

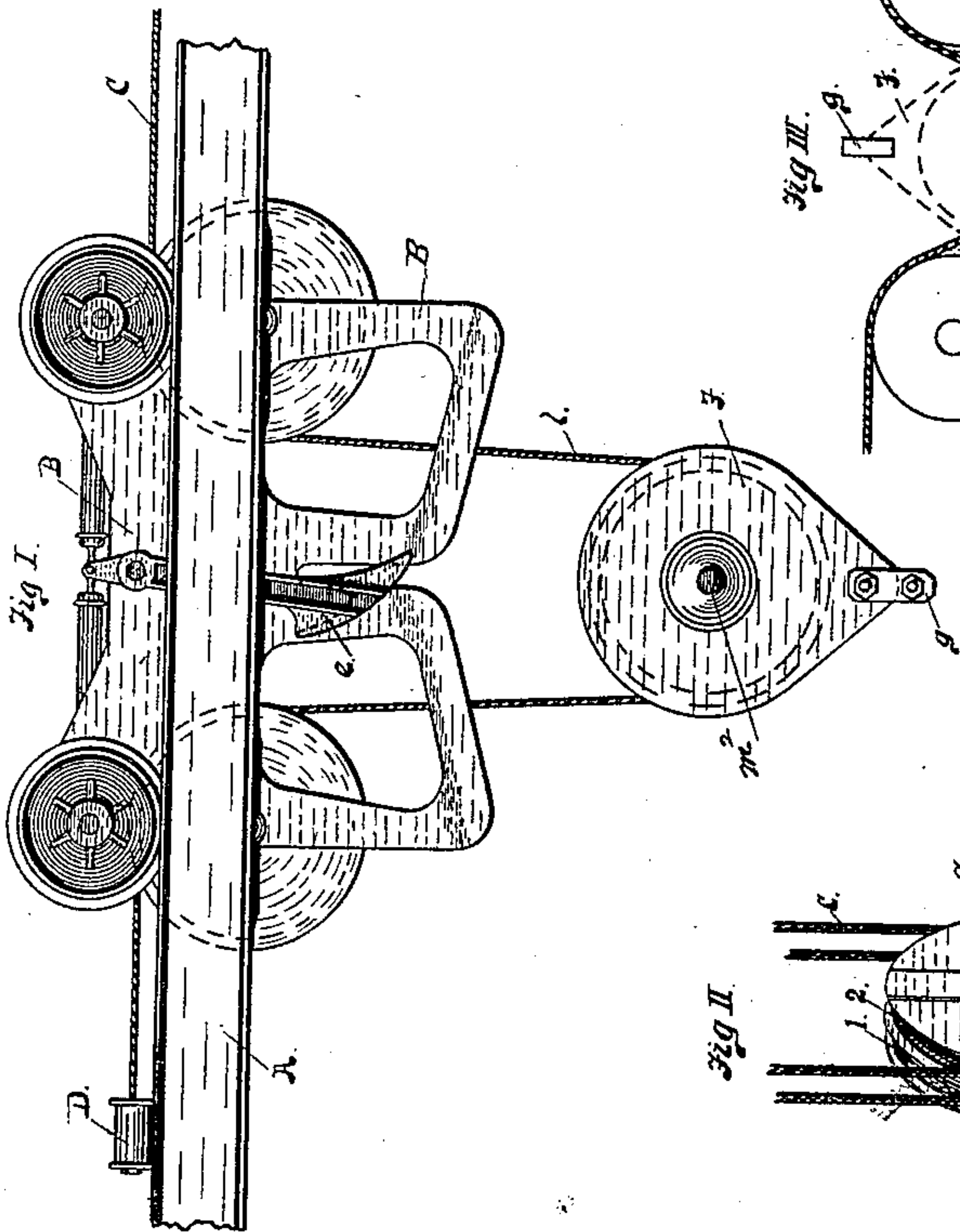
