

No. 682,666.

Patented Sept. 17, 1901.

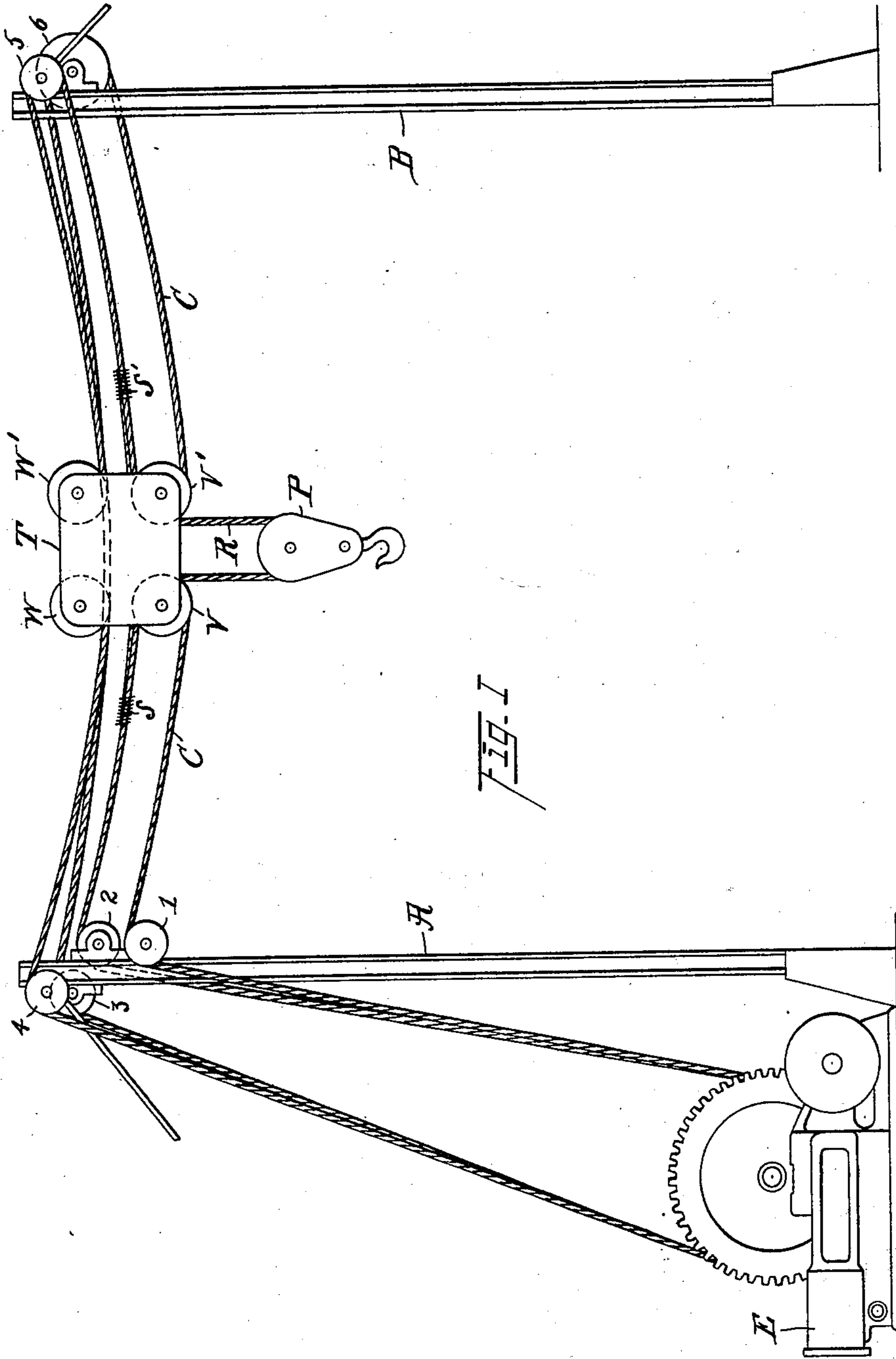
A. E. BROWN.

HOISTING AND CONVEYING MACHINE.

(Application filed Apr. 13, 1901.)

(No Model.)

5 Sheets—Sheet 1.



Witnesses:
A. Griswold.
James Ryan Maydon.

Inventor:
Alexander E. Brown.
by George C. Wing
his attorney.

No. 682,666.

