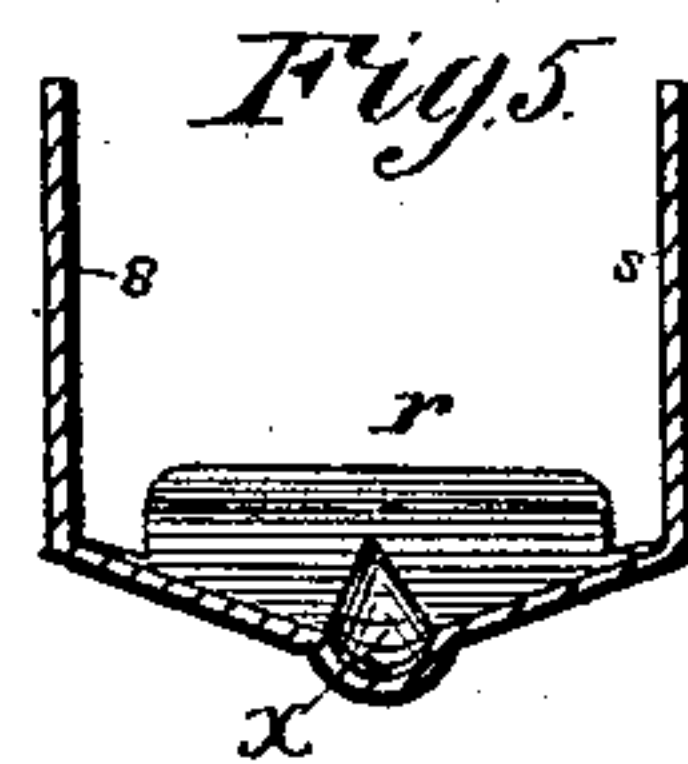
