

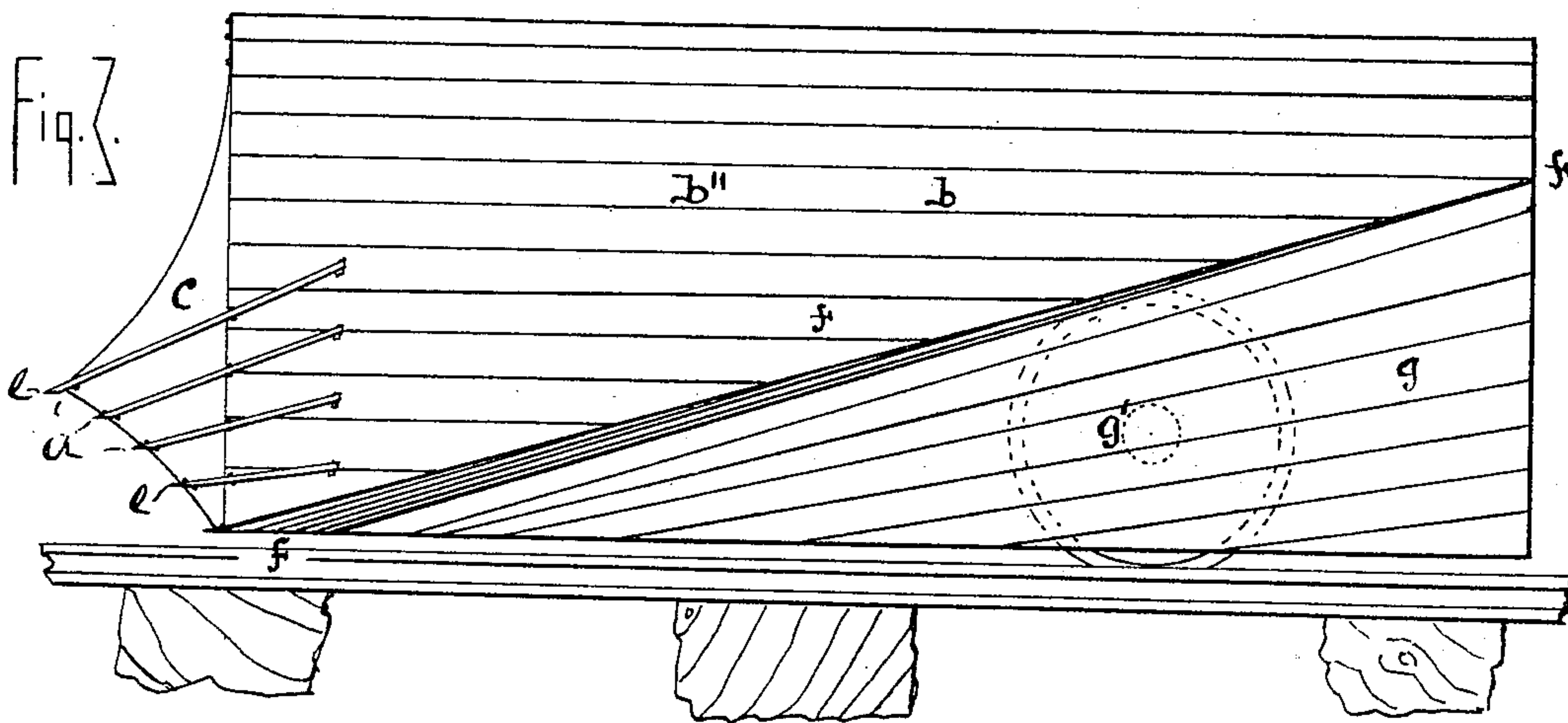