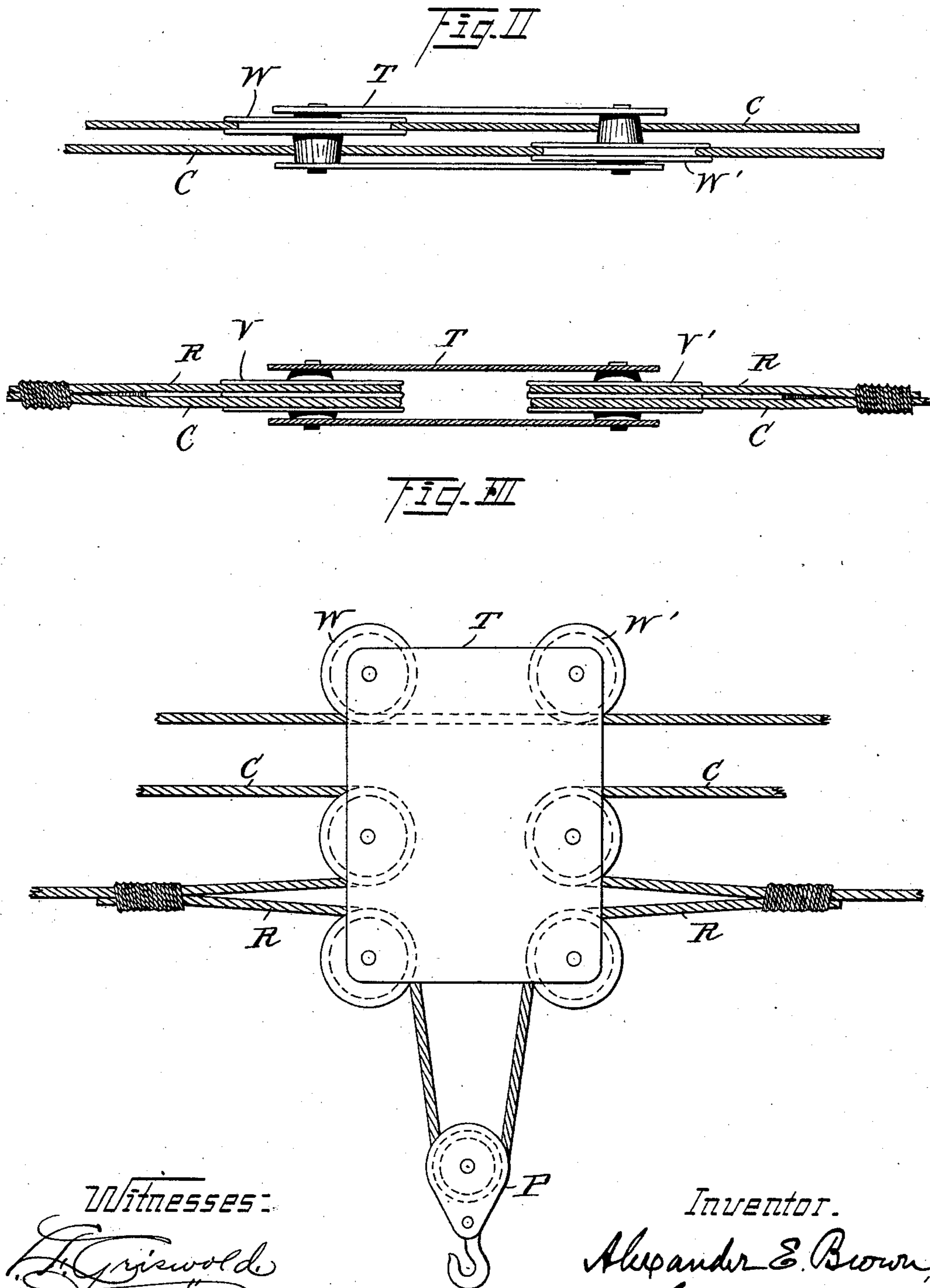
Patented Sept. 17, 1901.

A. E. BROWN.
HOISTING AND CONVEYING MACHINE.

(Application filed Apr. 18, 1901.)

(No Model.)

5 Sheets—Sheet 2.



Witnesses:
L. Griswold

James Ryan Maydon.

Fig. VI

Inventor.
Alexander E. Brown
by *George C. Wing*
his attorney.

No. 682,666.

Patented Sept. 17, 1901.

A. E. BROWN.
HOISTING AND CONVEYING MACHINE.

(Application filed Apr. 13, 1901.)

(No Model.)