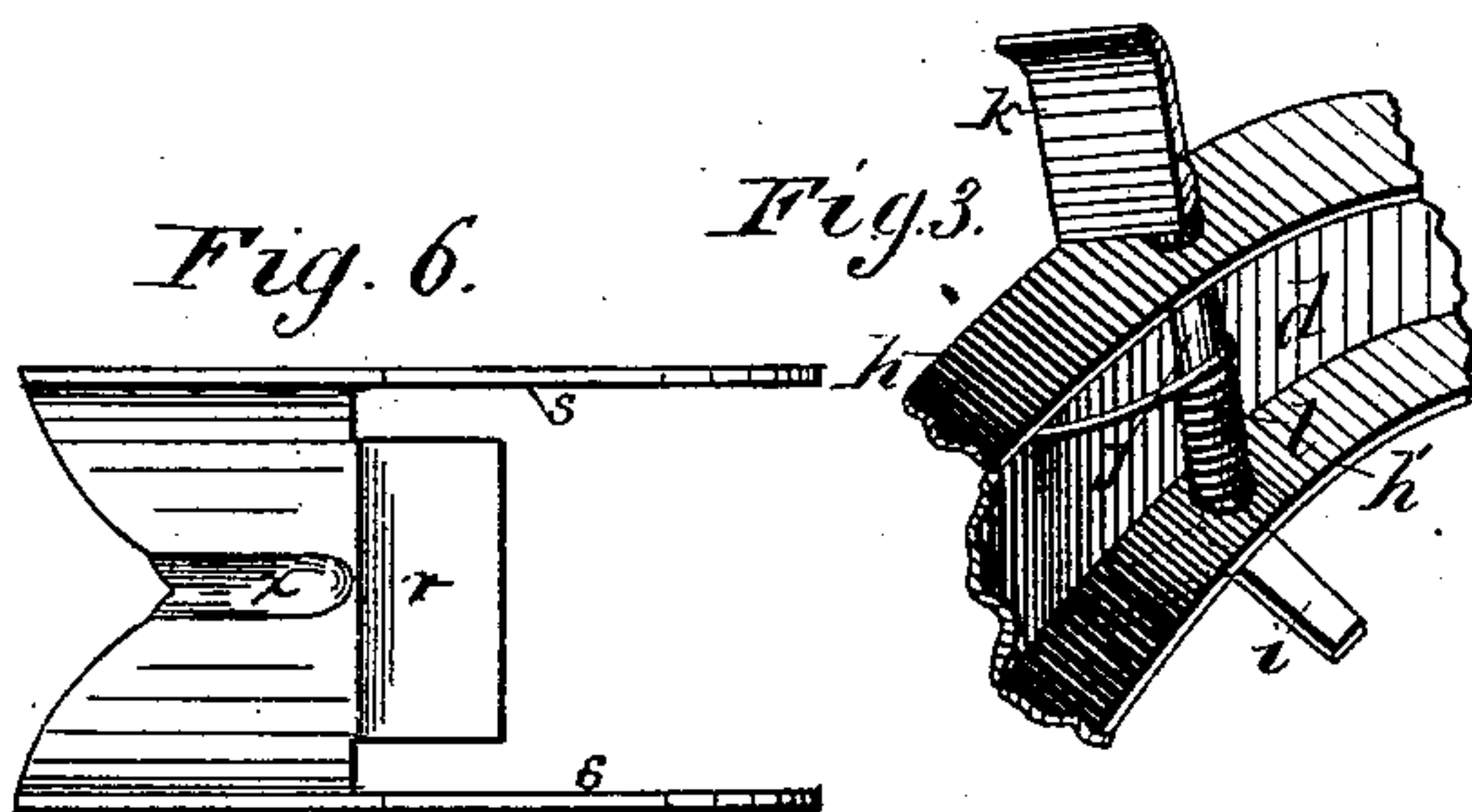
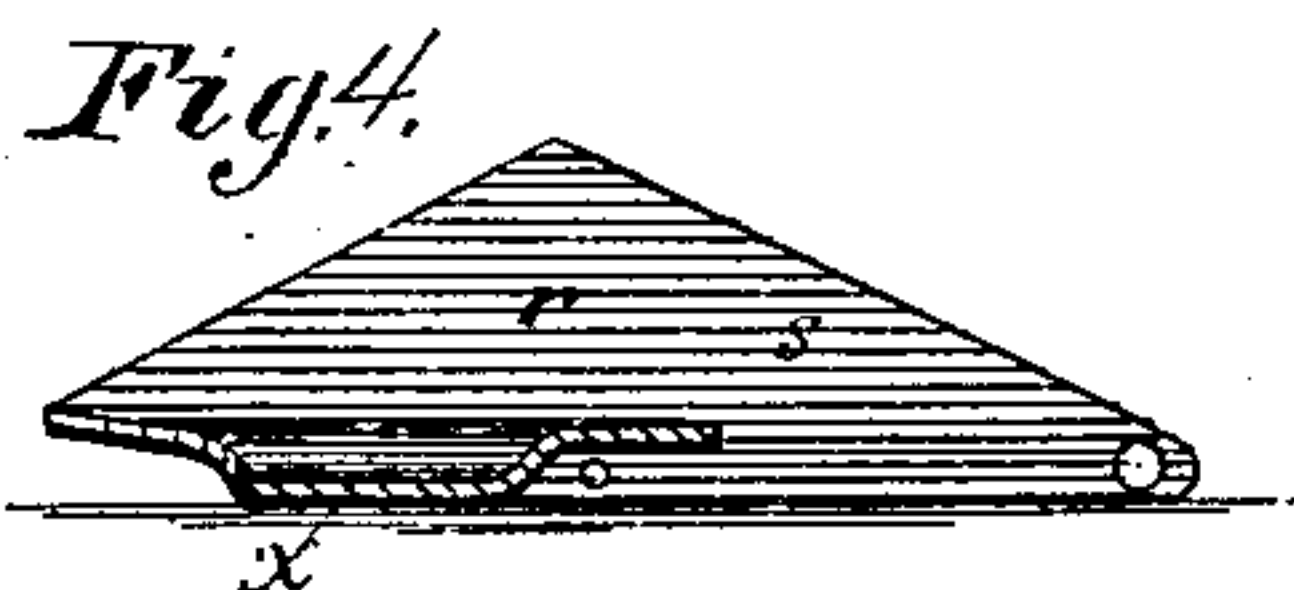
