

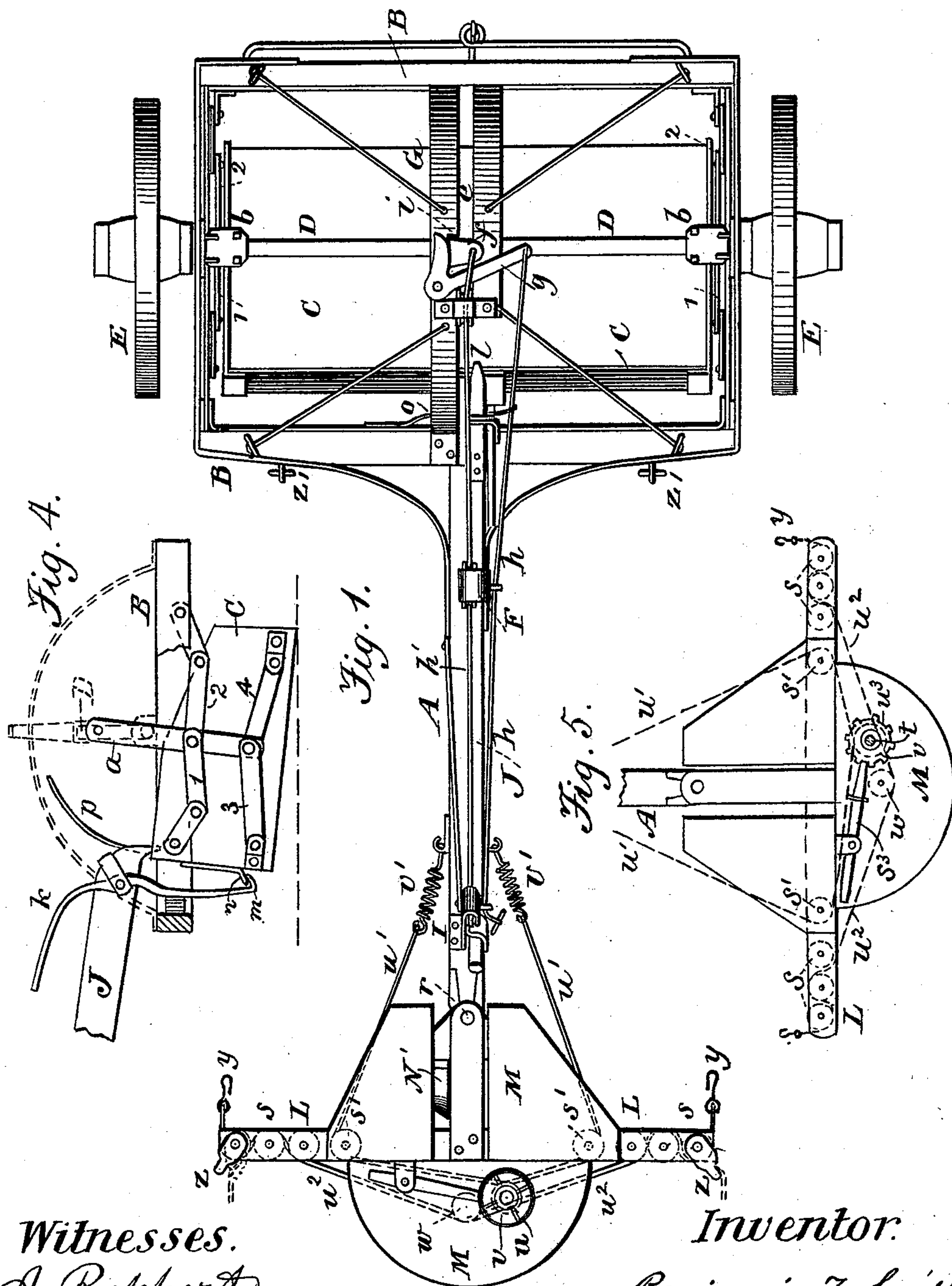
(No Model.)

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B. F. SMITH.  
EXCAVATOR AND SCRAPER.

No. 497,389.

Patented May 16, 1893.



