and attached to the load-ejector.

16. The combination with a scoop, of a tail-gate operable as a load-ejector slidably mounted in the scoop and having bridle draft-connections adapted for connection to the hauling cable of the scoop.

In testimony whereof I affix my signature, in presence of two witnesses.

CHARLES L. HOPKINS.

Witnesses:

AL. C. KAMMER,
S. E. GALIBER.