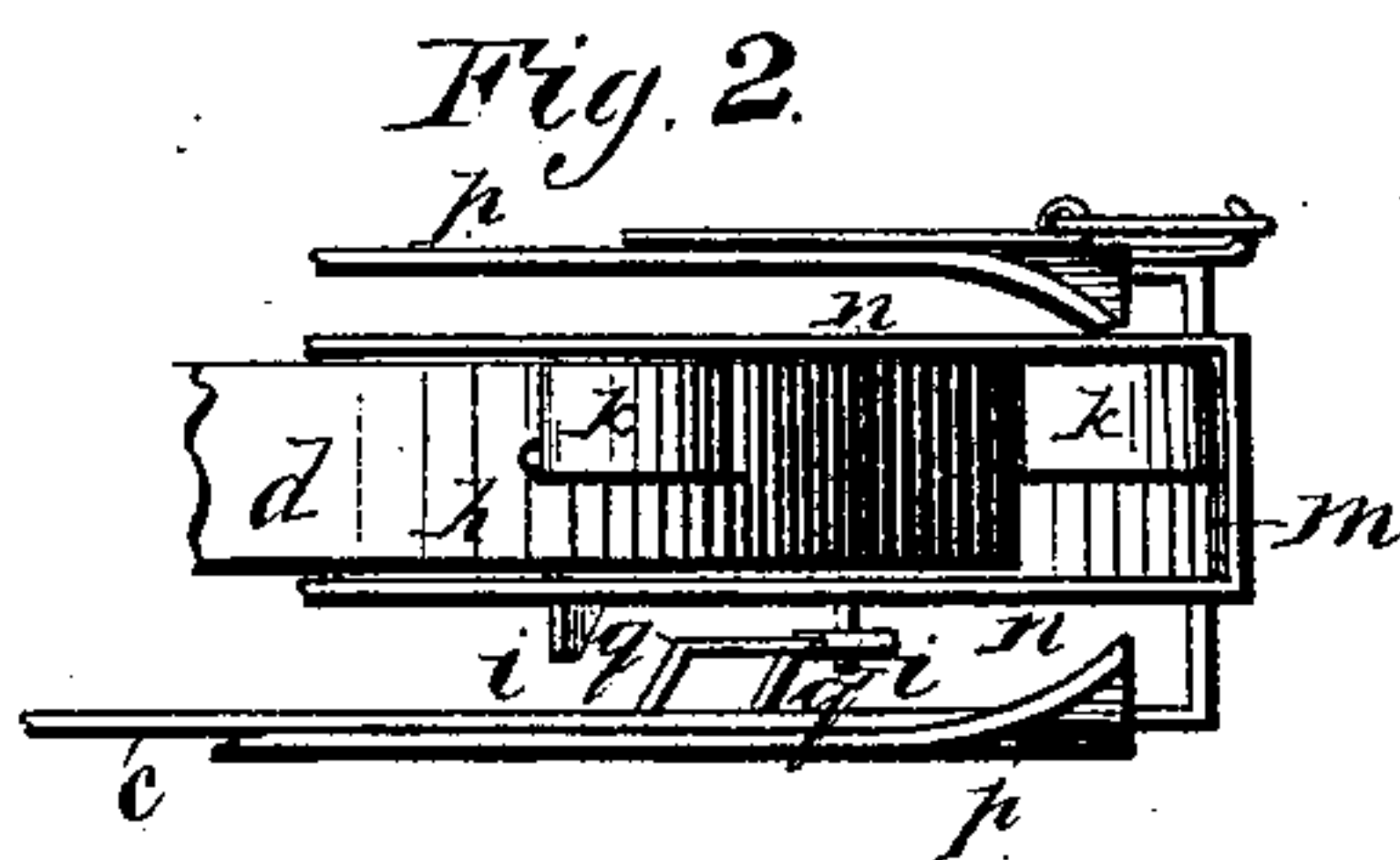