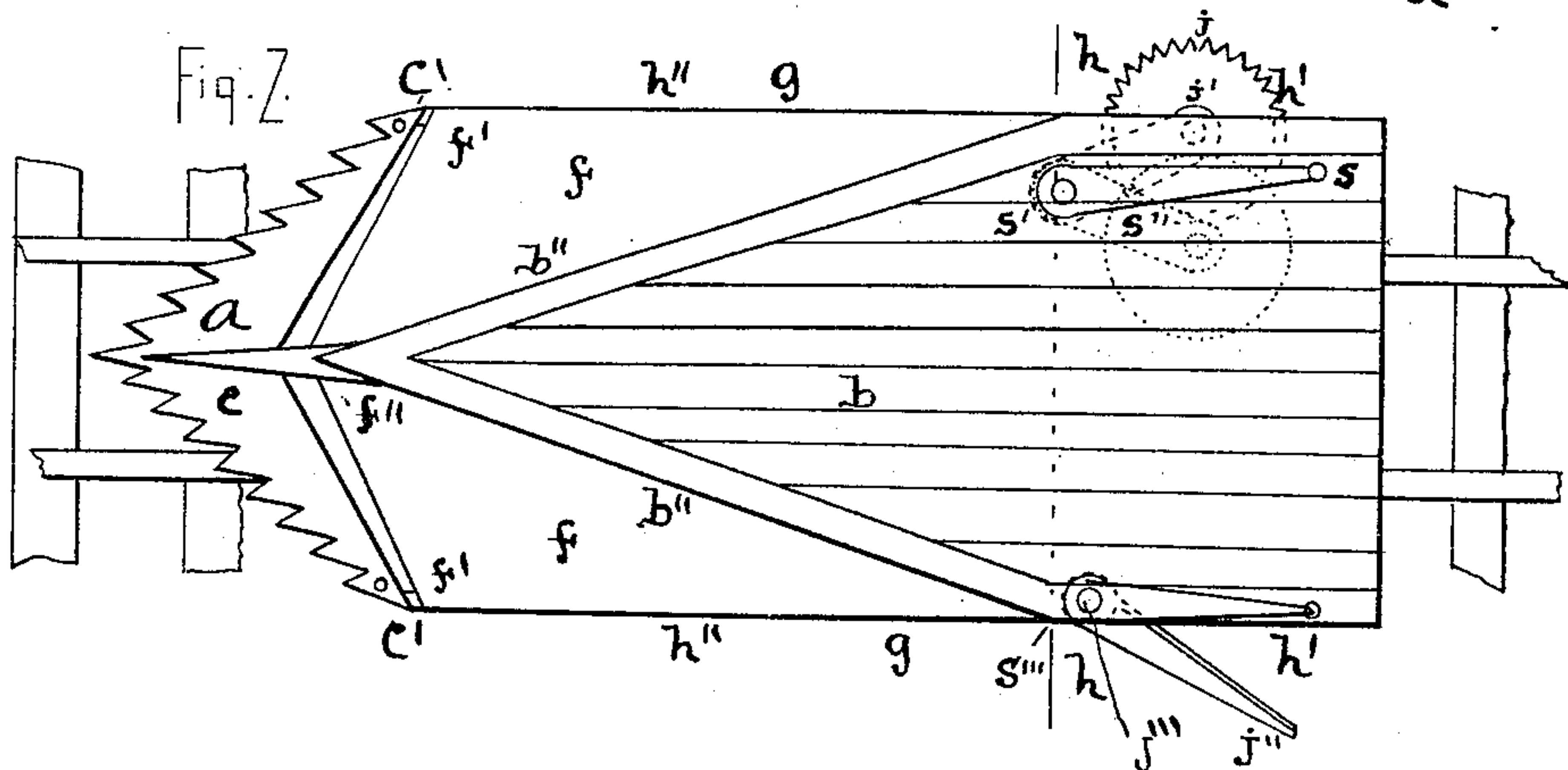
