

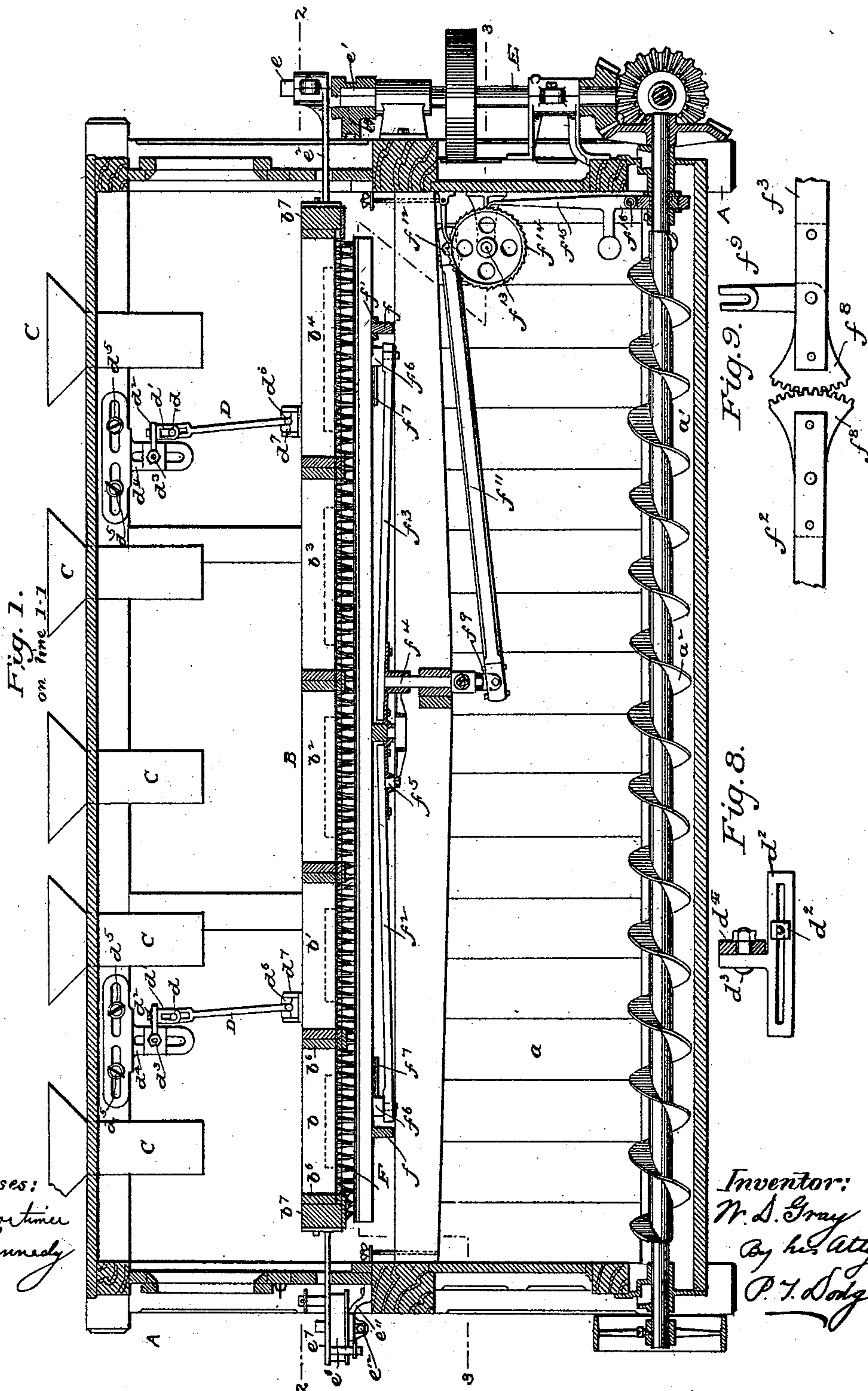
(No Model.)

5 Sheets—Sheet 1.

W. D. GRAY.
SCALPING MACHINE.

No. 497,655.

Patented May 16, 1893.



Witnesses:
W. M. Mortimer
H. A. Kennedy

Inventor:
W. D. Gray
By his Atty
P. T. Dodge

(No Model.)