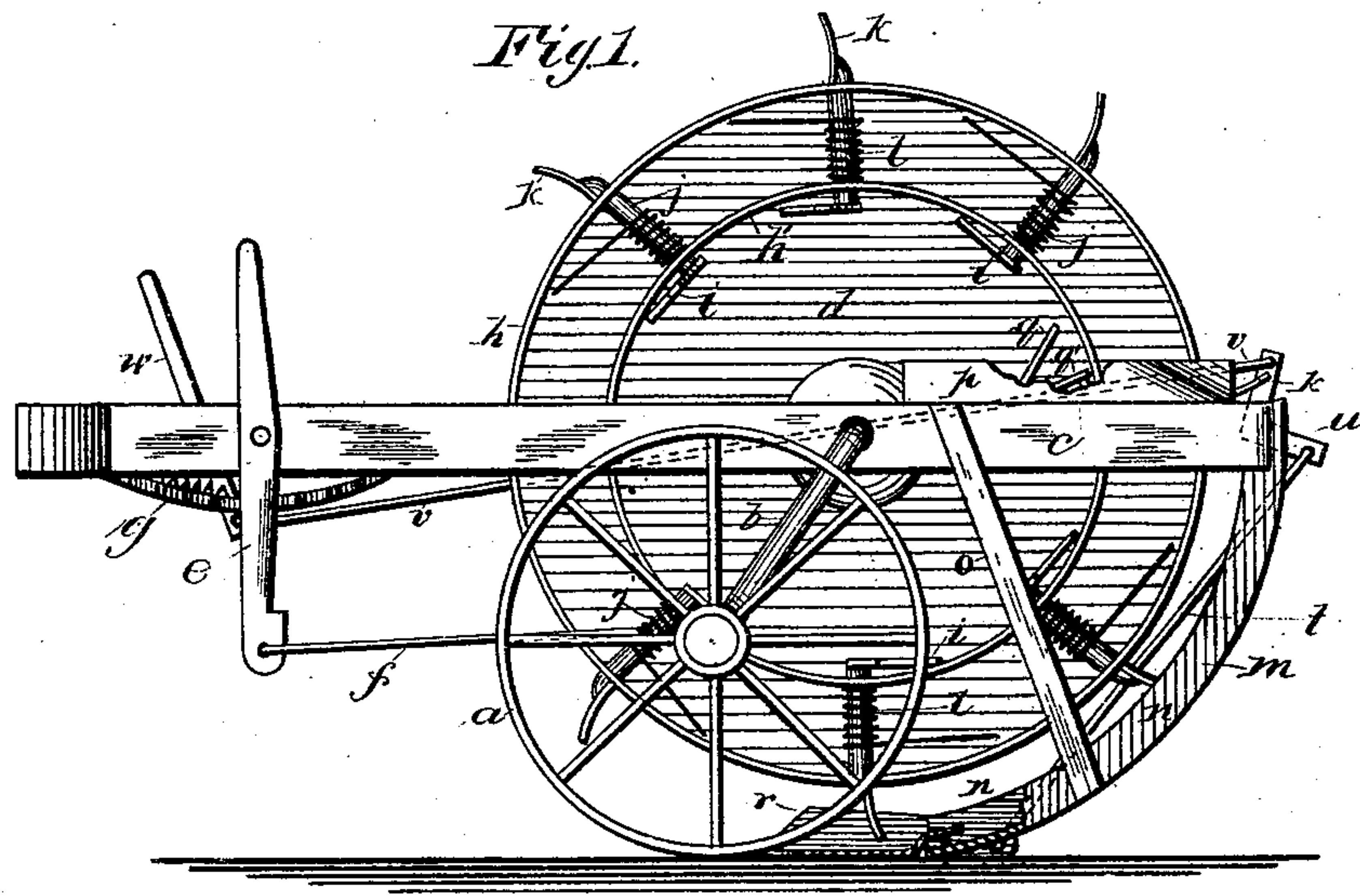