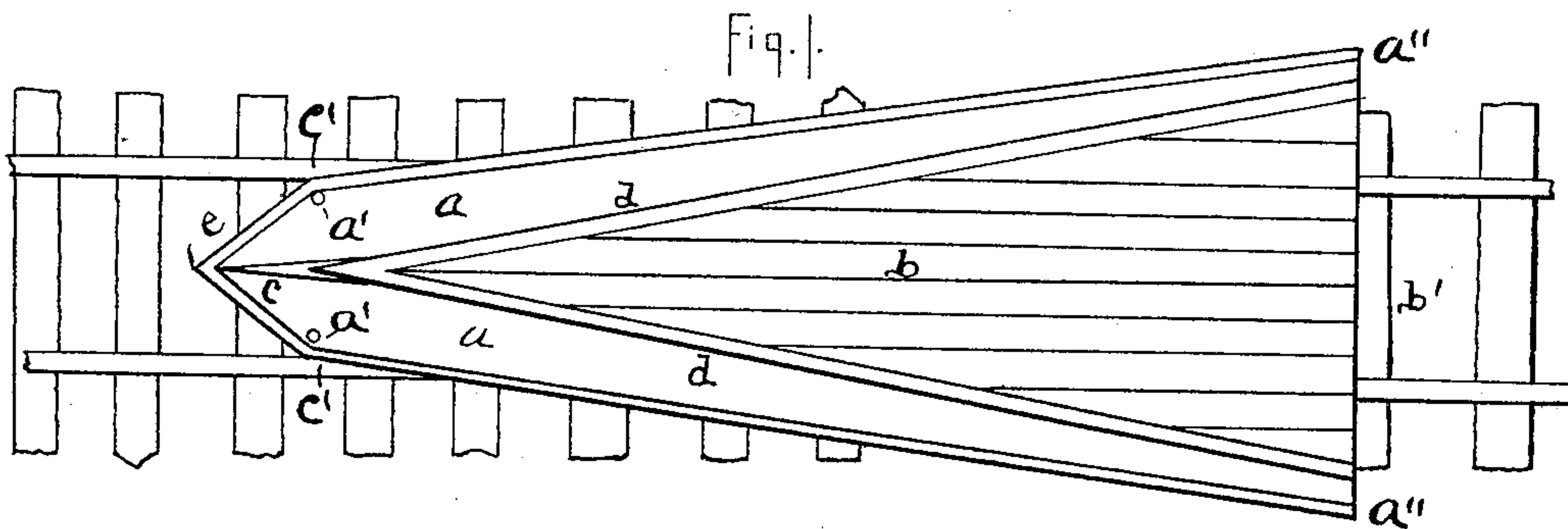
(No Model.)

