

(No Model.)

W. E. SCOTT.
GRATE.

No. 569,063.

Patented Oct. 6, 1896.

Fig. 1.

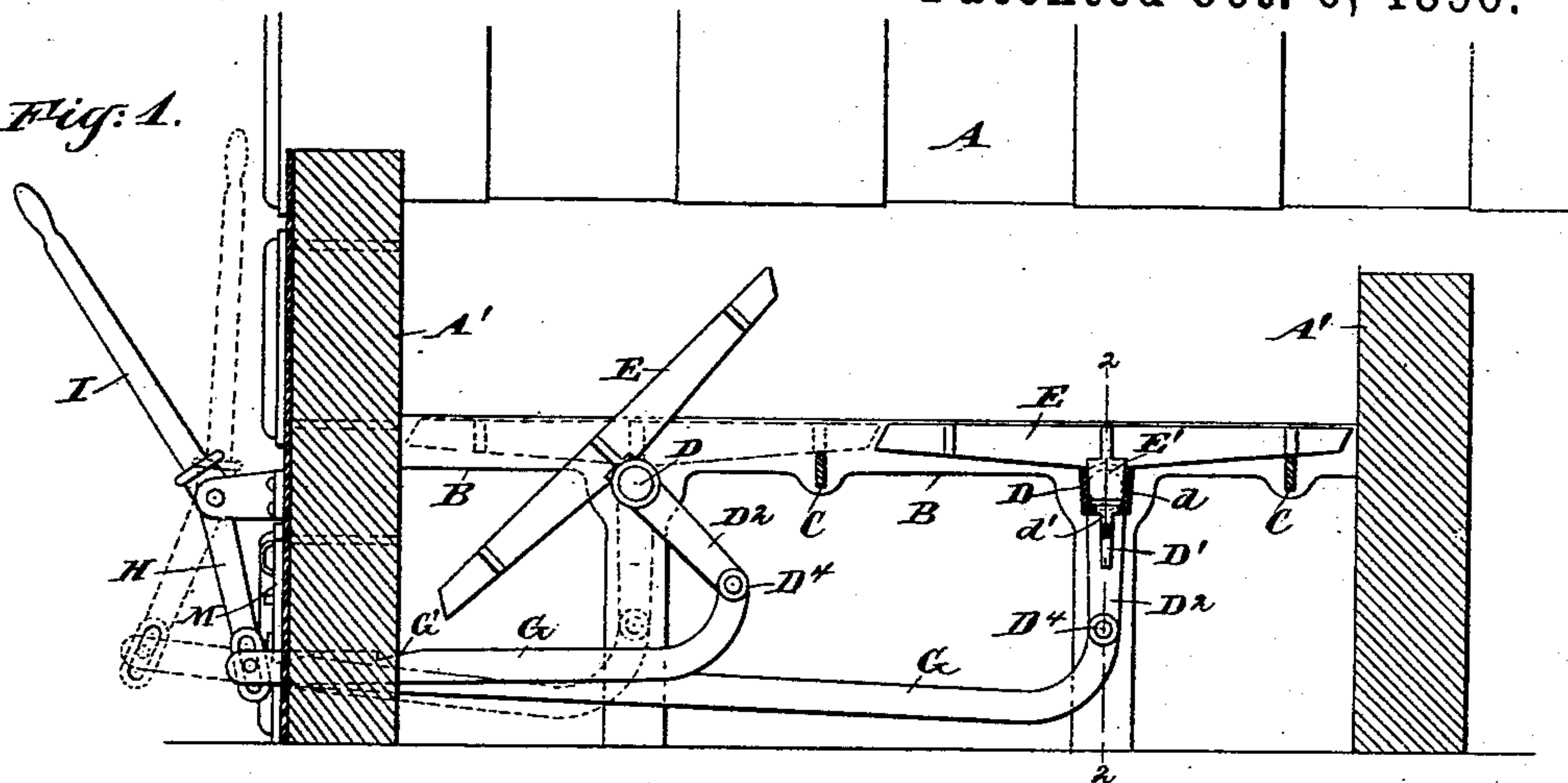


Fig. 2.