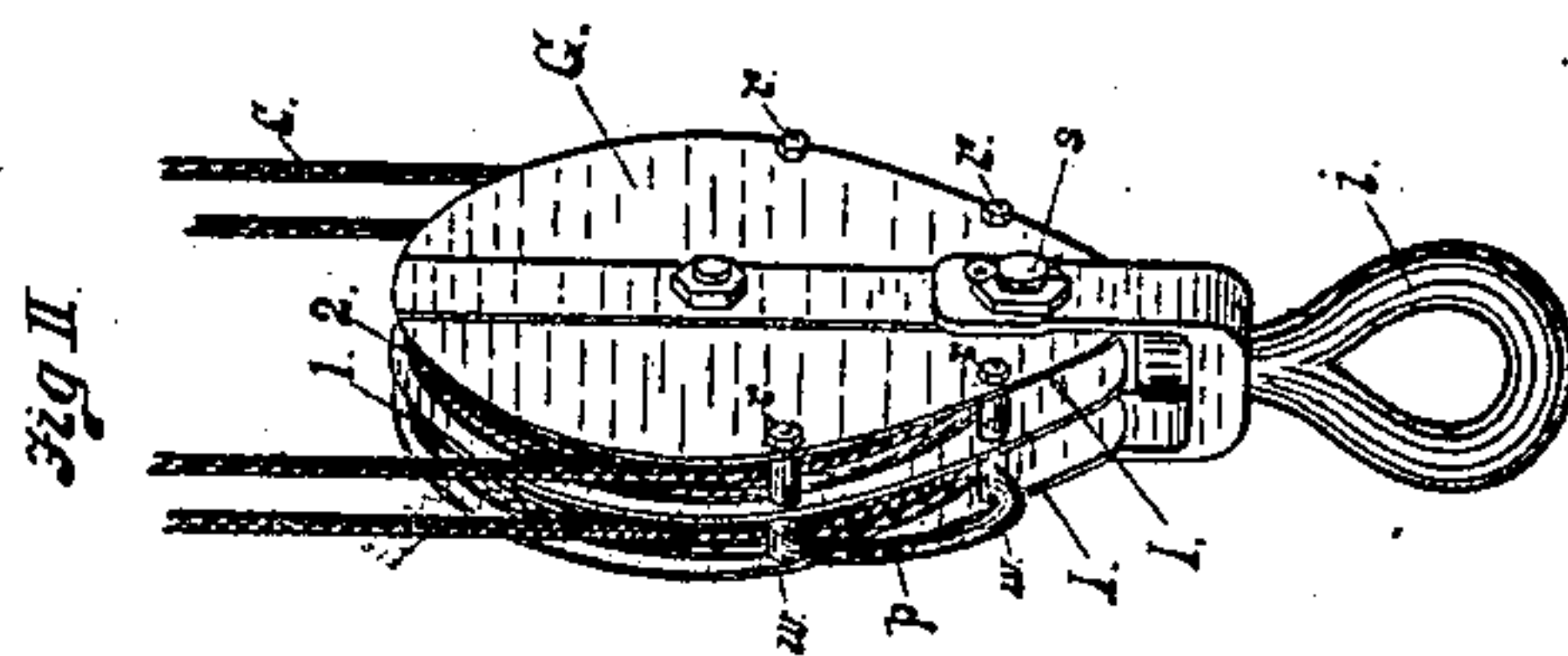
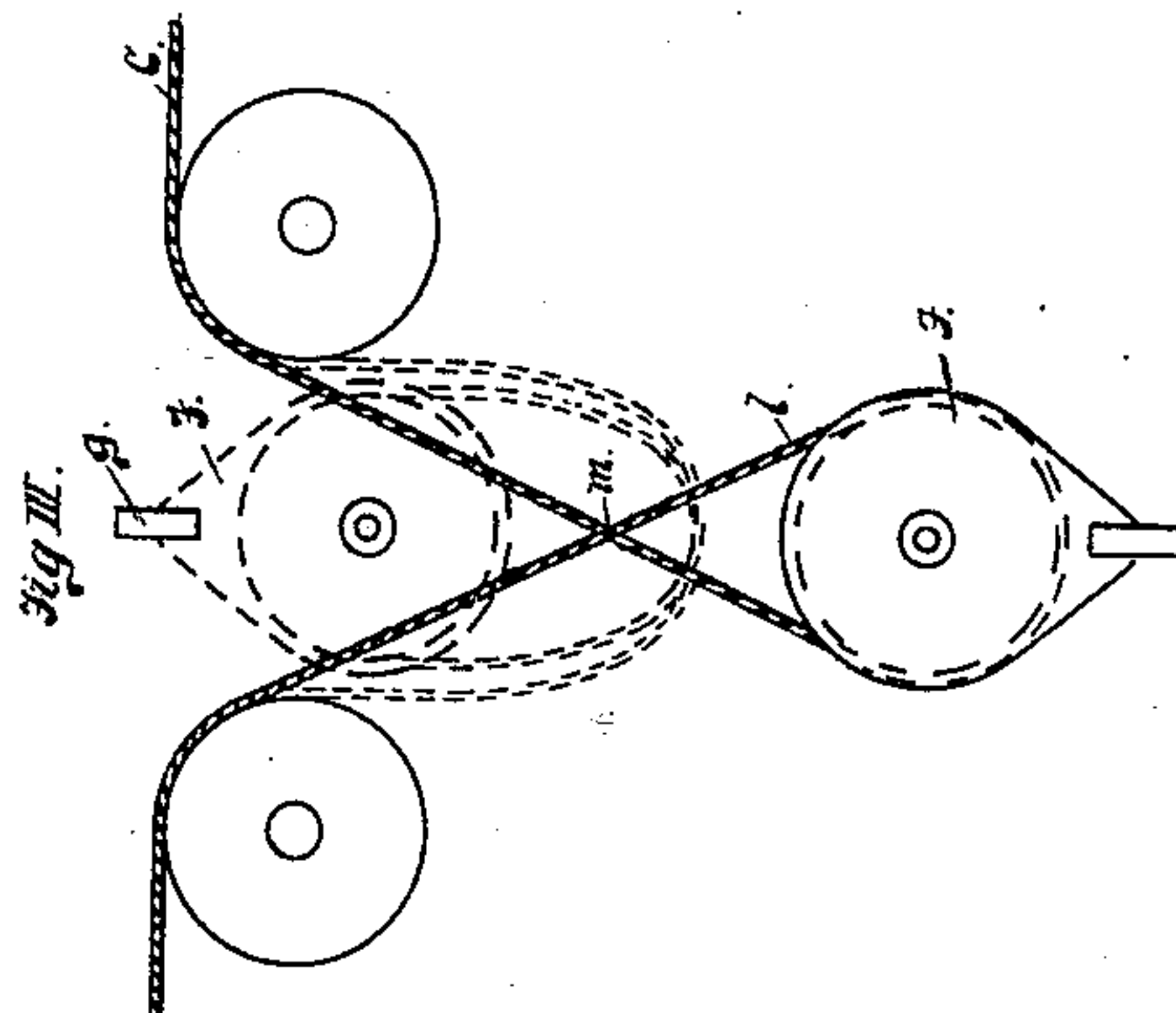