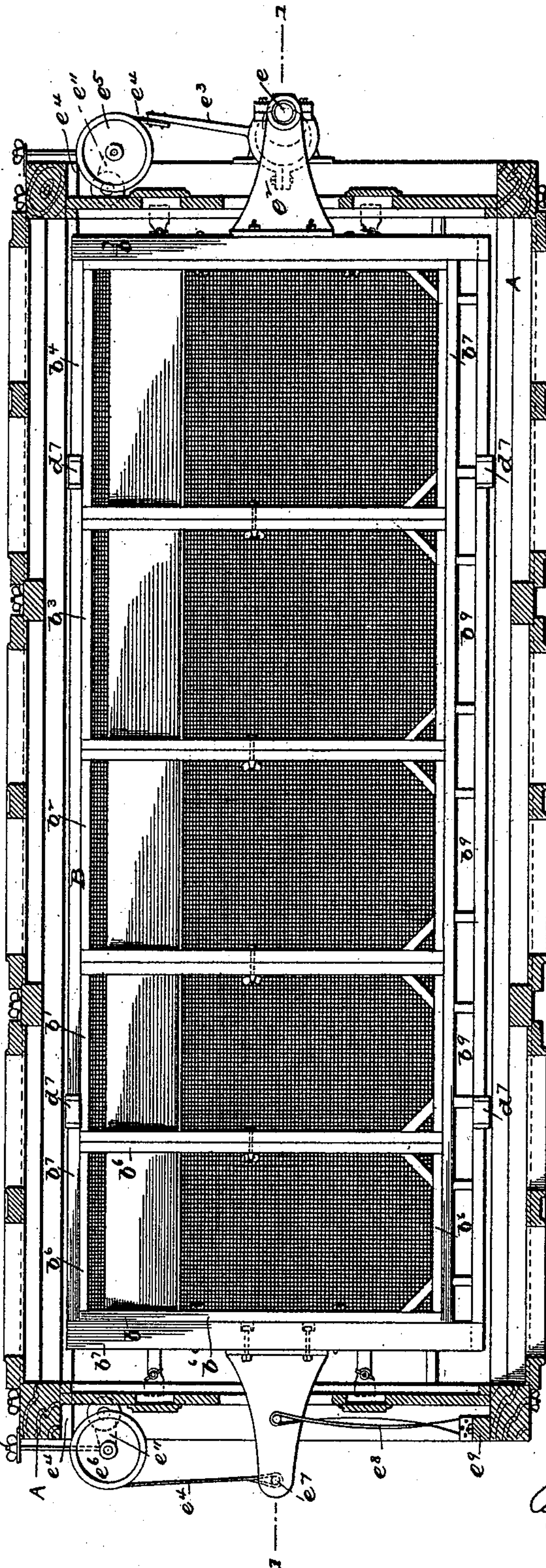
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Fig. 2.
on line 2-2



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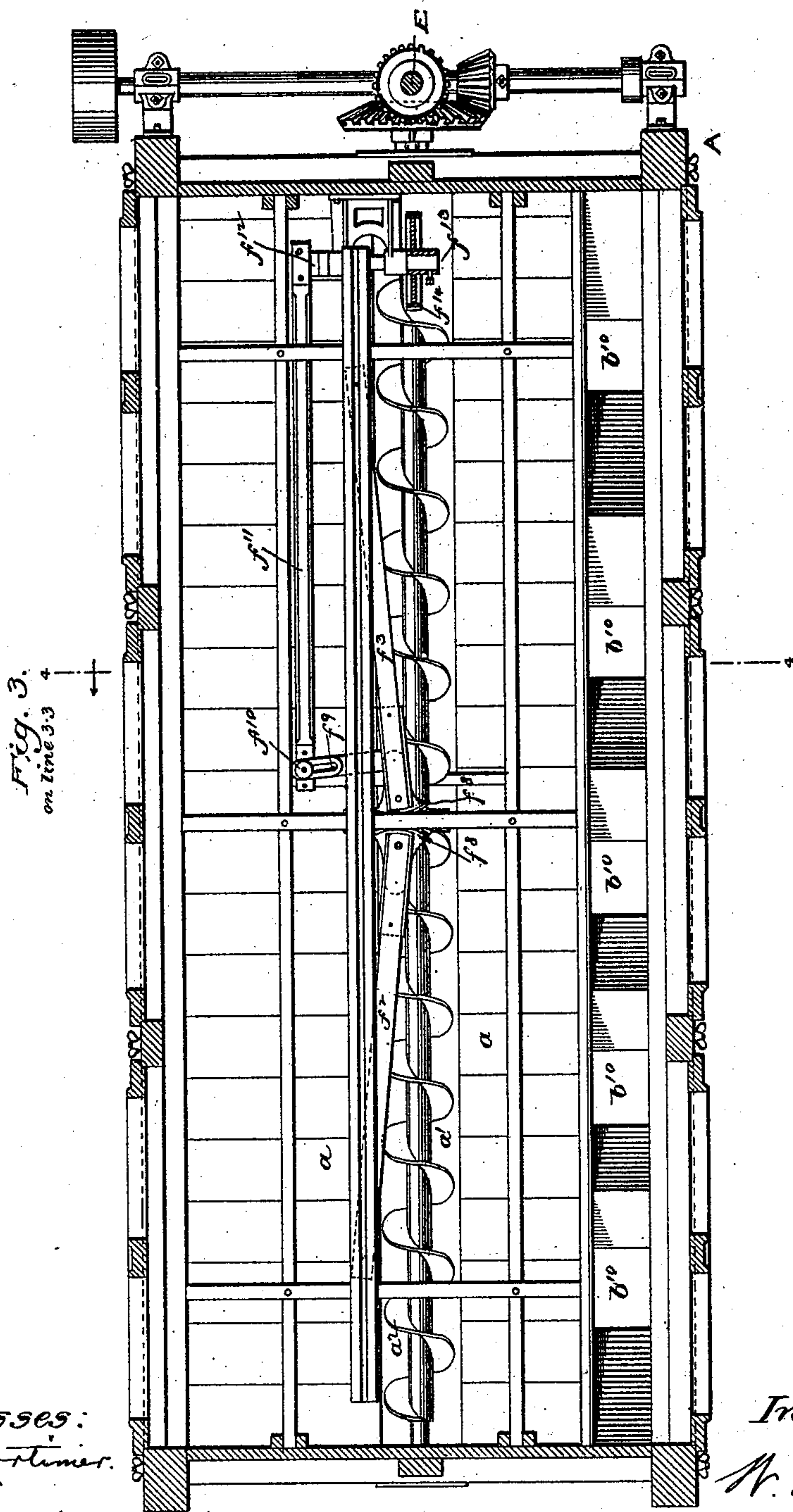
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Fig. 5.