Witnesses.  
A. Ruppert,  
H. A. Daniels

Inventor.  
Benjamin F. Smith  
per Thomas P. Simpson  
Attorney

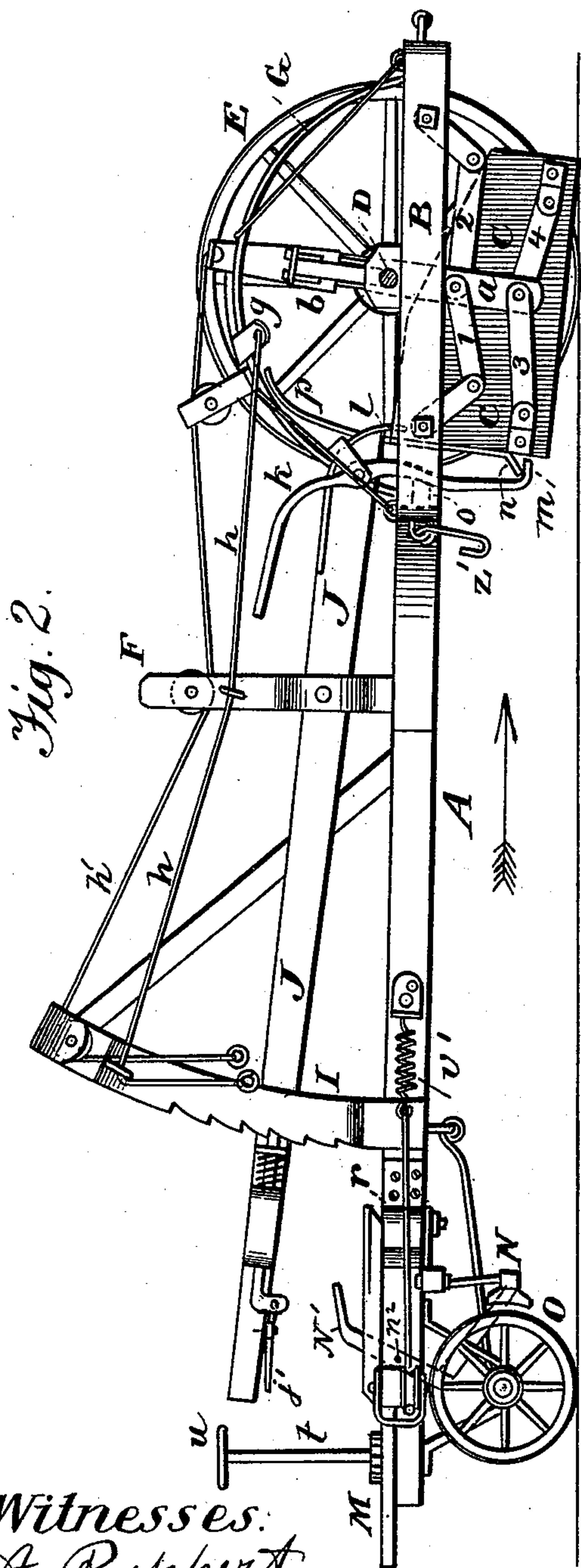
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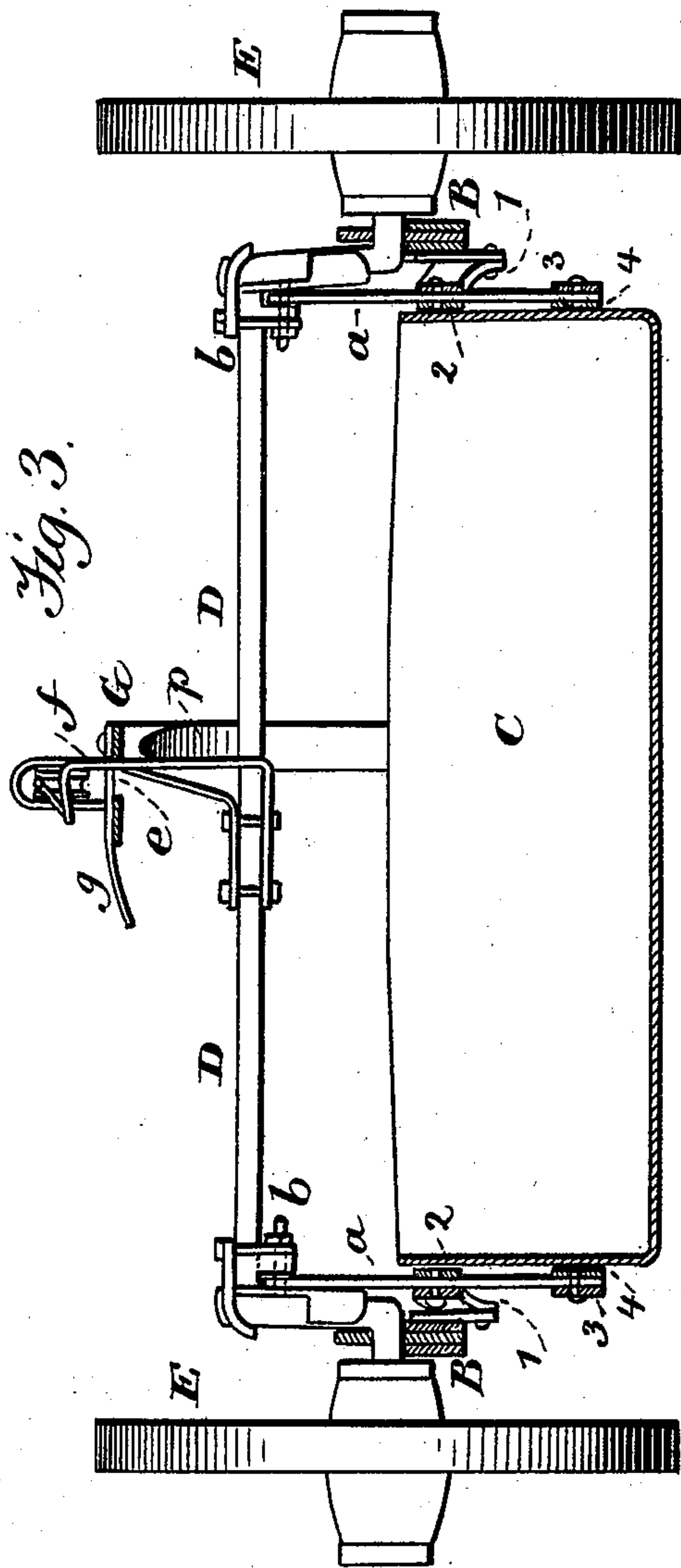
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# UNITED STATES PATENT OFFICE.