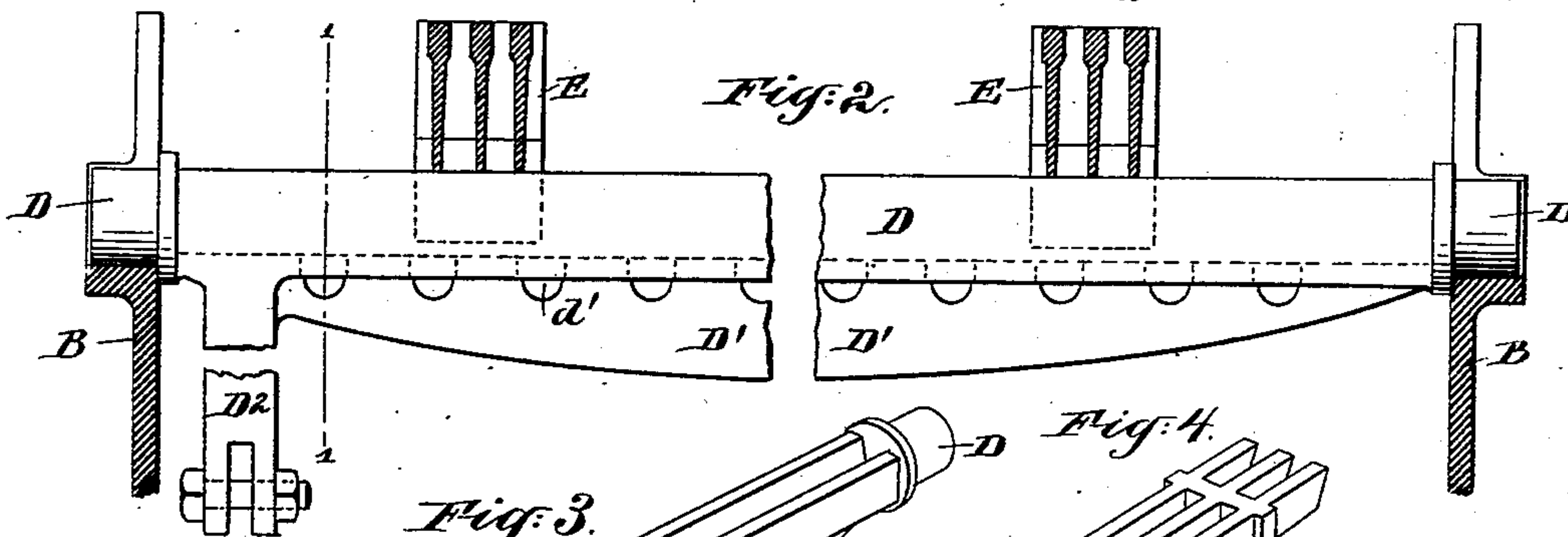


Fig. 3.