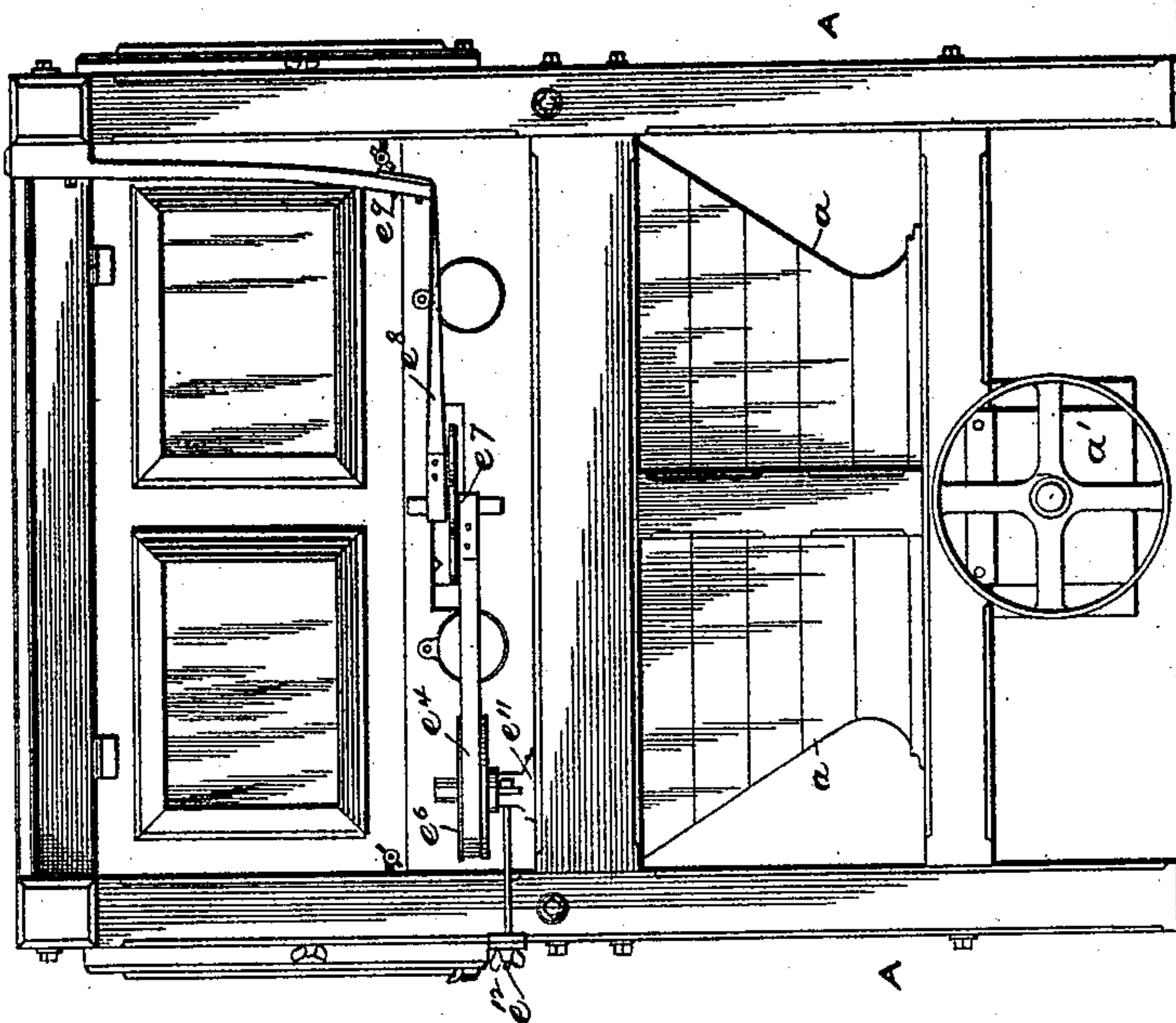