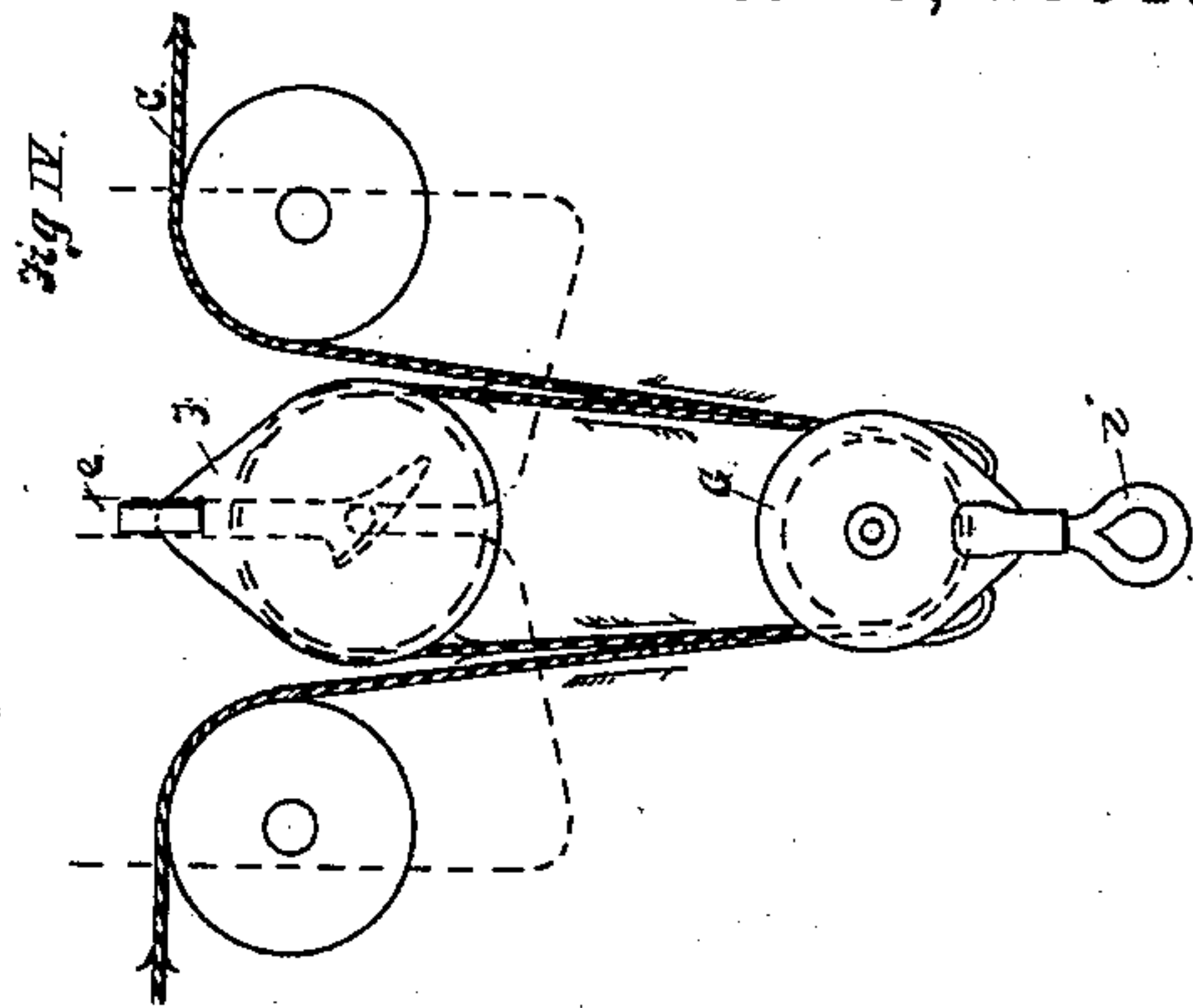