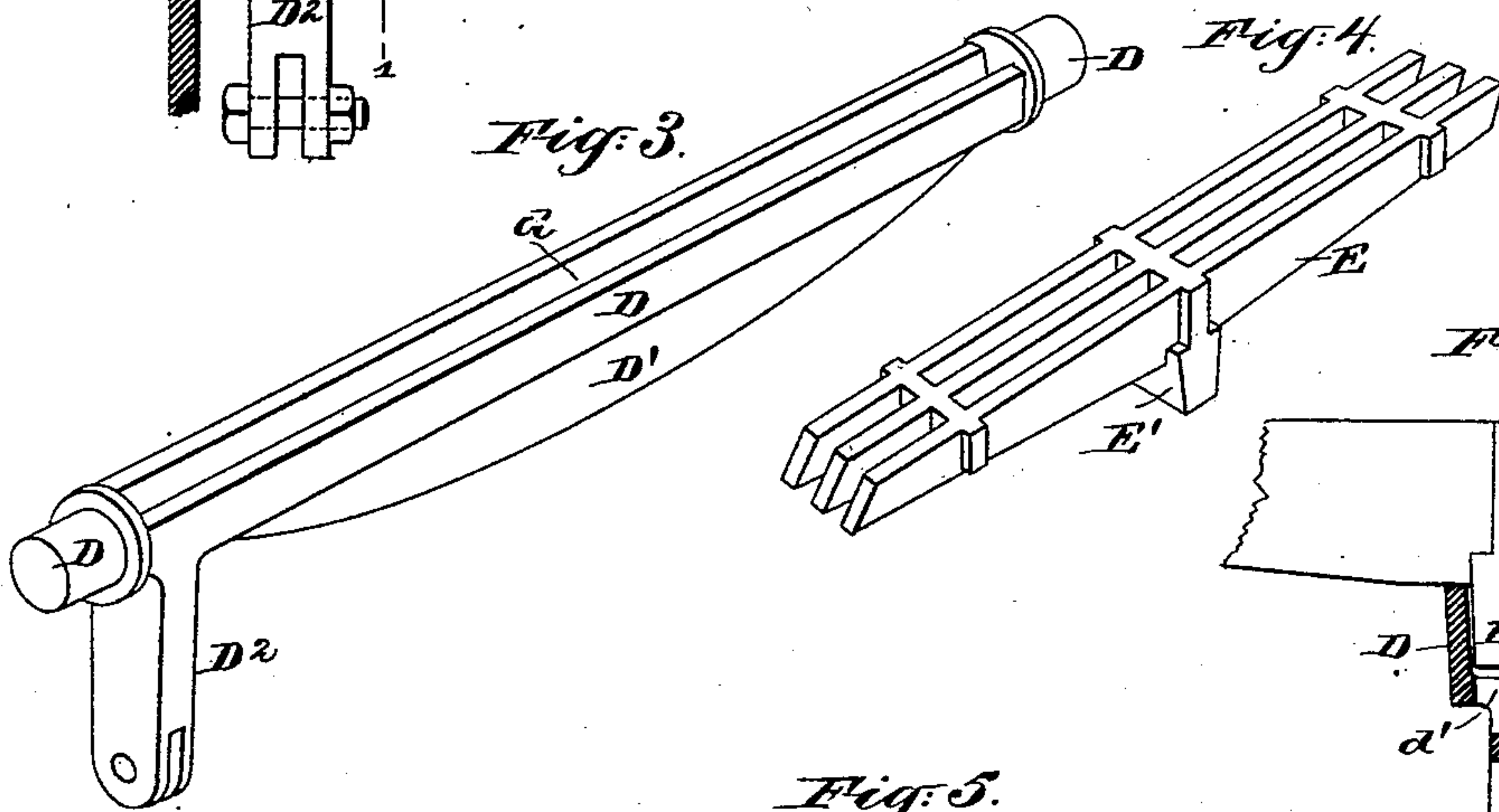


Fig. 4.

Fig. 5.

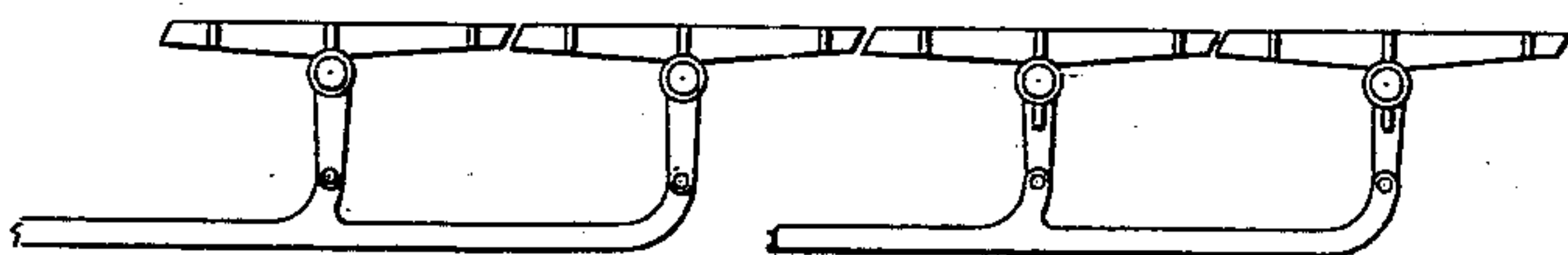
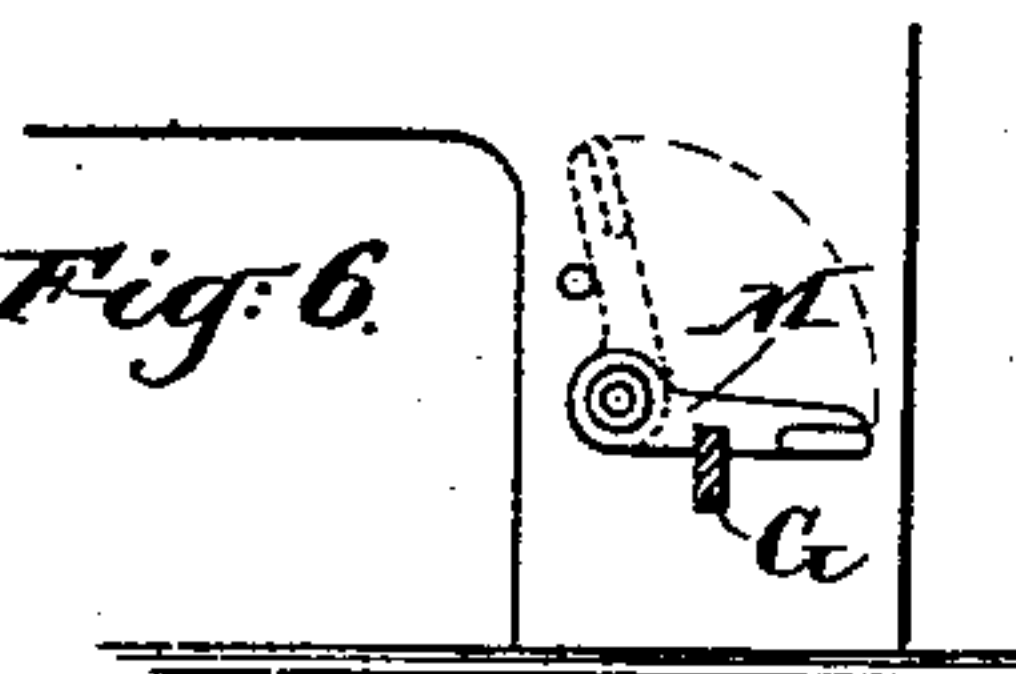