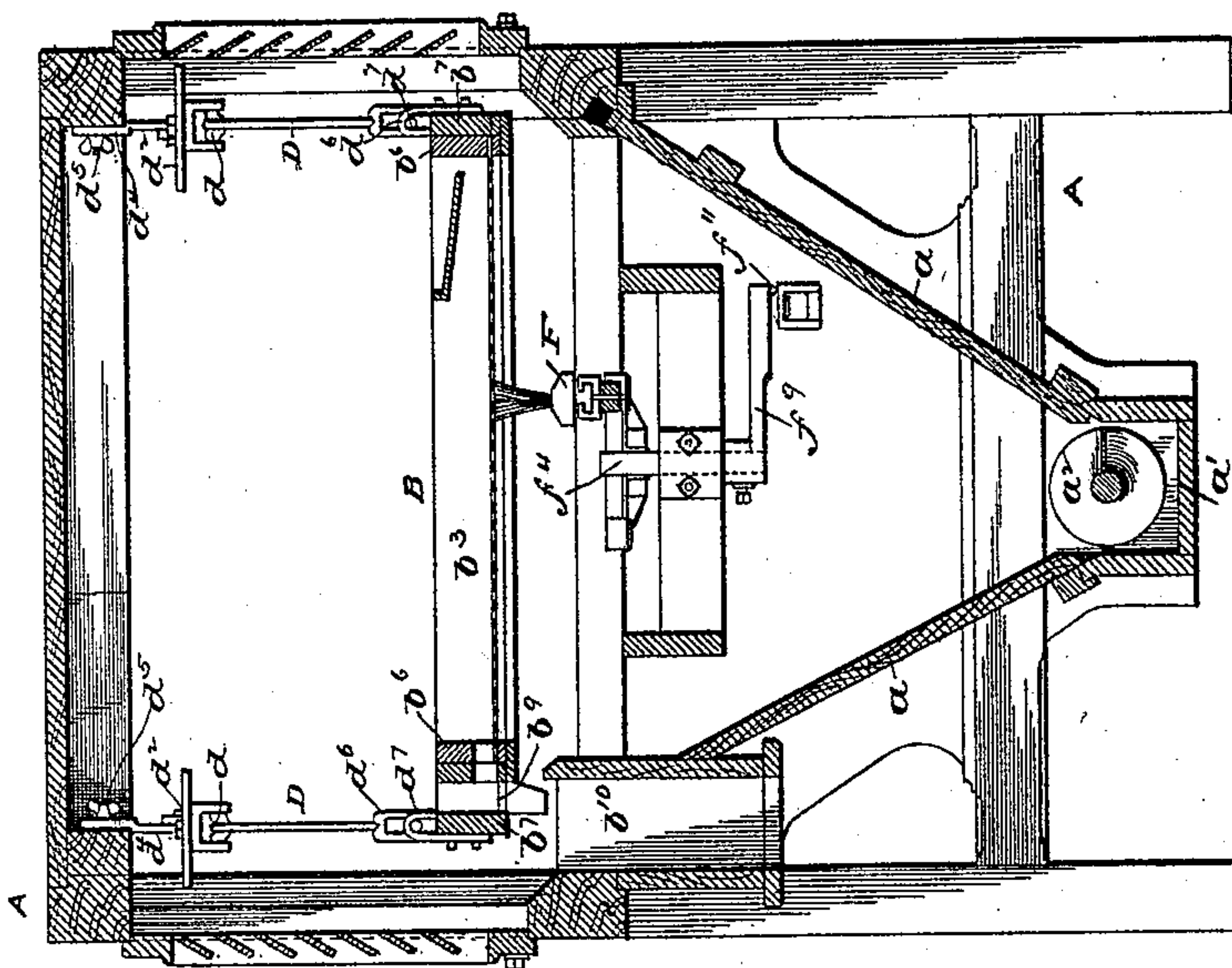