2 Sheets—Sheet 1.

G. V. BENJAMIN.
SNOW PLOW WITH SNOW CUTTERS.

No. 328,640.

Patented Oct. 20, 1885.



Witnesses.

B. R. Williams
J. L. Baker.

Inventor.

George Vaughan Benjamin.

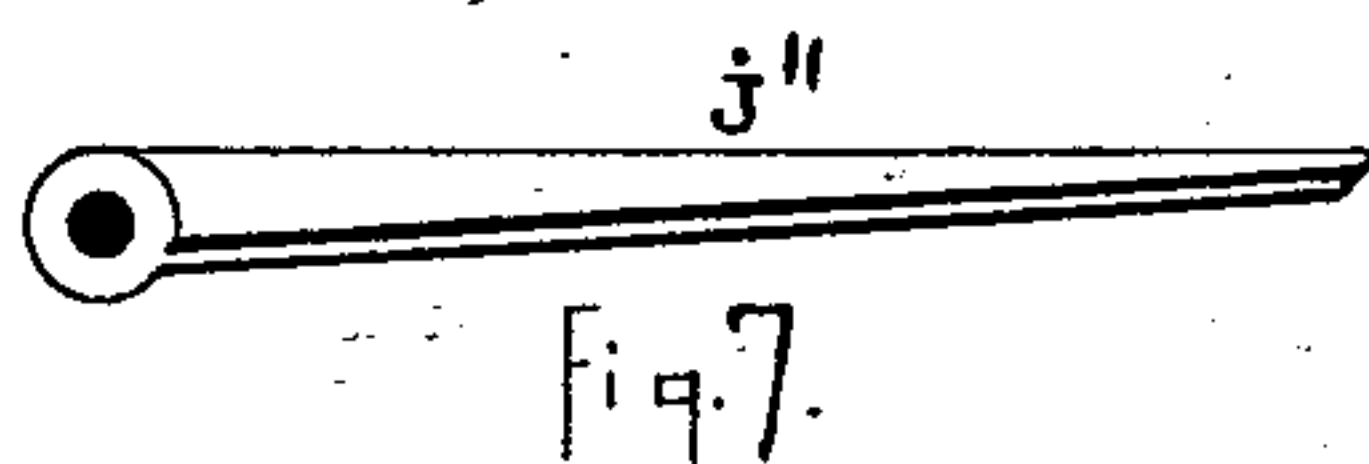
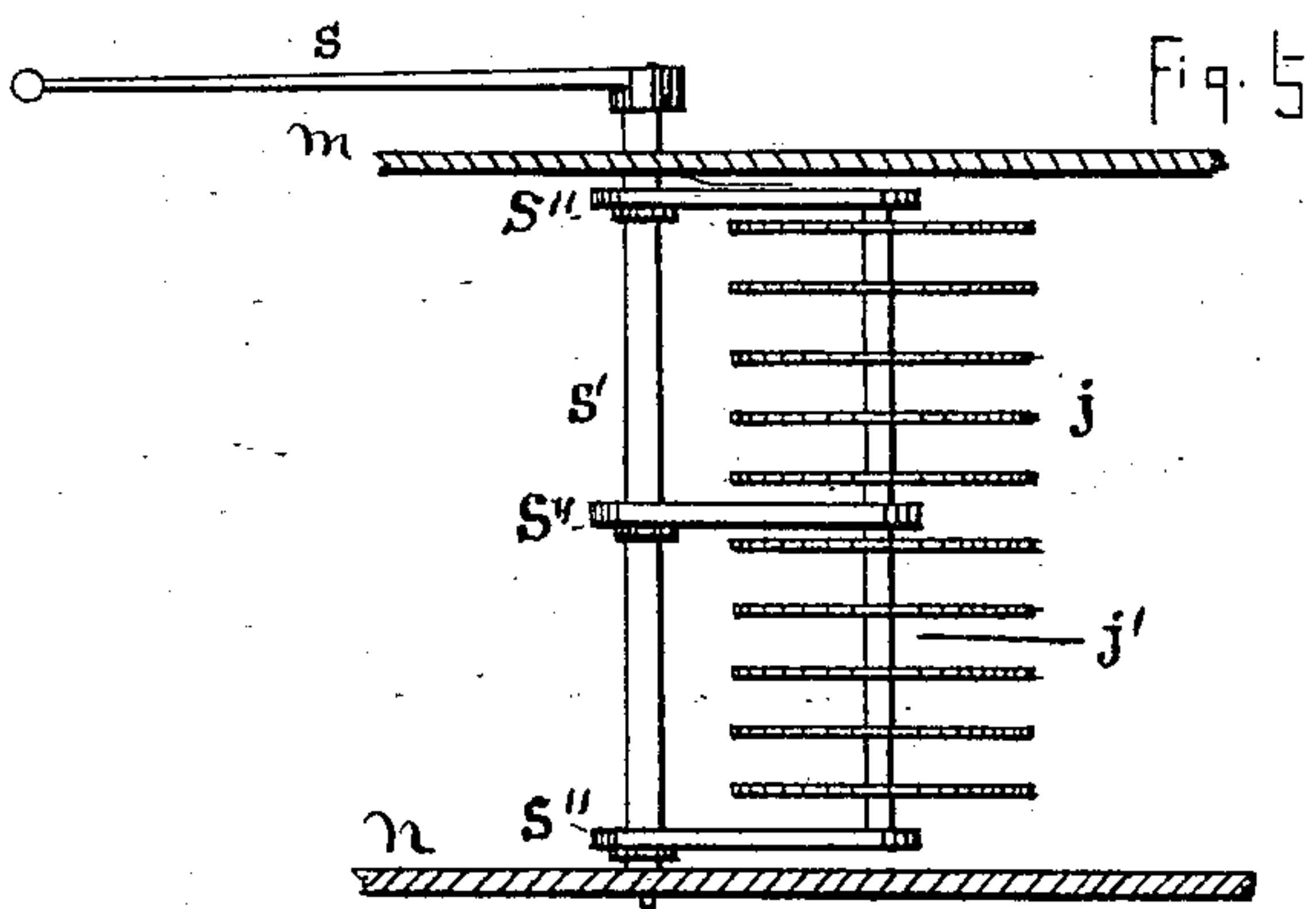
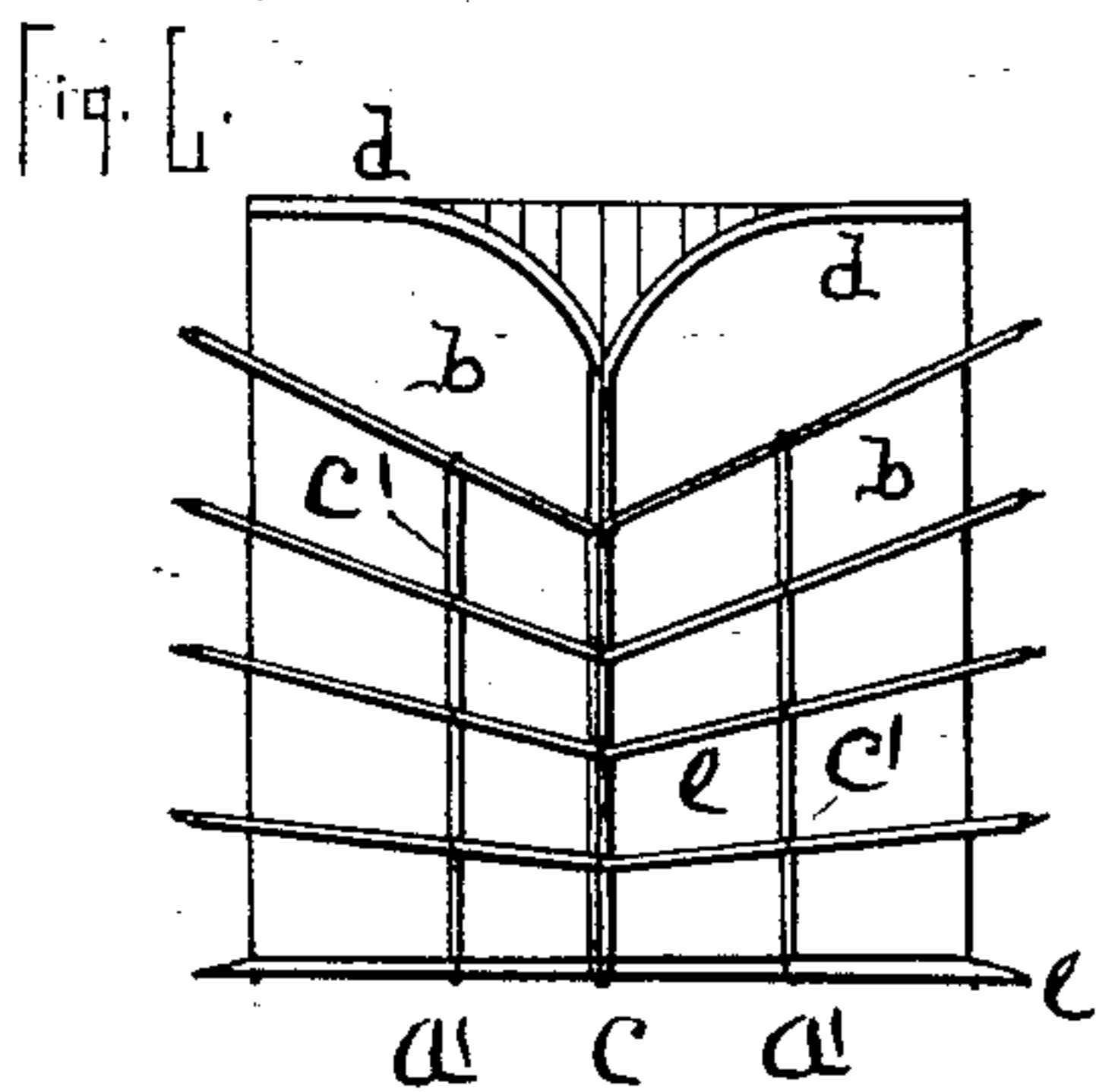