5 Sheets—Sheet 3.

Fig. IV

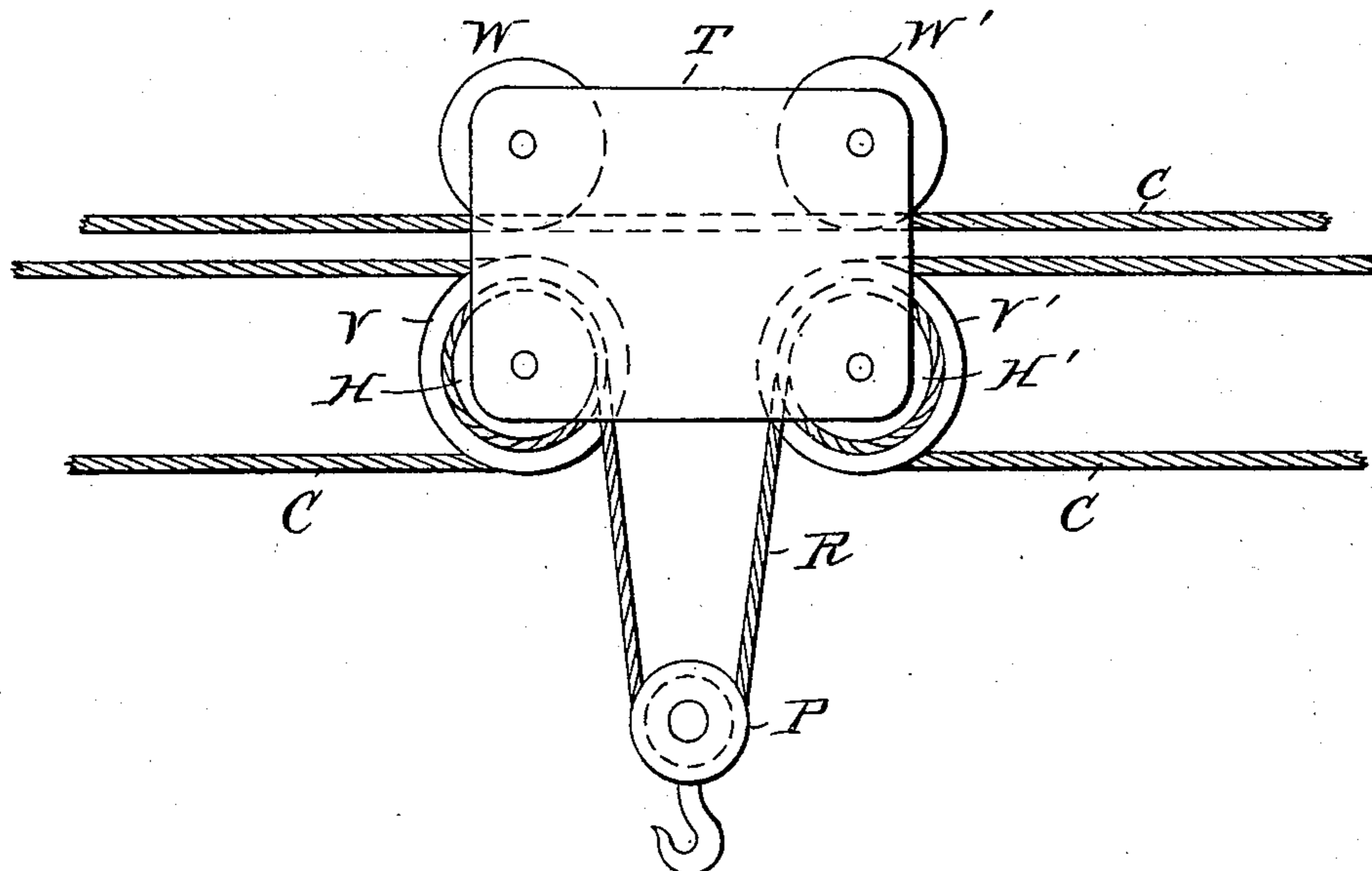
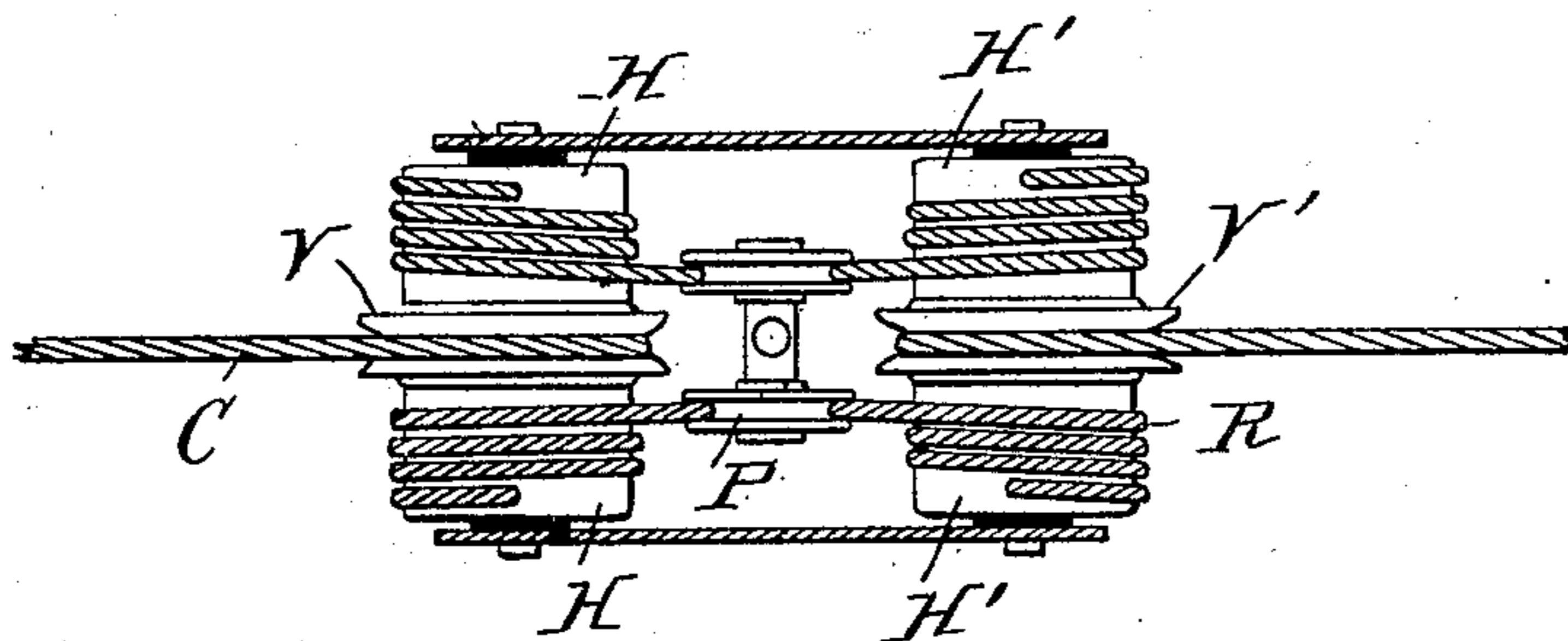


Fig. V



Witnesses:

J. H. Griswold.

James Ryan Maydow.

Inventor.

Alexander E. Brown
by George C. Wing
his attorney.

No. 682,666.