Fig. 4.
on line 4-4.



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Fig. 6.

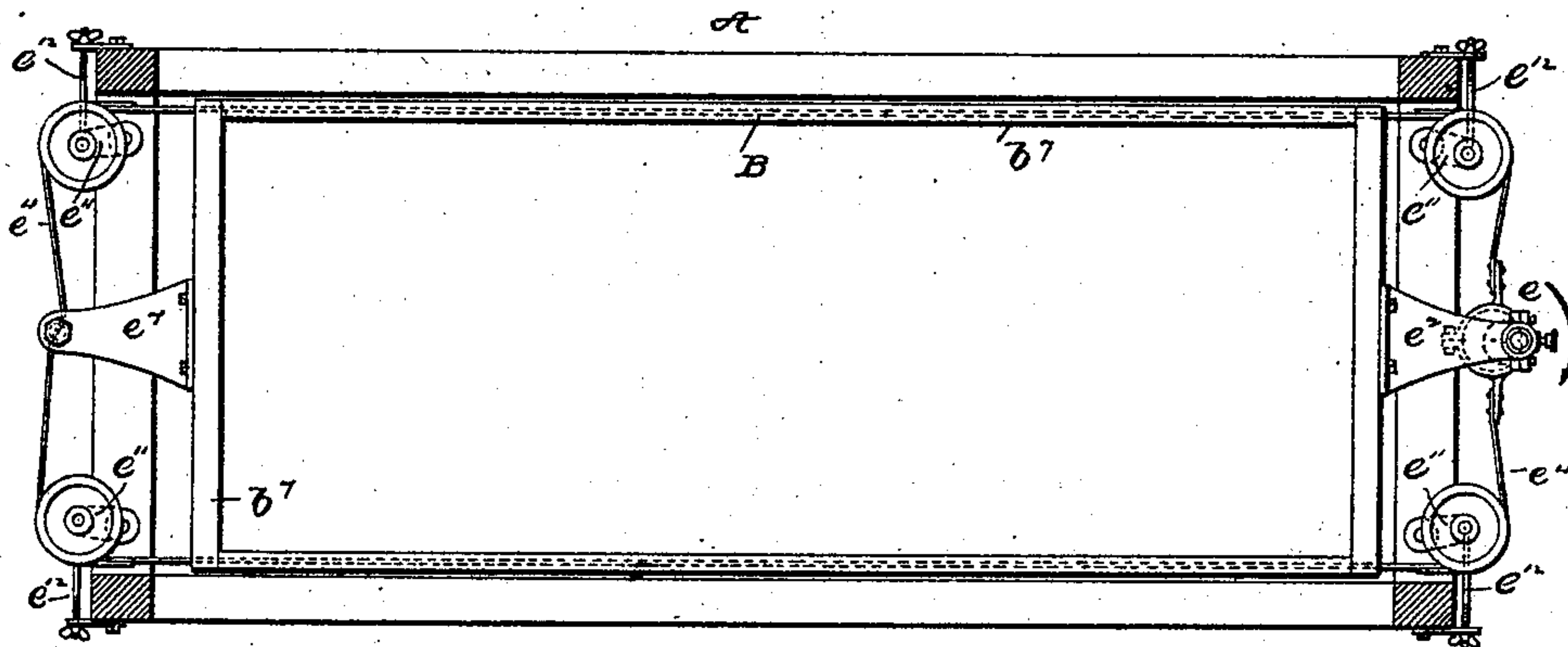
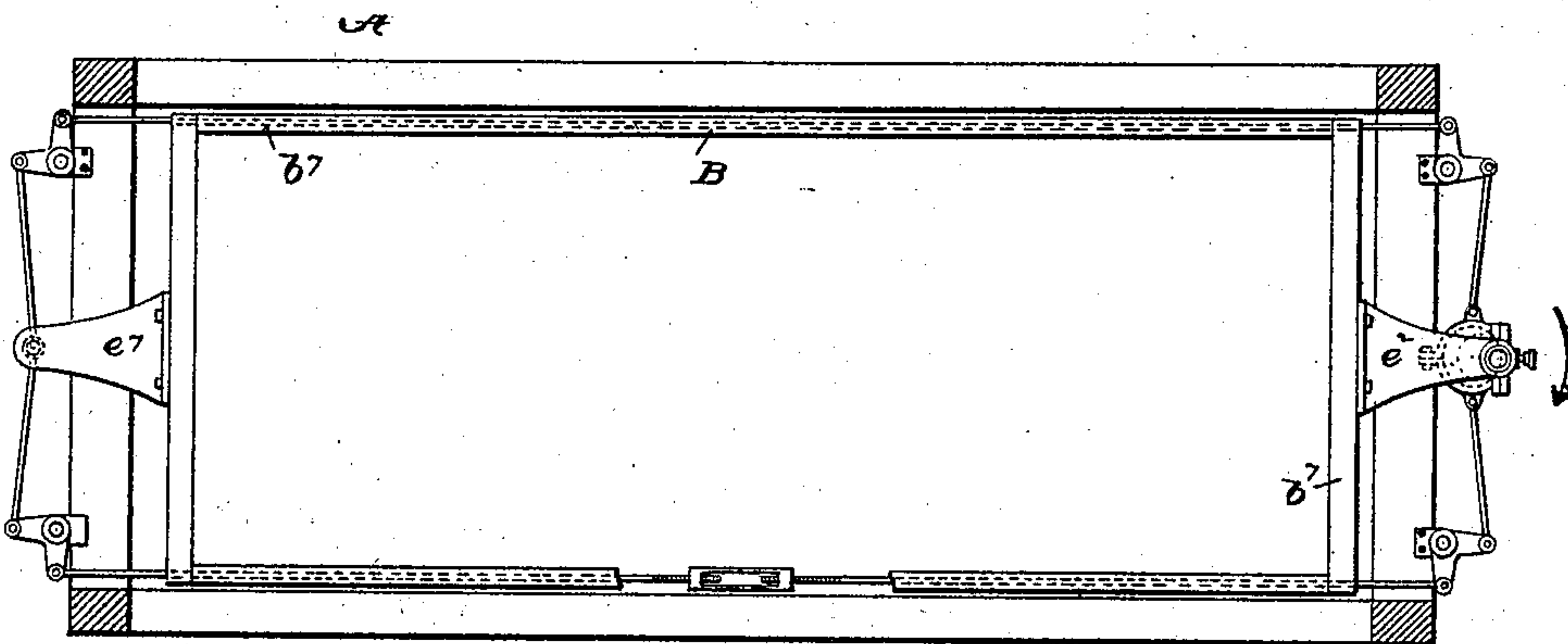