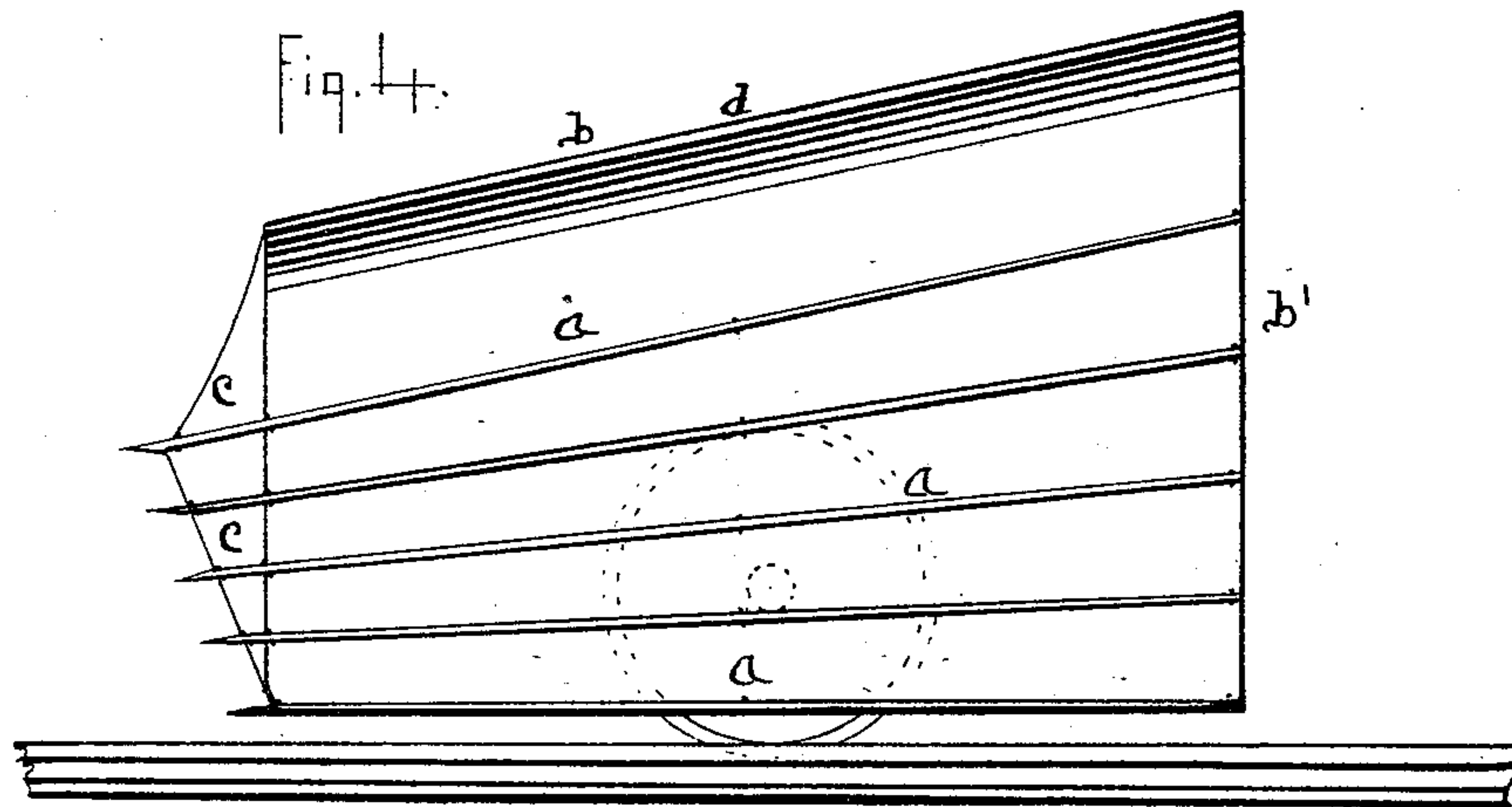
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UNITED STATES PATENT OFFICE.