Fig. 6.



Witnesses:
Charles R. Searle,
H. A. Johnston.

Inventor:
Walter E. Scott
by his attorney
James Drew Stearns

UNITED STATES PATENT OFFICE.

WALTER E. SCOTT, OF NEW YORK, N. Y., ASSIGNOR TO EDWARD GIBSON,
OF JERSEY CITY, NEW JERSEY.

GRATE.

SPECIFICATION forming part of Letters Patent No. 569,063, dated October 6, 1896.

Application filed January 31, 1893. Serial No. 460,277. (No model.)

To all whom it may concern:

Be it known that I, WALTER E. SCOTT, a citizen of the United States, residing in the city and county of New York, in the State of New York, have invented a certain new and useful Improvement in Grates, of which the following is a specification.

The improvement is intended more particularly for the grates of furnaces for steam-boilers, and will be described as thus applied.

The boiler may be of the ordinary cylindrical style, and there may be the ordinary depth of furnace between the boiler and the grates. I provide two stout shafts, one behind the other, at a proper distance apart, of cast-iron or other suitable material, each having a deep pocket of nearly rectangular section but slightly contracted at the base, extending longitudinally along its upper side, the two sides strongly connected together below, with liberal perforations through the bottom to allow ashes to descend and air to rise, and with a deep web below to contribute stiffness. These shafts extend across under the furnace, with provisions for tilting them. I construct the grate in sections of several bars, each section cast with a short arm adapted to match into the pocket and to be tilted therewith, and to be lifted out and exchanged with facility when required. Each arm forming the pivotal point for the rocking of the grate-sections is a little forward of the center, so that gravity tends to hold the sections level by the descent of the rear end until it rests on a fixed bearing extending across a proper distance in the rear of the shaft. The fire may be sliced and treated in the ordinary manner with each section of the grate in its ordinary horizontal position. I insure the continuance of the horizontal position of the grates for any period while in use by locking the connections. To clean the fire, I push the best part of the fuel off the front sections onto the rear sections and tilt the front shaft, thereby tilting the entire set of front sections into an inclined position, so that the clinkers will fall off into the ash-pit. Then I drop the front sections again into the horizontal position, rake forward the good coal which was formerly on these sections and all the best part of that which is on the

rear sections, and then similarly dump the refuse from the rear sections and return them again to the horizontal position. The preponderance of the weight of the rear end of each section over the front should be slight. The construction affords great facility for exchanging the sections. I can lift out a section which is most exposed in the center of the furnace and exchange it for one which has been less exposed at the edge. I can replace any with new sections with very little labor.

The construction of my shaft with the pocket slightly V-shaped in section, extending continuously along the upper side, allows the correspondingly slightly-tapered arm which extends down from each section to be accommodated in any portion of the length, while the bottom, being partially closed but liberally perforated, ties together and braces the parts above without preventing air from ascending or ashes from descending.

The accompanying drawings form a part of this specification and represent what I consider the best means of carrying out the invention.

Figure 1 is a vertical section on the line 1 1 in Fig. 2. Fig. 1^a is a corresponding section of a portion on a larger scale. Fig. 2 is a vertical section near the line 2 2 in Fig. 1, some of the parts being in elevation. The remaining figures show details detached. Fig. 3 represents one of the shafts, and Fig. 4 one of the removable sections of the grate. Fig. 5 is a side view showing a modification. Fig. 6 is a front view of a portion.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A' A' are the masonry walls of the furnace, and A is a portion of the boiler immediately over the furnace.

B B are stout bars or bearers to support the grates, and C C the cross-bars which support the back ends of the removable sections when in position for use.