Fig. 7.



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UNITED STATES PATENT OFFICE

WILLIAM D. GRAY, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO THE EDWARD P. ALLIS COMPANY, OF SAME PLACE.

SCALPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 497,655, dated May 16, 1893.

Application filed March 26, 1890. Serial No. 345,372. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM D. GRAY, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain

5 Improvements in Scalping-Machines, of which the following is a specification.

My invention relates to that class of machines in which horizontal screens having a circulatory motion are employed.

10 It consists in various details of the pendulous suspension devices; in improved means for giving motion to the screen; and in the combination with the screen of a brush thereunder, and mechanism for slowly changing

15 the position of the brush so that it may act on all the parts of the screening surface.

Referring to the drawings,—Figure 1 is a longitudinal vertical section of the machine on line 1—1, Fig. 2. Fig. 2 is a horizontal section on line 2—2, Fig. 1. Fig. 3 is a horizontal section on line 3—3, the screen being removed. Fig. 4 is a vertical cross-section on the line 4—4 of the preceding figures. Fig. 5 is an end elevation of the machine. Figs. 6 and 7

25 are plan views of modifications. Fig. 8 is a detail showing one of the slotted plates hereinafter referred to. Fig. 9 is a plan view of the inner ends of the levers for moving the brush.

30 In the accompanying drawings,—A represents the frame or body of the machine, of oblong rectangular form having at the base the inclined gathering boards *a*, and the intermediate conveyer trough *a'*, containing the conveyer *a''*, by which the material passing

35 through the screen is delivered at one end of the machine.

Under the modern system of milling the reduction of grain is effected by successive operations, the material being screened or bolted after each operation, and the tailings re-ground. It is to be understood that this machine is designed for the treatment, simultaneously, of different grades or qualities of material, or material under different stages of reduction, as, for instance, the productions of several different mills producing different or successive grades. Hence, I provide a main screen with as many different screen sections

50 of various degrees of fineness as there are different grades of material to be treated. Each

section is supplied from an independent feed hopper C, the several grades of material being supplied to the respective hoppers by suitable conveyers (not shown) from the several mills, 55 or other sources of supply.