GEORGE VAUGHAN BENJAMIN, OF ITHACA, NEW YORK.

SNOW-PLOW WITH SNOW-CUTTERS.

SPECIFICATION forming part of Letters Patent No. 328,640, dated October 20, 1885.

Application filed March 27, 1885. Serial No. 160,362. (No model.)

To all whom it may concern:

Be it known that I, GEORGE V. BENJAMIN, a citizen of the United States, residing at Ithaca, Tompkins county, New York, have invented an Improved Railway Snow-Plow with Snow-Cutters, whereof the following is a specification, reference being had to the accompanying drawings.

My especial device is the construction of a series of cutting-blades with or without saw-teeth, in a series one over the other, in front of a snow-plow, for the purpose of cutting or planing in successive portions the impacted snow on a railway-track, and to this other parts are adjuncts; and the nature of my invention will be apparent as I describe it.

Figure 1 is a ground plot of a snow-plow designed to cut through impacted snow of comparatively little depth. Fig. 2 is a plow with horizontal wedge-shaped snow-elevating inclines, and with wedge-shaped side-thrusting surfaces with my saw-toothed cutting-blades. Fig. 3 is a side elevation of Fig. 2. Fig. 4 is a side elevation of the plow seen in Fig. 1. Figs. 5, 6, and 7 are detached views of parts of my plows.

In the figures, *a a* are the blades or saw-blades, made with sharp cutting-edges or with saw-teeth; and *b* is the ordinary wedge-shaped plow with perpendicular surfaces on each side of it, that thrust the snow off of the railway-track; and *c* is the perpendicular cutting-plate fixed before the plow fronts; and *d d* are curved top flanges that make the upper edges of the comparatively low form of my snow-plow. In a deep snow-plow they may be omitted. The cutting-blades in both shallow and deep snow-plows have cutting or sharp edges, *e*, as in Figs. 1 and 3, or with saw-teeth edges, as indicated in Fig. 2. They are broad and fastened at their front points and middle line of the plow to the stout perpendicular cutting-plate *c*. The blades slant at an angle each side of the middle line backward, thus presenting a spear-point front to the snow. They are made fast in Figs. 1 and 4 to another stout plate-shaped cutting-support at the angles *a'*, and in these figures they extend backward to the rear end of the plow, as indicated, even to the end at *a''*. This form is suited only to plows without the planes which elevate or raise the snow upward by means of the surfaces *f* and their nec-

essary perpendicular sides *g*, and it makes a sharp lance-shaped comparatively small snow-plow, especially adapted to the moderately deep but impacted snow with dust and sand that occasions much trouble on prairie and rocky mountain plains. Its size may be a foot or two wider than the locomotive and cars at its rear end, and six or ten feet long and three to eight feet high. The form shown in Figs. 2 and 3 is made, as has been said, with the perpendicular wedge plow-planes *b* and with the elevating-surfaces *f*, and it may be made a large and long structure and as high as the top of the smoke stack or funnel of the locomotive. Fig. 3 is the double-wedge part shown to the left of the line *h*, Fig. 2. To the rear of that, as indicated, may be one or more compartment-spaces, *h'*, as long as desirable, and the full width of the excavation made in the snow by the point of this plow. In the compartments may be arranged the semicircular side excavators of Garrett W. Hopkins, of which I am half owner; but in at least one of them I prefer to construct a series of horizontal and revolving knives, *j*, that may be made of circular saws like those in use in saw-mills, placed one over the other, and they revolve with the shaft *j'* as they cut through the snow beyond the width of the cars, thus giving ample space for the cars through a drift or deep snow. They may also be simple long knives *j''*, fast to a stationary shaft, *j'''*, which, by a lever on the top of the plow, turns them out beyond the width of the plow. On the upper side of Fig. 2 the round-saw form is indicated. On the lower side of Fig. 2 the long knives are indicated.

It will be noticed in Figs. 3 and 4 that the front cutting-blades or planing saw-blades are placed in a series, one over the other, and that they are made with sharp edges, and that the lower blade is back to and close by the front edges of the wedge-planes both perpendicular and horizontal; that the one next above this is advanced some distance, preferably at least six inches, beyond the lower blade, and that the third knife is still farther anterior to the second knife or blade, and so on of all the blades, be they more or less in number. In Fig. 3 their line of increasing forward position is by a segment of a circle, which is shown by the cutting-edge of the perpendic-

ular blade *c*; and also it will be noticed that these blades are wider apart each at their rear ends than at their front edges. This is for the purpose of a free escape of the snow, that by an action like a carpenter's plane planes off the snow, of the obstruction, one blade after the other. In the plow indicated in Figs. 2 and 3 the use of the elevating-wedge compels the cutting-blades to be placed at a comparatively blunt angle that they may cut or plane off the layers of snow before the impact of snow reaches the front elevating-surfaces, as is seen in Fig. 2, and that limits their extension backward to the front edges of these wedge-surfaces. They can be extended backward and upward on the sides *b''* of the perpendicular plow-wedge; but if so they are mere upward lifters of the snow, and no longer cutting-blades. In the form of Fig. 1 the blades cut all the way back to *a''* on each side. By this structure the planing off or cutting of the obstruction is done by the front edges of the blades; and by the horizontal yet elevating action of the rear portions of the blades the snow is lifted up and broken up, when the wedge of the plow thrusts aside the snow without compacting it into masses. This is accomplished by these two direct and simple movements of the snow.