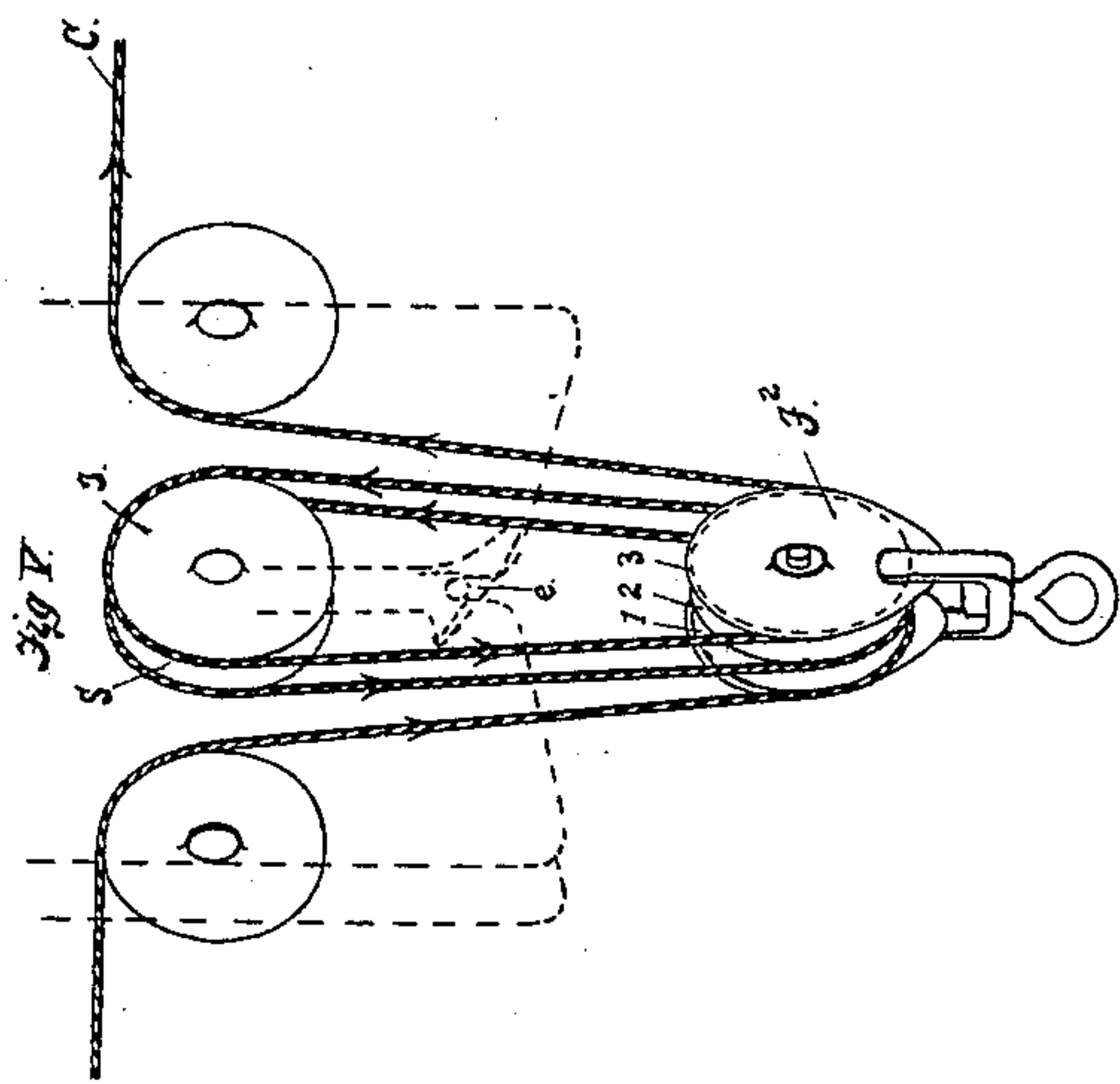
(No Model.)