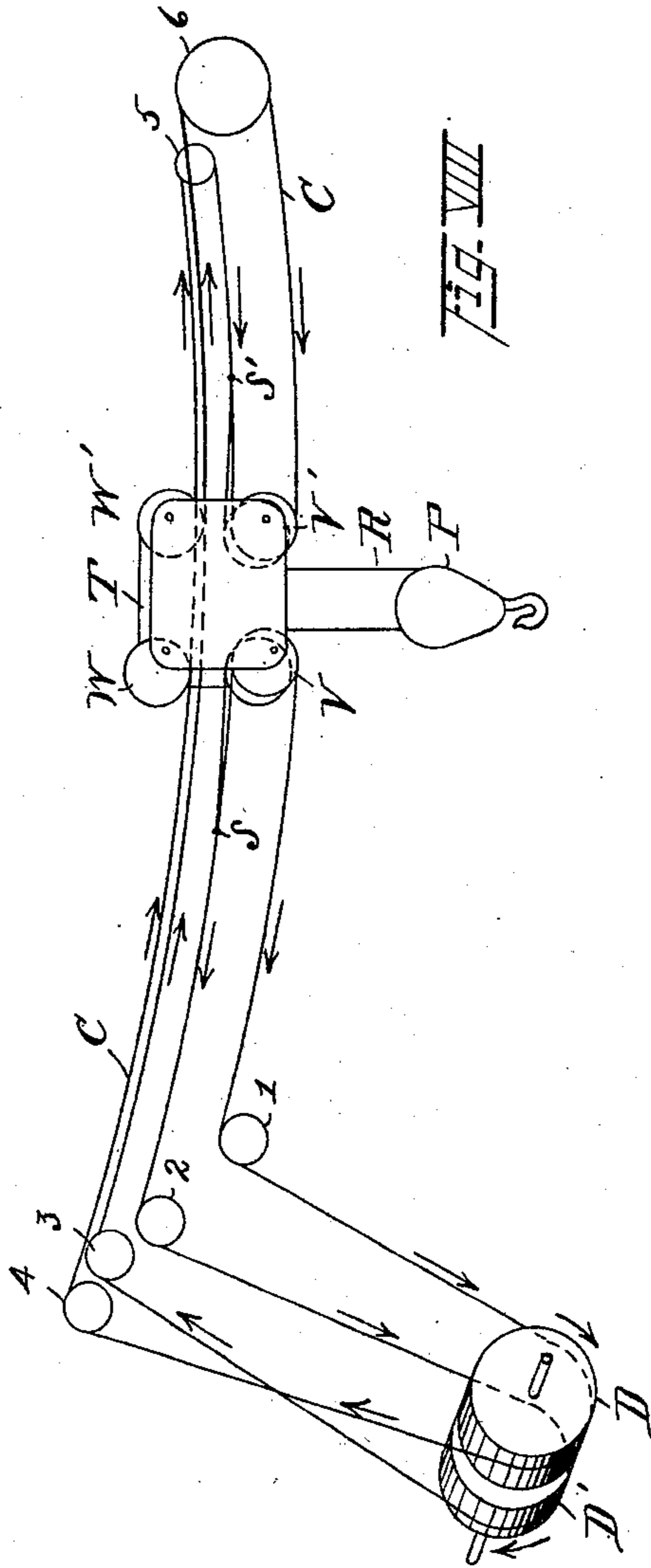
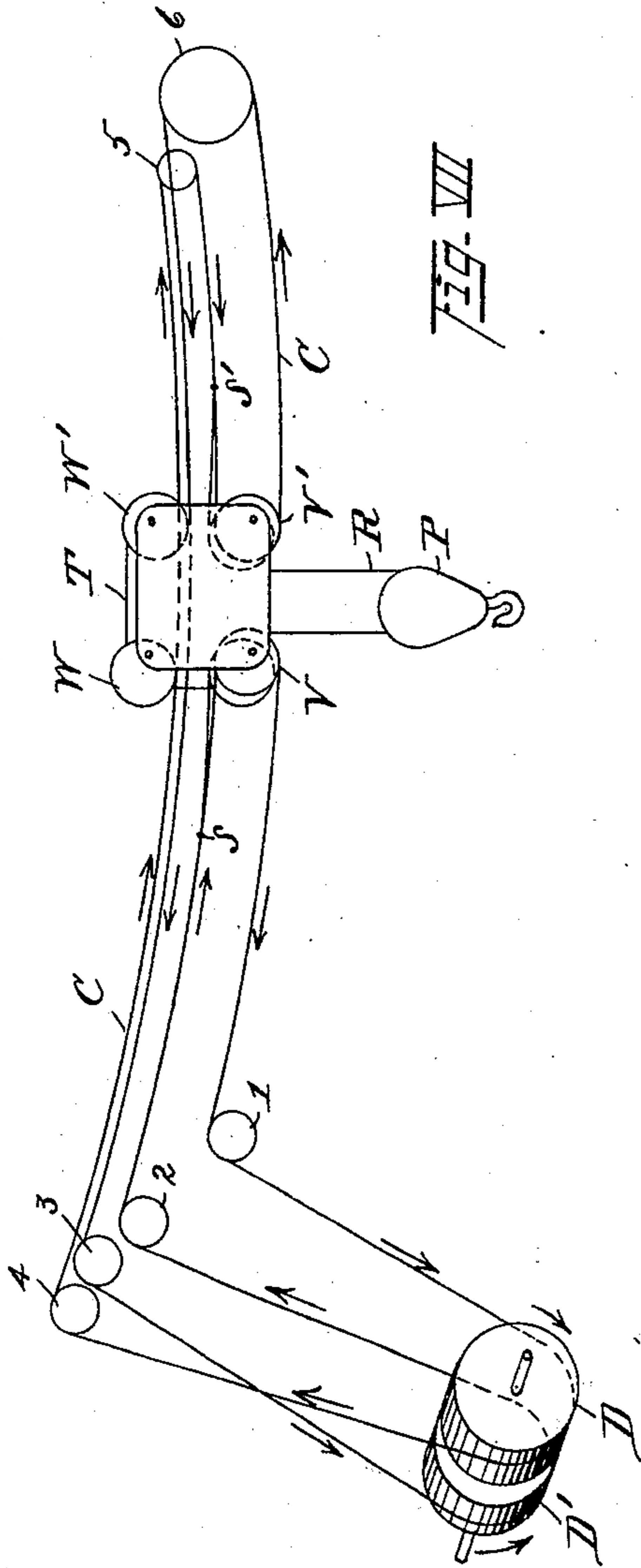
Patented Sept. 17, 1901.