BENJAMIN F. SMITH, OF PIERRE, SOUTH DAKOTA.

## EXCAVATOR AND SCRAPER.

SPECIFICATION forming part of Letters Patent No. 497,389, dated May 16, 1893.

Application filed July 10, 1891. Serial No. 399,002. (No model.)

*To all whom it may concern:*

Be it known that I, BENJAMIN F. SMITH, a citizen of the United States, residing at Pierre, in the county of Hughes and State of South Dakota, have invented certain new and useful Improvements in Excavators and Scrapers; 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 excavating and scraping machines for gathering and carrying away earth; and consists in certain improvements in the construction of such machines as hereinafter described and claimed.

In the accompanying drawings—Figure 1 represents a plan view of an excavating and scraping machine having my improvements. Fig. 2 is a side view of the same. Fig. 3 is a front view, partly in section, of the scraper or excavating pan and the axle with which it is connected. Fig. 4 represents certain parts in side view. Fig. 5 illustrates certain parts in plan view.

A designates the main beam; to the forward end of which is fastened the rectangular frame B; within which is hung the scraper or excavating pan C. The main or cross bars of the frame B are constructed of wood, strengthened with iron strips; the end or side bars being of iron, and said frame is pivotally mounted on the axle D of the carrying wheels E. The said axle D is bent near its extremities, so that the main or central portion is arched or elevated, as shown; and the pan C is hung to the axle by the rods or strips *a*, connected with the blocks *b*, fastened to said axle. The said strips *a* are connected with the end bars of the frame B by the jointed links 1 and 2, and are also connected with the sides of the pan C by the lower links 3 and 4. The upper links 2 receive, with the axle D, the strain of the draft when the machine is driven forward in excavating, and the links 1 serve to hold the pan in proper position when the machine is drawn backward after dumping the pan. The links 3 and 4 serve to sustain the pan at the proper balance when it is lifted after being loaded, as the said links 3 and 4 are connected with the pan at points some distance apart, so that the center of gravity of the pan,

in one position or another, would be at some point between such points of connection.