A. E. BROWN.

METHOD OF DOUBLING UP THE PURCHASE OF HOIST ROPES.

No. 466,090.

Patented Dec. 29, 1891.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

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## METHOD OF DOUBLING UP THE PURCHASE OF HOIST-ROPES.

SPECIFICATION forming part of Letters Patent No. 466,090, dated December 29, 1891.

Application filed July 16, 1891. Serial No. 399,739. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER E. BROWN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful  
5 Method or System of Doubling Up or Increasing the Purchase of the Hoist-Rope of a Hoisting and Conveying Machine; 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.

My invention relates to a novel method of varying or multiplying and diminishing the purchase or lifting capacity of the hoist-rope  
15 of the various species of that genus of hoisting and conveying machine in which the load is raised and lowered through the medium of a hoist-block the sheave of which is hung in a depending loop of the hoist-rope, and which  
20 hoist-block (with its attached load) is raised and lowered by taking up and letting out the loop of said rope, all in a manner well known to those familiar with the constructions and operations of hoisting and conveying machines.

In the kind of machinery referred to it is very desirable, of course, in the construction of the apparatus or plant for a given kind of work, to make the hoist-rope, engine, and  
30 other parts only sufficiently heavy and strong to certainly withstand all the strain and wear to which they will naturally be subjected in the performance of the kind of work for which the machine is mainly designed. It, however, sometimes happens that it would be very convenient and desirable to use the machine for the lifting and transportation of a load greater than that to the handling of which the machine is adapted, and to provide  
40 a way to render it capable of doing this, and doing it without risk of any undue or injurious strain on any of the parts of the whole plant, is the object of my invention, which to this end consists in a novel method of increasing the purchase of the hoist-rope (without bringing any more strain on the hoist-engine and other parts designed to lift only the lighter load) by doubling on itself the loop  
50 from which the load is suspended and multiplying the strands thereof to work on supplemental devices, with which the machine is supplied, all as will be hereinafter more fully

explained, and as will be more particularly pointed out in the claim of this specification.