A. E. BROWN.
HOISTING AND CONVEYING MACHINE.

(Application filed Apr. 13, 1901.)

(No Model.)

5 Sheets—Sheet 4.



Witnesses:

H. Griswold.
James Ryan Maydon.

Inventor.

Alexander E. Brown.
by George C. Wing
his attorney

No. 682,666.

Patented Sept. 17, 1901.

A. E. BROWN.
HOISTING AND CONVEYING MACHINE.

(Application filed Apr. 13, 1901.)

(No Model.)

5 Sheets—Sheet 5.

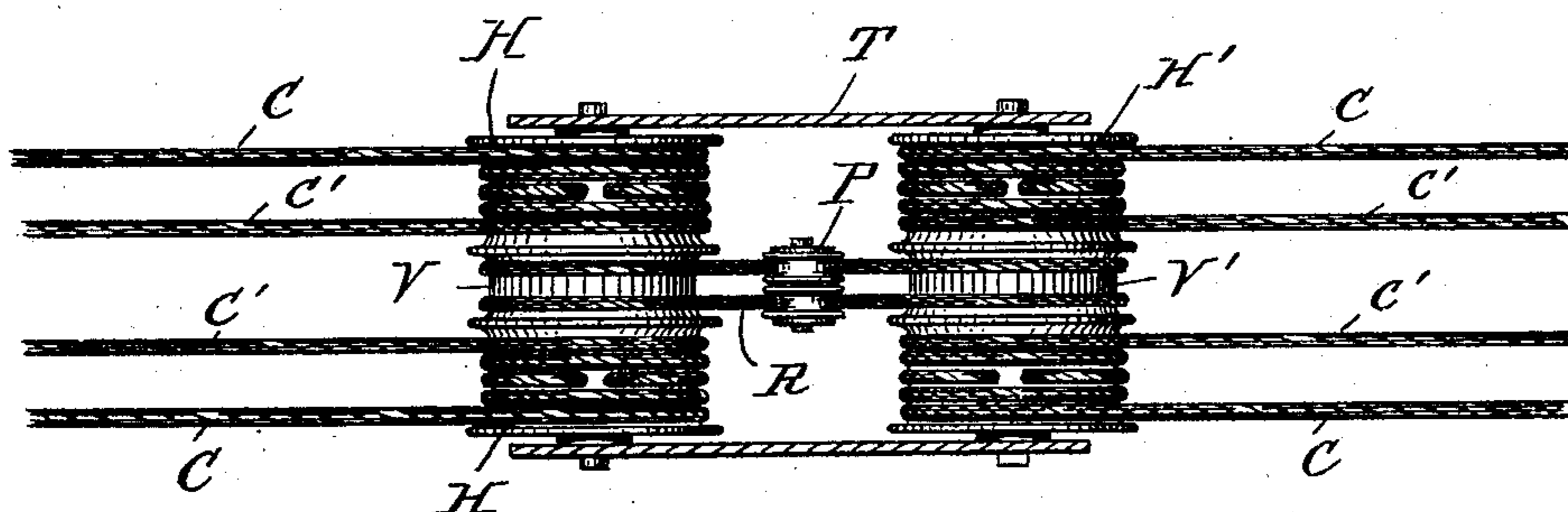


Fig. IX

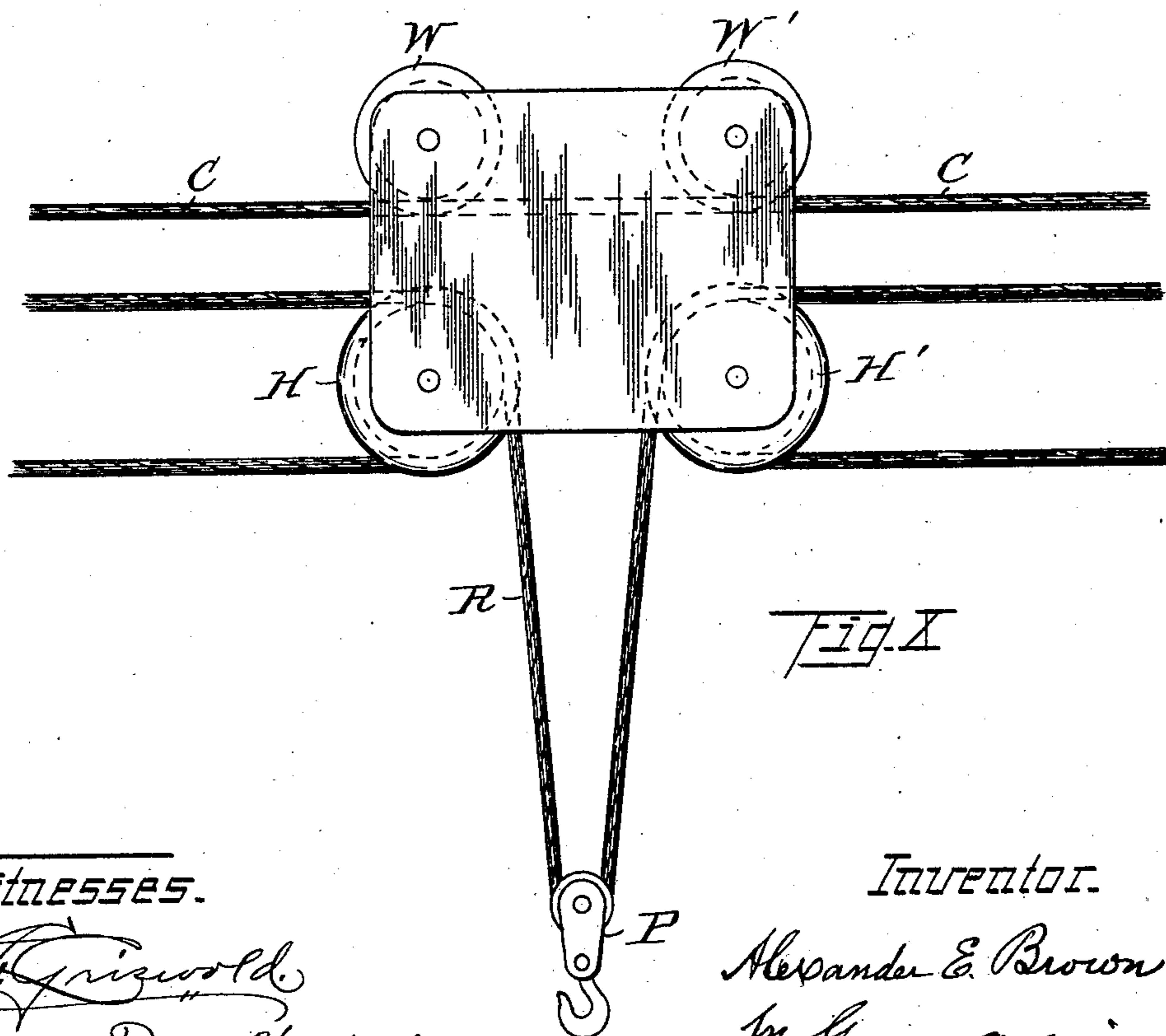


Fig. X

Witnesses.

A. Grizwold.

James Ryan Maydon.

Inventor.

Alexander E. Brown.

by George C. Wing
his attorney

UNITED STATES PATENT OFFICE.

ALEXANDER E. BROWN, OF CLEVELAND, OHIO, ASSIGNOR TO THE BROWN
HOISTING MACHINERY COMPANY, OF DELAWARE.

HOISTING AND CONVEYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 682,666, dated September 17, 1901.

Original application filed February 10, 1900, Serial No. 4,736. Divided and this application filed April 13, 1901. Serial
No. 55,745. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER E. BROWN, whose post-office address is 1151 Prospect street, in the city of Cleveland, in the county
5 of Cuyahoga and State of Ohio, have invented a new and useful Hoisting and Conveying Machine; and I hereby declare that the following is a full and exact explanation and description of the same, which, together with the drawings
10 referred to therein, constitute my present application.

My invention has relation to the class of machines above referred to wherein a load-bearing trolley is mounted and adapted to travel
15 upon a track of either the bridge or cable-tramway type and is actuated in its several functions by means of ropes or cables connected with winding drums or sheaves of a suitable motive power.

20 Prior to my present invention various forms of the above-named machines have been devised, the chief constructive purpose of which has been to effect, so far as may be, the operative functions above referred to, and to this
25 end some of them have made use of a continuous or substantially continuous rope or cable suitably reeved between opposing piers or supports and supplied with a secondary hoist-rope, suspended from the trolley, to be
30 raised or lowered according as its point or points of attachment to the main rope or cable approach or are withdrawn from the said trolley by the revolution of the winding-drums. Aside from the multiplication of parts and op-
35 erations involved in such preceding devices, a serious problem has always been to properly take care of and carry the sag of the hoisting-rope when not under load, and especially in long spans, where the length of the
40 track is considerably out of proportion to its height above the ground, so that the slack is liable to reach the ground or encounter intervening objects, its proper solution is imperative. In certain of such overhead tramways
45 this sag of the hoisting-lines has heretofore been provided for by so-called "sag-carriers," consisting of a series of supports freely suspended at intervals beneath the length of the hoisting and pulling rope and adapted to be

propelled or "threaded" together by contact 50
with and before the advancing trolley. Such additions and devices are attended with well-known complications and consequences which it is desirable to avoid, and particularly in the
55 case of high-speed machines, where the contact of the trolley with such sag-carriers must be rapid and sharp.