(No Model.)

S. C. ROBINSON.  
Ditching Machine.

No. 243,624.

Patented June 28, 1881.



WITNESSES:  
*John C. Kemmer*  
*W. W. Hollingsworth*

INVENTOR:  
*S. C. Robinson*  
BY *Wm. H. L.*  
ATTORNEYS.



# UNITED STATES PATENT OFFICE.

SAMUEL C. ROBINSON, OF PEMBERTON, OHIO.

## DITCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 243,624, dated June 28, 1881.

Application filed April 19, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL C. ROBINSON, of Pemberton, Shelby county, Ohio, have invented a new and useful Improvement in Ditching-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

10 Figure 1 is a side elevation of my improved ditching-machine. Fig. 2 is a detail plan view of the rear end of my device, showing position of pins *q q'*. Fig. 3 is a detail view, showing construction of spade; and Figs. 4 and 5 are  
15 sectional views of the scoop. Fig. 6 is a top view of the scoop.

My invention relates to that class of ditching-machines intended to excavate a ditch for the reception of tile in its bottom; and it consists of a wheel capable of being raised and  
20 lowered, and provided on its circumference with a series of curved spades for excavating the earth to form a ditch as the wheel revolves, which earth is carried up a circular chute concentric with the wheel by the curved spades,  
25 and discharged on the ground outside of the ditch by a quick semi-rotary motion of the axis of each spade.

My invention further consists in the construction of an adjustable scoop arranged on the forward lower end of the chute, to remove  
30 a portion of the earth and form a groove or recess in the bottom of the ditch for the reception of the tile arranged in said groove.

35 My invention further consists in certain details of construction, hereinafter more fully set forth.

In the accompanying drawings, *a a* are the wheels for supporting and carrying the ditching mechanism, connected together by an axle,  
40 *b*, having a double crank at its middle, the horizontal portion of which passes through holes in the frame *c*, to the forward end of which frame the propelling-power is applied, and also  
45 through a central hole in the ditching-wheel *d*, the latter and the frame *c* being pivoted on the horizontal part of the double crank.

*e* is a lever pivoted to the front part of one of the sides of the frame, to the lower end of  
50 which is pivoted a rod, *f*, pivotally secured at

its opposite end to the double-crank axle. The lever *e* is provided with a catch adapted to engage with one of the teeth of the rack-bar *g*. By this construction it will be seen that the ditching-wheel can be raised or lowered, as desired, for excavating purposes, or can be raised  
55 entirely off the ground for transporting the machine from place to place.

The ditching-wheel *d*, revolving on the double-crank axle *b* in the forward movement of  
60 the machine, is constructed as follows:

*h* is an outer rim, provided with a series of holes, and secured to the wheel at its circumference; and *h'* is an inner rim concentric with the outer rim, and provided also with a series  
65 of holes lying radially opposite the holes in the outer rim. Through each set of opposite holes in the outer and inner rims passes the shank *j* of a curved spade, having a bell-crank arm, *i*, rigidly secured to its lower end, inside  
70 the inner rim, the outer end of the spade-shank *j* projecting out beyond the outer rim, and having secured to it the spade *k*, at or near one side thereof, curved at its upper end and projecting beyond the outer rim.  
75

*l* is a spring, securely attached at one end to the face of the ditching-wheel, thence coiled around the spade-shank *j*, and having its opposite end secured to said shank. By this construction it will be seen that each spade is  
80 held in position by means of a spring-catch, which is operated by the inclined or bent pins *q q'*, attached to the frame.

To the rear end of the frame *c* of the ditching-machine is secured the upper end of the  
85 circular chute *m*, which is made concentric with the ditching-wheel, and provided with sides *n n*, fitting close to the spades, to prevent the earth raised by the revolving spades from falling back into the ditch.  
90

*o o* are braces secured to the chute at each side, near its lower end, and attached to the sides of the frame at their upper ends.