Different grades of material being treated simultaneously it is necessary to keep the tailings of each grade separate in order that they may be returned to the proper mills for 60 further reduction, and therefore each screen section is provided with a separate outlet discharging into a separate receptacle or conveyer *b*¹⁰, from which the tailings are conveyed back to be re-ground. In this way I am en- 65 abled to use a single scalper in connection with several mills, whereby economy in the cost of machinery, as well as of space, is effected.

B represents the horizontal shaking screen 70 of rectangular form and of suitable size to permit of its receiving a limited circulatory motion within the body. The screen is divided transversely into a number of sections *b* *b'* *b''*, &c., which are separated by interven- 75 ing partitions so that each operates independently of the others so far as its screening action is concerned. These sections are intended to treat material of different qualities or different degrees of fineness received from 80 separate mills or reducing apparatus.

The sectional screen may be built up in any suitable manner, but I prefer, as shown in the drawings, to construct each section complete in itself with a marginal frame, *b*⁶. These 85 sections are inserted side by side within an encircling frame, *b*⁷, which may be considered the main-frame of the screen, and they are connected to each other and to this frame *b*⁷, in order to admit of their removal or re- 90 arrangement at will.

The material will be delivered to the several sections of the screen independently through spouts C, as indicated in the drawings, or in any other appropriate manner. A discharge 95 opening, *b*⁹, leads from each of the sections through the side of the screen frame, the material to be treated traveling transversely of the machine and being delivered from the several sections independently into side 100 spouts *b*¹⁰.

The provision in the screen of a series of non-

communicating transverse sections delivering at the side is one of the essential features of my invention, and it is manifest that the details of construction may be variously modified without departing from the limits of the invention in this respect.

The screen is preferably supported, as shown in the drawings, by pendulous arms D, so connected as to allow the screen to move horizontally in all directions.

In order to admit of the screen being raised or lowered at will, and of the pendulous supports being changed in position so as to secure a smooth and easy action of the parts I adopt the peculiar construction shown in the drawings. Each link D has its upper end slotted transversely and mounted to swing laterally of the machine on a fulcrum plate, d , which is in turn sustained by journals at its ends in a U-shaped plate, d' , so that it may swing in the direction of the length of the machine. The plate d' is adjustably connected by a vertical bolt to a plate, d^2 , slotted transversely of the machine. The plate d^2 is in turn connected by a bolt, d^3 , to a vertically-slotted bracket plate, d^4 , which is seated at its upper end against the top of the main-frame and secured by bolts d^5 , passing through horizontal slots therein.

The foregoing parts permit the upper end of the pendulous link to be adjusted in all directions. The lower end of the link is slotted lengthwise of the machine to receive a fulcrum plate, d^6 , which has trunnions mounted lengthwise of the machine in a U-shaped plate, d^7 , bolted to the sides of the screen frame.

By the connections above described the screen is permitted to swing easily in a horizontal course.

For the purpose of imparting the circulatory motion to the screen I mount in bearings in the main-frame a vertical shaft, E, having on the upper end two oppositely-projecting cranks ee' . The crank e is fixed closely within an arm, e^2 , which is bolted rigidly to the end of the screen-frame. The crank e' , is encircled by a strap, e^3 , from which a flexible belt, e^4 , preferably of steel, passes around a guide pulley, e^5 , at the corner of the main-frame, and thence around a second guide pulley, e^6 , at the opposite end of the frame, being finally attached to an arm, e^7 , rigidly bolted to the screen. From this arm e^7 , a strap or other connection, e^8 , is extended to the free end of a strong spring-arm, e^9 , bolted to the main-frame, and resisting the strain of the strap so as to keep the same under tension. The crank e imparts a positive motion in a circular direction to one end of the screen-frame while the second crank e' , through the strap, imparts a lateral motion to the opposite end. The strap pulls the screen laterally in one direction and when it slackens the spring moves it in the opposite direction but as the screen receives at the same time, a longitudinal motion from the crank e at the opposite end it follows that the two ends are moved in sub-

stantially the same manner, or, in other words, that the screen is moved bodily in a circular path. The spring acting in opposition to the strap gives a smooth easy action and avoids the shock and concussion which would result from driving both ends of the screen in a positive manner at high speed.

In order that the motion of the screen and the tension of the strap may be modified, I commonly mount the guide pulleys e^5 and e^6 , on arms e^{11} , pivoted to the main-frame and connected at their free ends with adjusting screws e^{12} , so that their positions may be changed.