It is the purpose and object of my present invention to supply a form and kind of hoisting and conveying machine wherein the actu- 60
ating rope or system of ropes and cables, if desired, may be utilized as the support and tramway for the trolley itself and shall constitute the means by which not only the trolley is traversed along its course, but its load 65
is also thereby hoisted or lowered, and which, further, by maintaining in the construction a predetermined minimum tension at all times will be free from any detrimental or undue
70 slack or sag in any of its parts.

In an application filed by me under date of February 10, 1900, and bearing Serial No. 4,736, I have shown and described drawings and specifications for the most part identical with those hereof. Upon said application, 75
however, I have founded and declared certain generic claims, as well as several claims for specific features of the invention, and which under the requirements of the Patent Office should be divided and made the subject of 80
separate applications. In accordance with such requirements I have filed this application, and as to all matters herein shown and described, but not claimed, and which are
85 claimed in my said application dated February 10, 1900, and serially numbered 4,736, I hereby disclaim the same in favor of said former application and as forming no part of the invention sought to be secured by the
90 present application.

I accomplish the results hereinbefore mentioned by the devices and mechanisms I shall now proceed to more fully describe by also referring to the accompanying drawings and diagrams, whereby I illustrate the invention 95
involved in such manner as is intended to clearly and conveniently make known to those skilled in the art the full extent and scope of

the same, as well as its mode of application to certain specific cases.

In the said drawings, Figure I is a side view of a hoisting and conveying machine embodying one form and arrangement of my said invention. Fig. II is a plan view of the upper portion of the trolley shown in Fig. I. Fig. III is a similar view of the lower portion of the same. Fig. IV is a side view of the trolley employed in a modified form of my device. Fig. V is a downward view of the lower portion of the same. Fig. VI is a view of a further modification of the trolley used. Figs. VII and VIII are diagrammatic views of the form of hoisting and conveying machines shown in Fig. I. Fig. IX is a plan view of a modified construction, and Fig. X is a side elevation of the same.

Throughout the several views similar parts are denoted by the same letters and numerals.

A and B, Fig. I, represent supporting-shears or piers in my said device, C, Figs. VII and VIII, the cable, and D D' two hoisting-drums driven by an engine E'', Fig. I.

T is the trolley, which in all the figures is of the class containing two upper supporting or track wheels W W' and two lower supporting or hoisting wheels V V'.

1 to 6 are sheaves suitably mounted upon the supporting-piers A and B, as indicated.

The drums D and D', Figs. VII and VIII, are represented as mounted on the main drive-shaft of a winding-engine and should be adapted to be revolved at the same time in either the same or opposite directions and with the same or varying relative speed. They are of course to be provided with all the accepted facilities for stopping and regulating their motions. The cable C may be in the actual form of an endless rope or band, as represented in Figs. VII and VIII, or it may consist of a single piece or pieces whose ends are respectively fastened to the drums D and D' in the usual manner. The cable C, being wound about the drum D, leads off therefrom in one direction to and over the sheave 1, thence upwardly and around the sheave V in the trolley T, thence backwardly, thereby completing a loop in the cable system involved, to and over the sheave 2, down and around the second drum D'. Thence it leads up and over the sheave 3 and forwardly beneath the wheel W', to and over the sheave 6, thence to and around the sheave V' and backwardly, forming a second and opposing loop in said cable system to and about the sheave 5, from whence it passes beneath the trolley-wheel W to the sheave 4 and over said sheave 4 down to the drum D, completing the circuit. At predetermined points S S of the cable C, on either side of the trolley T, when supported by the said cable, as shown in the drawings, I have attached the respective ends of a supplemental or secondary rope or cable R and passed the same over the sheaves V and V', (which are double-grooved for the purpose, as shown in

Fig. III,) around the pulley-block P, to thereby constitute a hoist-line for the load. The cable C, however, may be so reeved over the sheaves 1, 2, 3, 4, 5, and 6, as shown in Figs. VII and VIII, that one end shall pass over and around the sheave V in the trolley, down through the hoist-block P, upward over the sheave V', and be fastened to the cable C at a point a suitable distance from the trolley corresponding with S', and the other end be passed or reeved up and around the remaining score in the sheave V to a point on the said line on the opposite side of the trolley corresponding with S, and there be secured to the strand or cable C. The diagrams constituting Figs. VII and VIII may be taken interchangeably to represent and illustrate either form of my said invention last above referred to.

A method of suspending the hoist-rope R upon the sheaves V and V', located below the sheaves or wheels V and V' for the purpose, is shown in Fig. VI, and in Figs. IV and V is shown a special mode of attaching and operating the hoist-line R, which is comprehended by the claims, wherein the sheaves or wheels V and V' are provided with drums H and H', to which the ends of the rope R are fastened and which consequently wind and unwind the said rope, according as the wheels V and V' revolve in one direction or the other. In the modification as shown in Fig. V the rope has preferably been duplicated.

An additional form of my invention and included in the claims herewith consists in the employment in the trolley of one or more drums in place of the sheaves and drums shown in Fig. V or sheaves shown in the remaining figures, in which case the drums so employed may have wound thereon the load-sustaining line R in a like or similar manner to that shown in Fig. V, while the cable C, instead of passing around the sheaves V and V', as shown, thereby driving through its frictional contact with the same in hoisting and lowering the load, is wound a sufficient number of times around said drum or drums to effect the number of revolutions necessary to hoist or lower the load to the desired limit. In order to maintain at all times in this form of construction an equal and opposite central pull of the cable C on said drums of the trolley with respect to the longitudinal vertical plane on the same, it will be found of advantage to make the cable C in two parallel strands, having the guide-sheaves and winding-drums pertaining to the trolley arranged to receive the same in like manner to that where a single strand is employed, as described herein and shown in the drawings. Although throughout the several figures, except Figs. IX and X, the cable C is shown as an endless line in the modification last above-referred to, the cable system corresponding with the endless line C in the other figure is made up of separate ropes C C', fastened, respectively, at

one end to the drums D and D' and at the other, after being reeved through the sheave 1 and the sheaves 3 and 4, are severally wound about the hubs or drums H and H' in the trolley in the manner shown in Figs. IX and X, hereinbefore described. It is also evident that, though in many cases desirable, it is not essential that the cable C should be an endless line passing around the winding-drums of the actuating-engine, but that it also may be made up of separate portions fastened to the same.