*p p* are guide-plates secured to the opposite sides of the frame, near its rear end. These  
95 guide-plates are preferably bent inward near their rear ends. The function of these guide-plates is to conduct the earth raised in the chute by the revolving spades on the ground outside of or beyond the ditch excavated.  
100



$q q'$  are inclined or bent pins, secured at their lower ends to the inner face of one of the sides of the frame  $c$ , and projecting inwardly, so as to be struck, in the revolution of the ditching-wheel, by the bell-crank arm  $i$ , secured to the end of each spade-shank  $j$ . The pins  $q q'$  are so arranged on the inner face of one of the sides of the frame that the arm  $i$  of the spade-shank, in its revolving motion, strikes the first pin,  $q$ , just as it emerges from the upper end of the chute, and imparts a quick, sudden, semi-rotary motion to the curved spade, discharging the earth over the guide-plate outside of the ditch, the next pin also operating on the arm  $i$  of the spade-shank to remove and discharge any earth adhering to the curved spade. By this construction it will be seen that the ditching-wheel, raised or lowered as desired, rapidly excavates a ditch in its forward movement, the excavated earth being carried up the circular chute by the curved spades, which are each in succession partially or semi rotated to discharge the earth over the guide-plates and outside of the ditch.

It will be seen that the outer end of each spade-shank is secured to one side of its spade, in contradistinction to being secured to the middle of the spade. This is an important feature, as by securing the spade-shank to one side of the spade, as shown, the latter, in turning to discharge the earth, does not compress the earth in rear of it, and can be operated much more readily and with less power.

$r$  is a scoop, the sides  $s$  of which are pivoted to the sides  $n$  of the chute, near its lower end.

To the end of one or both of the sides  $s$  of the scoop is secured a rod,  $t$ , the opposite end of which is attached to one arm of a bell-crank lever,  $u$ , pivoted in one side of the frame, the other arm of the bell-crank lever being connected by a rod,  $v$ , with a lever,  $w$ , pivoted to the frame, by which construction the front end of the scoop can be raised or lowered to suit the required depth of ditch.

The scoop  $r$  is in form like the right and left shares of a plow joined together, with an angular central recess and two points, and is provided with rounding under faces, terminating in its middle in a longitudinal semi-cylindrical or square rib,  $x$ , adapted to form a groove or rounded or square recess in the bottom of the ditch for the reception of tile.

The scoop can be detached when excavating

the ditch and a scoop without a rib to form the groove employed.

What I claim as my invention is—

1. The combination, with the spade  $k$ , of the spade-shank  $j$ , secured to one of the sides of the spade, substantially as described, and for the purpose set forth.

2. The combination, with the spade  $k$  and spade-shank  $j$ , secured to one of the sides of the spade, of the spring  $l$ , secured at one end to the face of the ditching-wheel, coiled around the spade-shank, and having its opposite end secured thereto, substantially as described, and for the purpose set forth.

3. The combination, with the ditching-wheel  $d$ , provided with the outer and inner rims,  $h h'$ , having a series of holes, of the curved spades  $k$ , spade-shanks  $j$ , each secured to one of the sides of its curved spade, and provided with a bell-crank arm,  $i$ , on its inner end, and spring  $l$ , substantially as described, and for the purpose set forth.

4. The combination of the ditching-wheel  $d$ , provided with perforated rims  $h h'$ , curved spades  $k$ , spade-shanks  $j$ , having crank-arms  $i$ , and secured to one side of the spades, springs  $l$ , chute  $m$ , and pins  $q q'$ , substantially as described, and for the purpose set forth.

5. The combination of the ditching-wheel  $d$ , provided with perforated rims  $h h'$ , curved spades  $k$ , spade-shanks  $j$ , secured to one side of the spades and provided with crank-arms  $i$ , springs  $l$ , chute  $m$ , pins  $q q'$ , and guide-plates  $p p$ , substantially as described, and for the purpose set forth.

6. The combination, with a ditching-wheel  $d$ , carrying a series of curved spades  $k$ , provided with crank-arms  $i$  and springs  $l$ , of the pins  $q q'$  and chute  $m$ , provided with sides  $n$ , substantially as described.

7. The scoop  $r$ , having two points, an angular central recess, and a longitudinal rib,  $x$ , on its under face, substantially as described, and for the purpose set forth.

8. The combination, with the chute  $m$ , of the scoop  $r$ , pivoted to the lower end of the chute and constructed as described, bell-crank  $u$ , rods  $t v$ , and lever  $w$ , substantially as described, and for the purpose set forth.

SAMUEL C. ROBINSON.

Witnesses:

A. S. FORSYTH,  
JOHN M. BRANKLE.