Instead of making use of the spring as above described I may employ, as shown in Fig. 6, two belts extending from the crank e , around guide pulleys at opposite sides of the frame to the opposite end of the screen and by this arrangement the screen is moved positively at both ends. Or, instead of the belts the connections may be made from the crank e' , by means of elbow levers and rods as shown in Fig. 7.

For the purpose of removing the adhering material from the screening surface and keeping the meshes clear I employ beneath the screen a brush which remains practically at rest so that the screen will travel thereover but which is advanced step by step from one side of the machine to the other in order that it may act upon every portion of the screening surface. Owing to the motion of the screen it will be seen that the brush sweeps its surface in circular paths, the effect being practically the same as that of carrying a brush with a circular motion over the surface of a stationary screen. The progressive lateral motion of the brush modifies its course over the screening surface, that is to say, the path of action over the screening surface is gradually varied so that the brush sweeps in different directions over every portion of the surface, the paths described being similar to those produced by the rose engine or by "engine-turning" so called.

F represents the brush bar extending lengthwise beneath the screen and provided with bristles or like material to act on the screening surface. It is sustained upon cross-bars ff , being provided with cleats or shoulders f' , engaging one of these bars to prevent end motion. The brush is guided and moved from side to side of the screen by the duplicate underlying levers f^2 and f^3 , mounted on fixed vertical pivots f^4 f^5 , the outer ends of these levers being connected by vertical pivots to blocks f^6 , which slide in grooved guide plates f^7 , on the ends of the brush bars. The toothed ends of the levers are provided with sector-pinions f^8 , which engage each other whereby the levers are compelled to move in unison so that their outer ends move in the same direction and to the same extent, thereby carrying the brush to and fro from one side of the screen to the other. The movement of the levers is secured by a slotted arm, f^9 , attached

to one of them and connected by an adjustable pivot, f^{10} , to a pitman f^{11} , carried by a crank, f^{12} . This crank is mounted on the horizontal shaft f^{13} , seated in the fixed bearings
 5 in the inside of the machine, and provided with a ratchet wheel, f^{14} , through which it receives motion from a weighted pawl, f^{15} , mounted in turn on an eccentric, f^{16} , on the conveyer shaft. This pawl and ratchet mechanism imparts to the shaft f^{13} an intermittent
 10 rotary motion and to the levers $f^2 f^3$ a step by step vibratory movement, whereby the brush-bar is also moved back and forth from side to side of the screen with an intermittent
 15 or step by step movement, the result being the efficient cleansing of the bolting-cloth or screen with the minimum amount of wear thereon.

It is obvious that the pawl and ratchet
 20 mechanism may be replaced by other appropriate mechanism adapted to slowly operate the arms which carry the brush.

I believe myself to be the first to combine
 25 with a screen having a circulatory movement, an underlying brush the position of which is gradually changed, and I therefore, claim this combination without reference to the minor details of the mechanism for moving the brush.

Having thus described my invention, what
 30 I claim is—

1. The combination with the horizontal screen and with the means for imparting horizontal circulatory motion thereto, of a brush below, and in contact with the screen, and
 35 mechanism for imparting a step by step movement to said brush across the screen, substantially as and for the purpose described.

2. The combination with the horizontal screen, and with the mechanism for imparting

motion thereto, of a brush below and in contact with the screen, levers for moving said
 40 brush across the screen from side to side, and a pawl and ratchet mechanism for imparting a step by step movement to said levers, substantially as shown and described. 45

3. In combination with the brush bar, its two adjusting levers, the crank and pitman mechanism for moving said levers, and a pawl and ratchet mechanism to operate the cranks,
 50 connected with a moving part of the machine. 55

4. In combination with the brush bar, the connected levers for moving the same, the pitman and cranks for moving said levers, the ratchet wheel, the pawl to operate the latter and the eccentric mounted on the rotary shaft
 55 to actuate the pawl.

5. In combination with the horizontal screen, the crank rigidly connected to one end thereof, the second crank and the flexible strap extending around suitable guides to the
 60 opposite end of the screen, and the spring acting in opposition to said strap, whereby an easy circulatory motion is imparted to the screen.

6. In combination with the horizontal
 65 screen, a shaft provided with two cranks one of which is connected with one end of the screen and flexible connections substantially as shown extending from the second crank to the opposite end of the screen. 70

In testimony whereof I hereunto set my hand, this 6th day of March, 1890, in the presence of two attesting witnesses.

WILLIAM D. GRAY.

Witnesses:

WM. BANNEN,

EDW. F. BYRON.