To enable those skilled in the art to readily  
55 understand and practice my novel method or system of varying the purchase of the hoist-rope in that kind of machine referred to, I will now proceed to more fully explain the same, referring by letters to the accompanying drawings, which form part of this specification, and in which I have illustrated my said novel method carried into effect by the means or appliances such as I have so far  
60 used in practicing my invention. The devices or apparatus by which I carry into effect my novel method may, however, be different from anything I have shown in this case, and may properly and do constitute the subject-matter of separate applications for Letters Patent  
65 by me, which applications were filed simultaneously with this case and are numbered, respectively, 399,737 and 399,738.

In the drawings, Figure 1 is a side view of so much of an elevated tramway hoisting and conveying machine as is necessary to be shown in  
75 order to illustrate my invention. Fig. 2 is a perspective view, on a slightly enlarged scale, of a supplemental sheave-block, such as may be added to and detached from the parts seen at Fig. 1 to respectively increase and diminish the purchase or lifting capacity of the hoist-rope. Fig. 3 is a diagrammatical view showing the manner of doubling up the rope and its usually attached hoist-block; and Fig. 85  
4 is another diagrammatical view showing a further step in the rope-doubling operation, and also showing the introduced supplemental hoist-block; illustrated as detached at Fig. 2. Fig. 5 is another diagrammatical view  
90 showing another form of apparatus or another set of devices, used differently, for doubling up the loop of the hoist-rope to increase the purchase three to one or for getting a greater multiplication of the lifting power  
95 than that illustrated at Figs. 3 and 4.

In all the figures the same part will be found designated by the same letter of reference.

A represents part of the bridge-tramway, B the trolley, and C the hoist-rope of a  
100 Brown hoisting and conveying machine of that species in which the hoist-rope has one end anchored to a fixed point of attachment D, and has the other wound on the drum of



a hoist-engine (not shown) in a well-known manner.

Referring now to all the figures, except Fig. 5, the trolley B is provided, as usual, with the type of machine shown, with suitable load-sustaining hooks *e*, with which are engaged, and from which are disengaged, as occasion requires, the laterally-projecting trunnions *m*<sup>2</sup> of the hoist-block F, all in a manner well understood by those familiar with the construction and operation of hoisting and conveying machines. The said hoist-block F is shown at Fig. 1 suspended in the single loop *l* of the hoist-rope as if in the act of either ascending or descending, and is provided with the usual load-supporting hook *g*, from which may depend the dump-bucket or other load-carrying device of the machine.

G is a supplemental hoist-block to be used only when it may be desired to double up or multiply the lifting power of the hoist-rope C, and, as will be seen best by reference to Fig. 2, this hoist-block G has two rope wheels or sheaves instead of one only, as in the case of the usual hoist-block F.

The supplemental duplex hoist-block G is of course provided with a depending hook *i* or equivalent device for engagement with the handle of the dump-bucket or other load-receptacle with which the hoisting and conveying machine may be provided.

In the manipulation or adjustment of the mechanism or contrivance from one to the other of its two different conditions the following *modus operandi* should be followed: Supposing the machine to be set or arranged for use in the usual condition, and as illustrated correctly by Fig. 1, to "double up" or multiply the power of the machine (with a proportionate loss of speed of course in the movement of the load to be lifted) the loop *l* of the rope C is crossed, as seen at Fig. 3, by giving the hoist-block F a half turn or revolution in a horizontal plane, then the thus crossed loop *l* is doubled on itself (at a fold-line about coincident with the point *m*, at which the strands of the loop cross each other) by lifting the block F up and giving it a half-turn sidewise, so as to bring it into about the position indicated in dotted lines of Fig. 3, with its load-hook *g* uppermost, as shown, and in this position (or after slightly lifting it while in this position) said hoist-block is brought into engagement with the trunnion-supporting hooks *e* of the trolley. Then the double loop of rope C, depending from the thus suspended block F, is pulled or distended downwardly into a condition (about such as seen at Fig. 4) to permit the convenient insertion within the lower portion of such double loop of the supplemental block G, which is now inserted in such manner, as shown at Fig. 4, as to have the two sheaves or rope-wheels 1 and 2 of said block run in peripheral engagement with the two strands of the said double loop, as clearly indicated in the drawings. When thus adjusted, with

this duplex supplemental block G in place, as shown at Fig. 4, the hoist-rope C will run, it will be seen, from the point of anchorage at D along to and partially over one of the other rope-wheels of the trolley, thence down to and partially around one of the two sheaves of the block G, thence up and over the single-sheave block F, thence down and partially around the other one of the two sheaves of block G, and thence up and partially around the other rope-wheel of the trolley, from which it passes onward toward the winding-drum of the hoist-engine.