The excavating pan is brought to and held in proper position by means of the large lever J and the jointed links 1 and 2 and lower links 3 and 4. During operation the strain is sometimes on the forward links and sometimes on the rearward links, according to the position of the pan C. When the pan is being filled, the front links are drawn tight and tend to equalize the strain on the frame B and the axle. When the loaded pan is tilted to a carrying position the front links become slack and the rear links hold the pan from swinging forward until the arched axle gets to a perpendicular position; and as the axle moves a little backward from the perpendicular, the front links become tight and retain the axle in position. Thus the forward and rearward links, acting alternately, tend to hold the pan at the proper balance in whatever position it may be brought by the movement of the large lever J or the lever *k*.

G indicates an arch mounted on and extending across the frame B and over the pan C, the forward part of said arch being divided as seen at *e* to form guides for an arm *f* which is mounted on and extends upward from the axle D. When the pan C is in position for carrying, the arm *f* rests against a shoulder *i* formed on the arch G. A hook or elbow lever *g* is pivoted to the arch G in position to push the arm *f* from connection with the shoulder *i* for the purpose of dumping or changing the position of the pan, the said lever *g* being actuated by means of a cord *h*, extending rearward.

A standard F is mounted on the beam A, a suitable distance from the frame B; and to said standard is pivoted a long lever J, the forward end of which has a point or hook *l*, in position to hook over the rear wall of the pan C. A segmental rack and guide I, for the lever J, is mounted on the beam A, the lever being provided with a spring bolt, at its handle end, by which said lever may be set at any desired inclination. The spring-bolt J' may be drawn back by means of a small elbow-lever *j'*, pivoted to the lever J.

To the lever J, at its forward end, is pivoted a rod *k* which extends downward and has a hook *m* at its lower end, adapted to connect



with a projection  $n$  on the back of the pan C, the rod  $k$  being pressed forward by a spring  $o$ . A curved arm  $p$  is fastened to the back of the pan and may be used to push the arm  $f$  from connection with the shoulder  $i$  for the purpose of dumping.

The rear end of the beam A is pivotally coupled at  $r$  with a frame in which is an extended cross-bar L, said frame being provided with a platform M for the driver, and mounted on two carrying wheels O. Under the cross-bar L, at each end, is mounted a series of pulleys or grooved rollers,  $s$  and  $s'$  which are journaled in said cross-bar and in bearing pieces secured thereto. A vertical shaft or rod  $t$ , provided with a hand-wheel  $u$  is mounted in the platform M; and a cable  $u'$  is wound upon a grooved wheel  $v$ , secured to the shaft  $t$ , and passed about the grooved rollers  $s'$ , the ends of said cable being brought forward and connected with opposite sides of the main beam A. The machine carriage may be steered by the driver, standing on the platform M and turning the shaft  $t$ . The cable  $u'$  may be provided with elastic connections with the beam A, as seen at  $v'$ .

A pulley  $w$  is journaled in the frame of the platform and a cable  $u^2$  is passed about and extended in opposite directions from said pulley, the ends of said cable being passed about and between the pulleys  $s$ . Hooks  $y$  are secured to the extremities of the cable  $u^2$  to connect with whiffletrees for the attachment of a team of horses on either side of the beam A. Loops  $z$  are secured to the outer ends of the cross-bar L, to retain the cable  $u^2$  in place; and hooks  $z'$  are connected with the rear bar of the frame B for hitching the teams thereto.

A brake N is pivoted at  $n^2$  in position to close against the rear wheels O and may be actuated by the driver pressing the brake-lever N' with his foot.