Wheels to support the plows on the railway-track are advisable. In the form shown in Fig. 1, though it is intended that the plow be made fast firmly to the locomotive, they are useful. In the long tall form of Figs. 2 and 3 supporting-wheels are of course used.

I have meant to indicate that all the cutting-blades have, all of them, either sharp knife-edges or saw-teeth edges, as may be preferable and best calculated to cut through tough compacted snow.

No particular means of fastening the blades to the plow is indicated beyond the perpendicular strong knife-edged post *c* and the inclined cutting edged posts *c'* *c'* at the angles *a'* *a'*. To these the blades are made secure. The knife-post *c* acts as a brace both above and below each and all the blades. Any usual means of fastening at other places are used.

To give greater length to the blades in Fig. 2, the outer ends, *f'*, of the front edges of the elevating-surfaces are made to be in rear of the point *f''*. This necessitates that the upper surfaces of the elevating-wedges be inclined outward, a fact indicated in Fig. 3, at each end of the plow, by the letters *f f*, and the darker lines between these letters.

Fig. 6 is a view looking toward the front of Figs. 1 and 4, on a reduced scale of sizes. In it the curved top flanges, *d*, are seen, the front of the knife *c*, the posts *a'*, and the rising upward of the blades *a* as they run backward on the sides *b* of the plow.

In Fig. 5 the circular saw revolving knives are shown, supported by their shaft, between the deck *m* and floor *n* of the plow, with the lever *s* on its shaft *s'*. The shaft *s'* is connected with the shaft *j'* by arms *s''*, and it is ap-

parent in Fig. 2 that the action of this lever is to move out and into the compartment space these saw-blades at the will of the operator. The fine dotted lines indicate these saw-blades in the compartment. The other lines show them extended outward.

Fig. 7 is a knife-blade that in Fig. 2 is seen on a stationary shaft, *s'''*, and in its extended outward position.

Fig. 6 at its top indicates that the roof of the small-sized plow of Figs. 1 and 4 is covered by wood, as do similar lines the use of wood in the other parts of the plows.

The saw-teeth may be of any size or shape thought best, or other reasonable variations made.

What I claim as my invention is—

1. A series of horizontal blades, in combination with a knife or support, *c*, to which their central points or parts are attached, and constituting an independent snow-severing structure in front of a snow-plow.

2. A series of horizontal cutting-blades placed one over the other in front of a snow-plow, each blade being in advance of the one below it, attached to the central perpendicular knife or bar *c* and to the side posts, *a'* *a'*.

3. A perpendicular knife, *c*, in front of the perpendicular wedge-surfaces of a snow-plow, in combination with a series of cutting-blades or cutters, and supporting their front points.

4. The cutting-blades which plane off the layers of snow or cut in pieces the snow obstruction, provided with or made with saw-toothed edges, as shown and described.

5. A series of horizontal blades one above the other, in front of a snow-plow and extending along the sides of the perpendicular wedge of the plow to the rear of the wedge, and attached to the perpendicular sides of the wedge.

6. The horizontal blades placed in an advancing series, one above the other, in front of the plow-point, and extending rearward along the sides of the wedge of the plow, and having their rearward ends elevated higher than their front edges, thus providing lifting-planes on which the snow is elevated.

7. A series of horizontal blades whose central portions are attached to the perpendicular knife or bar in advance of their rear angles, thus making a series of spear-pointed blades.

8. A series of saw-blades or horizontal cutting devices fixed to a perpendicular shaft concealed in the plow structure, and at the will of the operator of the plow thrust out and beyond the sides of the plow and cutting the snow wider than the plow.

9. A shaft provided with a series of knives, which at the will of the operator are either concealed in the plow or are thrust out into the snow beyond the sides of the plow.

GEORGE VAUGHAN BENJAMIN.

Witnesses:

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