By reference to the arrows at Fig. 4 the course of the hoist-rope just explained may be easily followed visually, and from an observation of what is there shown it will be understood that by the rearrangement of the strands of the rope C as there shown and the introduction of the duplex sheave-block G the purchase or lifting capacity of the hoist-rope will have been multiplied so as to become four to one, and that hence any load suspended from the load-hook *i* of the block G, while it will be lifted more slowly by the winding up on the hoist-drum of the rope C, will be lifted with less power.

In applying the supplemental block G (see now Fig. 2) the bolts *r s*, which tie together the lower side portions of the two plates I I of the block, and also the bolts *w w*, which secure in place the handles *p p*, (that are used to render the handling of the block more convenient,) have of course to be removed to get the strands of the double loop of the rope seated or placed properly round about the lower portions of the grooved peripheries of the rope-wheels of said block, and said bolts or pins are replaced after the block shall have been put in place in the rope-loops, as seen at Fig. 4.

Referring now to Fig. 5 only, the trolley is provided with two supplemental sheave-wheels marked, respectively, T and S, and the usual hoist-block F<sup>2</sup>, suspended in the loop of the rope C, is provided with three sheaves or rope-wheels 1 2 3, instead of having only one, as in the case of the hoist-block F seen at Fig. 1.

When the machine or apparatus is to be used to do the lighter work, (for which it is mainly designed and for which it is supposed to be employed most of the time,) the two supplemental wheels S and T of the trolley are left wholly in disuse, as are also the two outer rope-wheels 1 and 3 of the hoist-block F<sup>2</sup>, and the machine works in the usual manner with a single loop of the hoist-rope, in which is hung the hoist-block F<sup>2</sup>, with the middle rope-wheel 2 of its series of sheaves in engagement with said loop. When, however, it may be desired to increase the purchase of the hoist-rope six to one, the hoist-block F<sup>2</sup> is removed, the loop of the hoist-rope pulled down and doubled up on itself to form three loops, and these loops passed at their upper portions around the supplemental trolley-wheels S and



T, and at their lower portions around the other rope-wheels 1 and 3 of the triplex set of sheaves of the hoist-block F<sup>2</sup>, all in such manner, as plainly illustrated at Fig. 5, (observe the arrow-heads at said figure,) that the pulling power exerted on the hoist-rope by the engine will be multiplied in the proportion of three to one without any extra strain on the rope, the anchorage, or the engine.

10 In the modification of the apparatus as shown at Fig. 5 the same method or system of increasing the purchase of the hoist-rope is effectuated as in the case of the mechanical appliances shown in the other form of  
15 mechanism for only increasing the purchase four to one. Hence it will be understood that, though various means or mechanical devices may be employed in carrying out my novel method, the latter is not changed (except in  
20 the degree in which the purchase of the rope may be varied) by using more or less doubles of the loops on itself or employing such various appliances or supplemental devices on the machine, as may be necessary to the different  
25 multiplications of the power of the hoist-rope on the particular hoist-block that may be used.

I therefore wish it to be distinctly understood that my present invention is not restricted to any degree of multiplication of or reduction in the lifting power of the hoist-rope and is independent of any particular set of devices for carrying it into effect; and that

What I claim, broadly, and desire to secure by Letters Patent, is—

The hereinbefore-described method or system of varying the purchase or lifting capacity of the hoist-rope of that type of machine referred to, which method consists in changing the number of loops of the hoist-rope at the vicinity of the hoist-block by doubling on  
40 itself the loop from which the load is suspended and multiplying the strands thereof to work on supplemental devices with which the machine is supplied without unreeving the hoist-rope, substantially as hereinbefore  
45 set forth.

In witness whereof I have hereunto set my hand this 18th day of June, 1891.

ALEX. E. BROWN.

In presence of—

H. N. CHAMBERLAIN,  
M. MILLARD.