Referring now more especially to Figs. VII and VIII, the general mode of operation of my said invention will be readily understood in the operation of the particular form thereof shown. In Fig. VII the actuating-drums D and D' are supposed to be revolving at an equal speed in opposite directions, as denoted by the curved arrows, and in Fig. VIII, as likewise denoted, the drums are supposed to be rotated in the same directions. The several arrows along the cable C indicate the direction of the pull or tendency of said line at the points or portions thereof at which the arrows are severally placed. As is apparent in the case supposed as to Fig. VII, by the revolution of the drum D the cable C is pulled in toward said drum over the sheave 1 from the wheel V, and by the revolution of the drum D' in the opposite direction the corresponding portion of the cable C is paid out at the same rate from the drum D' over the sheave 2 toward the wheel V. At the same time at the opposite sides of the two drums the portion of the cable C which is reeved between the drum D and wheel V' over the sheave 6 is paid out at the same rate as the portions of said cable between the wheel V and the drum D are being pulled in, as above explained. Similarly the corresponding portion of said cable between the drum D' over the sheave 3 and the sheave 5 and the trolley-wheel V' is being pulled by the actuating-drum D' in the same degree as at other portions of the said cable system. It results that the points S S' on the cable, under the conditions above stated, must approach each other toward the trolley T, and the loop in the said hoist-line between the wheels V V', which contains the hoist-block P, must in consequence descend and lower beneath the said hoisting and conveying machine to a distance and limit determined by the length of the hoist-line R itself. In this manner, as will be seen, the operation of lowering the load is effected and the raising of the load is of course accomplished by simply reversing the revolutions of the two drums above described. On the other hand, in the conditions assumed in Fig. VIII, where the drums D D' both revolve in the same direction, it is plain that the revolution of the drum D, as indicated by the curved arrow, will pull the cable C toward said drum over sheave 1 from the trolley-wheel V; also, that the same revolution in a

corresponding manner will let out or release all that portion of the cable C that is reeved, as described, from the opposite side of said drum D over sheaves 6 and 4 and the wheel or sheave V', and that said revolution of the drum D' during the same time and at the same rate of speed will release all that portion of the cable C that is reeved between the drum D' and the wheel V' over the sheaves 3 and 5 and in consequence permit the pull on the cable C described at the opposite faces of the said drums to draw the trolley, with its hoist-line and load sustained thereby, in the direction of the drum end of the said system. The opposite haul and travel of said trolley under like conditions are effected by the rotation of both drums in the opposite directions to that just described.

It is manifest that my said invention is capable of variation in its operation and use in several subordinate respects—as, for instance, by rotating the drums D D' at different speeds in either of the conditions above noted the overplus velocity between the said drums in a given direction will operate as a resultant between the functions of traveling the trolley and raising or lowering the load, and both of said functions will in this manner be simultaneously effected.

Although I have hereinbefore shown a cable-tramway wherein the support of the trolley is provided by the same system of line or cable that moves the same and raises and lowers the load, my invention is not the less applicable to the functions of moving the trolley and operating its load independently of the function of sustaining the same meanwhile. The principle of reeving the cable, as hereinbefore disclosed, may equally be applied to a trolley that is supported and adapted to travel upon a cable or bridge tramway that is itself entirely distinct from the apparatus that moves and operates the said trolley. In such case there might of course be some rearrangement of the supporting-sheaves from that otherwise desirable or necessary, as well as of the location of the actuating-drums, which latter in such case might advantageously be placed above the trolley-track and the leads of the rope of cable C, which are herein shown as passing beneath the wheels W W', would in such construction be fixed in any directions convenient with regard to the said trolley. It is evident also that the leads of the various parts of the rope or cable C to and from the drums just above described may be changed with respect to the same, so that the hoisting and lowering of the load suspended to the line R may be effected by rotation of the drums in the same direction and the traveling of the trolley in the opposite direction.

Having thus described my said invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of a trolley having sheaves, one or more of which is provided with and connected to a winding drum or

drums; a suitable supporting-track for said trolley and a cable system passing over drums of an actuating mechanism, provided for the purpose, and around said trolley-sheaves in 5 opposing loops, as described, and a hoisting line or lines attached to said winding drum or drums, substantially as shown and described.

2. The combination of a trolley having one 10 or more winding-drums mounted therein, a suitable supporting-track for said trolley and a cable system connected with suitable actu-

ating mechanism provided for the purpose, a cable or cables constituting said system which pass around and are attached to said drum 15 or drums, in the form of opposing loops, as described, together with a hoisting line or lines secured to said drum or drums, substantially as shown and described.

Cleveland, Ohio, March 19, 1901.

ALEX. E. BROWN.

In presence of—

F. G. TALLMAN,
M. MILLARD.