D D are stout shafts of cast-iron. Each end is provided with a cylindrical bearing resting in corresponding cylindrical notches formed in the frames or bearers B, and each is provided with a stout arm D², extending

downward at one end, as indicated in the drawings. (See particularly Fig. 3.) The lower end of this arm is formed with a knuckle D^4 , by which it is pivoted to a link and connections for tilting the shaft.

The shafts D are each provided above with a plain-walled continuous longitudinal pocket d , the bottom of the pocket being formed of cross-bars, so as to leave liberal openings d' in said bottom between said cross-bars. Midway of the bottom is a depending longitudinal web D' , which connects the said cross-bars at the middle. With this construction of the tilting shafts, not only is an advantageous combination of strength and lightness secured by the presence of the central depending web below, in conjunction with the side walls of the rectangular pocket arranged above and on opposite sides of the plane of said web, but the formation of the bottom of the pocket (which intervenes between and connects the central web D' with upright side walls of the pocket) of cross-bars with liberal openings d' between the same causes the parts to be exposed to air and renders the pocket d not apt to be choked with ashes.

E E are sections, each comprising three grate-bars cast together, and E' is a short arm of approximately rectangular section extending downward from a point near, but a little forward of, the mid-length of each section and adapted to match in the pocket. The pocket is a little wider at the top than at the bottom and the arm E' is correspondingly wedge-shaped. The arm should not reach the bottom of the pocket, but should fill it, or very nearly fill it, so that the bottom of each section E will lie on the top of its proper shaft D each side of the pocket and the arm E' will make an approximately close fit in the pocket. Any ashes descending through the spaces around the arms E' can escape through the apertures d' and fall to the bottom of the ash-pit. Air can enter through the apertures d' and flow upward through the openings between and around the arms E' .

The several bars in each section are united by an extension of the casting across over the arm E' and also over the cross-bar C, these positions offering the least obstruction to the air. I have shown also a similar cross connection near the front end of each section. The ends of the sections are beveled, as shown.

The tilting shaft D constitutes the center on which the sections tilt. The arm E' in each section is set so far forward of the center that gravity will exert a sufficient force to bring the set of sections promptly back to a horizontal position after they have been tilted and released.

The tilting of each section is effected by a connection G, extending forward from the pivot at the bottom of the arm D^2 through a sufficient slot in the furnace-front and connecting to a pivot at the bottom of a lever H,

conveniently fulcrumed at the front of the boiler and operated by a removable hand-lever I. Each connection G has an offset G' on its upper edge.

M is a turning button pivoted to the front of the boiler and adapted to engage and disengage this offset, according as it is turned to the right or left. When the attendant wishes to tilt one of the shafts D and its attached sections E, he liberates the corresponding button M, and, depressing the lever I, thrusts on the connection G and turns the shaft D, throwing the sections E into the required inclined position. The strong lines in Fig. 1 show the front sections in this position. After the refuse material is thrown off the clean sections are again restored to the horizontal position by lifting the lever I, aided by the gravity of the parts. Then the button M is turned to the left, and by engaging with the offset G' locks the parts firmly in this position. A corresponding series of movements being made with the rear shaft, both sections are properly cleaned and again properly locked.

The arm D^2 , which is on the right-hand side for the front shaft, should be on the left-hand side of the furnace for the rear shaft, and the connections G and levers H are correspondingly arranged at the right and left of the furnace at the front.

The operation of exchanging a section is extremely simple. The section is lifted out and the new one is introduced either while the sections are horizontal or inclined. All the sections may be exchanged in a few minutes. It is especially easy by my invention to change the position of two sections or to take out any one section that may be desired and replace it without disturbing the others.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. There may be a greater or less number of the sections E. Each section E may have a greater or less number of bars than the three shown.

In deep furnaces I divide the grate into more than two sets. In such case I can connect the two front sets to one operating-lever at the front, and the two rear sets, if there are so many, to the lever on the opposite side. Fig. 5 shows such a modification.

I claim as my invention—

1. The tilting shaft D provided with a continuous longitudinal pocket d and below with a central longitudinal depending web D' , the bottom of the pocket being composed of cross-bars with liberal openings d' between them, and the web D' connecting the said cross-bars at the middle; substantially as described.

2. The tilting shaft D provided with a continuous longitudinal pocket d and below with a central longitudinal depending web D' , the bottom of the pocket being composed of cross-bars with liberal openings d' between

them, and the web D' connecting the said cross-bars at the middle, in combination with the sections E of integral grate-bars provided with rectangular arms E' loosely fitting within
5 the pocket d, the grate-bars resting upon the top edges of the side walls of said pocket; substantially as described.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

WALTER E. SCOTT.

Witnesses:

M. F. BOYLE,

H. A. JOHNSTONE.