When it is desired to excavate, the operator draws the cord  $h$  which releases the arm  $f$ ; the lever J is then released and lowered so as to raise the back of the pan and lower the front edge to the desired extent, the lever being set to hold the pan in such position. When the pan is filled, the lever J is raised, to bring the pan to a level position, and the arm  $f$  being pulled by means of the cord  $h'$  engages with the shoulder  $i$  to hold the pan in the position for carrying; the point for dumping being reached, the cord  $h$  is drawn to release the pan again, and the lever J is brought down until the pan is turned up far enough to dump its load, after which the parts are again brought to their carrying position and the machine is driven back to the point where further operation is required.

In passing from place to place, the apparatus may be steered by means of the hand-wheel  $u$ , whereby the cord  $u'$  may be wound from one direction or the other so as to turn the front of the machine to the right or left, as desired, the main, forward part of the machine turning on the pivot  $r$ . The draft ani-

mals being connected at  $z', z'$ , are thus led by the front part of the machine; they are hitched to the ends of the draft cord  $u^2$ , provided with hooks,  $y, y$ , and said cord  $u^2$ , running from side to side, adjusts itself, whatever may be the relative position of the platform with cross-bar L which may turn on its carrying wheels to direct the scraper one way or another. For carrying or other purposes, the draft animals may be loosened from the fastenings  $z'$ , and turned about so as to draw the machine backward.

The pan C may be readily adjusted in position for scraping or excavating, or for carrying away and dumping, by means of the long lever J and the cords  $h, h'$ , connected with the elbow-lever  $g$  and arm  $f$  respectively. After dumping the load from the pan C, the teams may be unhitched in front and turned about to draw the machine backward for further operation.

I claim—

1. The combination with the main beam of an excavating machine, of a rectangular frame fastened to the front end of said beam, an axle and wheels on which said frame is mounted, an excavating pan hung to said axle and provided with a projection  $n$  on its back, a pivoted lever mounted on said beam and provided with a hook at its forward end to connect with said pan, and a pivoted rod extending downward and provided with a hook, in position to connect with said projection  $n$  on said pan, and a spring in position to press said pivoted rod, substantially as and for the purposes described.

2. The combination with the rectangular frame of an excavating machine, of an axle and wheels on which said frame is mounted, an excavating pan which is hung to said axle, within said frame, by means of rods connected with said axle, said rods being also connected by links with said frame and by other links with said pan substantially as set forth and described.

3. The combination of the main beam and a rectangular frame fastened thereto, of an axle on which said frame is mounted, said axle being arched as shown, an excavating pan, hung to said axle, an arch extending across said frame and over said pan, an arm fixed to said axle and adapted to connect with said arch, an elbow-lever pivoted to said arch in position to act against said arm, and a curved arm fixed to the rear of said pan, in position to impinge against the arm on said axle, substantially as set forth and described.

4. The combination, with the main beam, of a platform mounted on wheels and pivotally connected with said beam at the rear end of the latter, a vertical shaft, provided with a hand-wheel and mounted in said platform, a grooved wheel on said shaft, a cable wound on said grooved wheel and extended in opposite directions therefrom, and two pulleys, carried by said platform, said cable being passed about the last mentioned pulleys and



having its extremities connected with said main beam, substantially as set forth and described.

5 5. The combination with the main beam and a wheeled platform pivotally connected therewith, of an extended cross-bar of said platform, a series of rollers at each end of said cross-bar which carries said rollers, a  
10 grooved roller centrally mounted in said platform, a draft cable passed about said central roller, said cable extending therefrom in opposite directions and being passed about and between the rollers at the ends of said cross-bar, substantially as set forth and described.

15 6. The combination with the frame B, of an

axle D, a pan C, rods *a* by which said pan is hung to said axle, jointed links 1 and 2, connecting rods *a* with said frame, links 3 and 4, connecting rods *a* with said pan, a pivoted lever J, adapted to connect with said pan, a 20 rod, *k*, pivoted to said lever and constructed to connect with the lower part of said pan, and a spring pressing rod *k*, substantially as set forth and described.

In testimony whereof I have affixed my signature in presence of two witnesses.

BENJAMIN F. SMITH.

Witnesses:

E. B. GRILLEY,

H. T. ZINSMASER.