

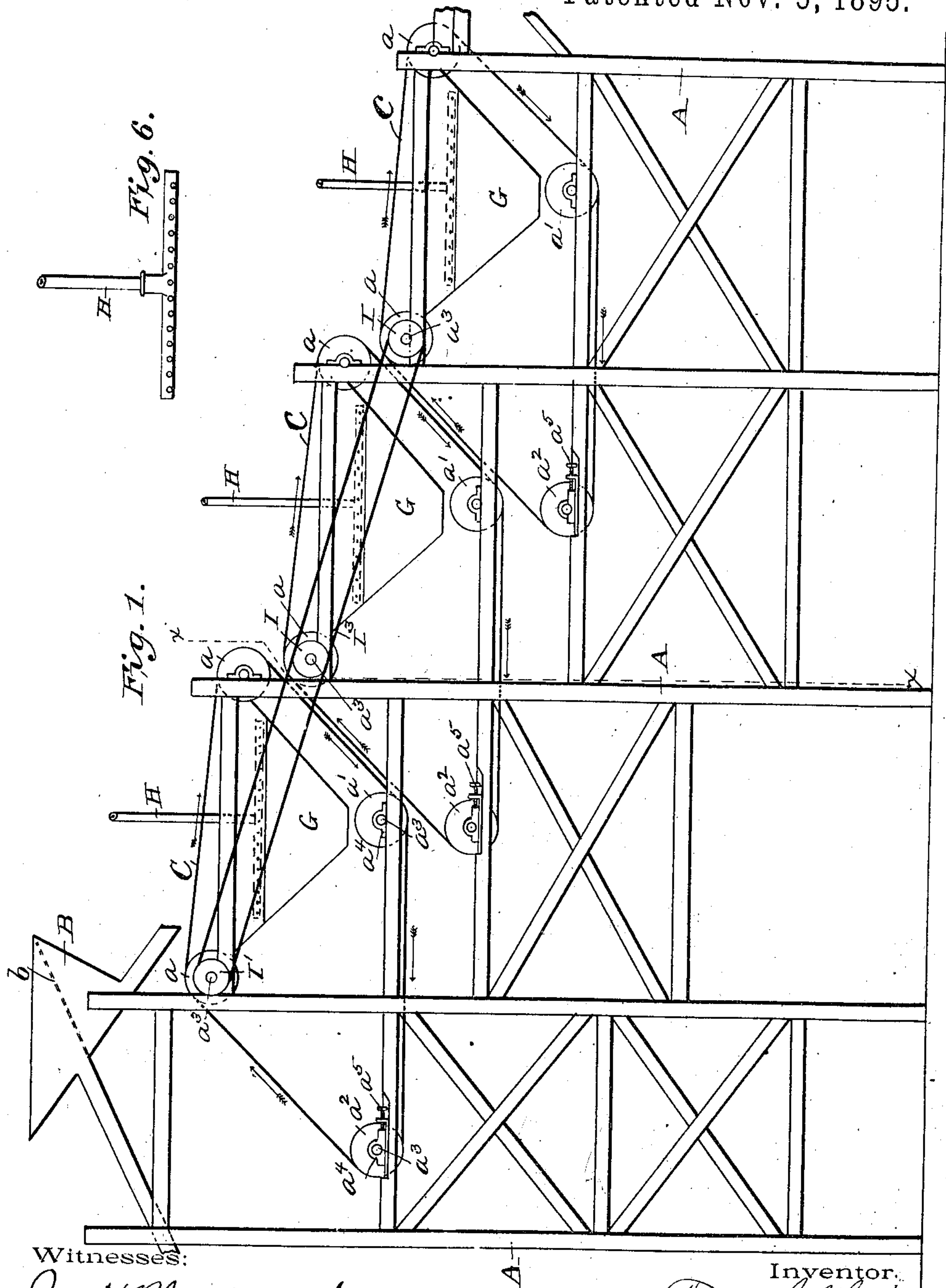
(No Model.)

2 Sheets—Sheet 1.

F. J. HOYT.
GRAVEL OR ORE SCREEN.

No. 549,270.

Patented Nov. 5, 1895.



Witnesses:

Joel H. Blackwood
Albert B. Blackwood

Inventor.

Fred J. Hoyt
by Wm. H. Doolittle

Attorney.

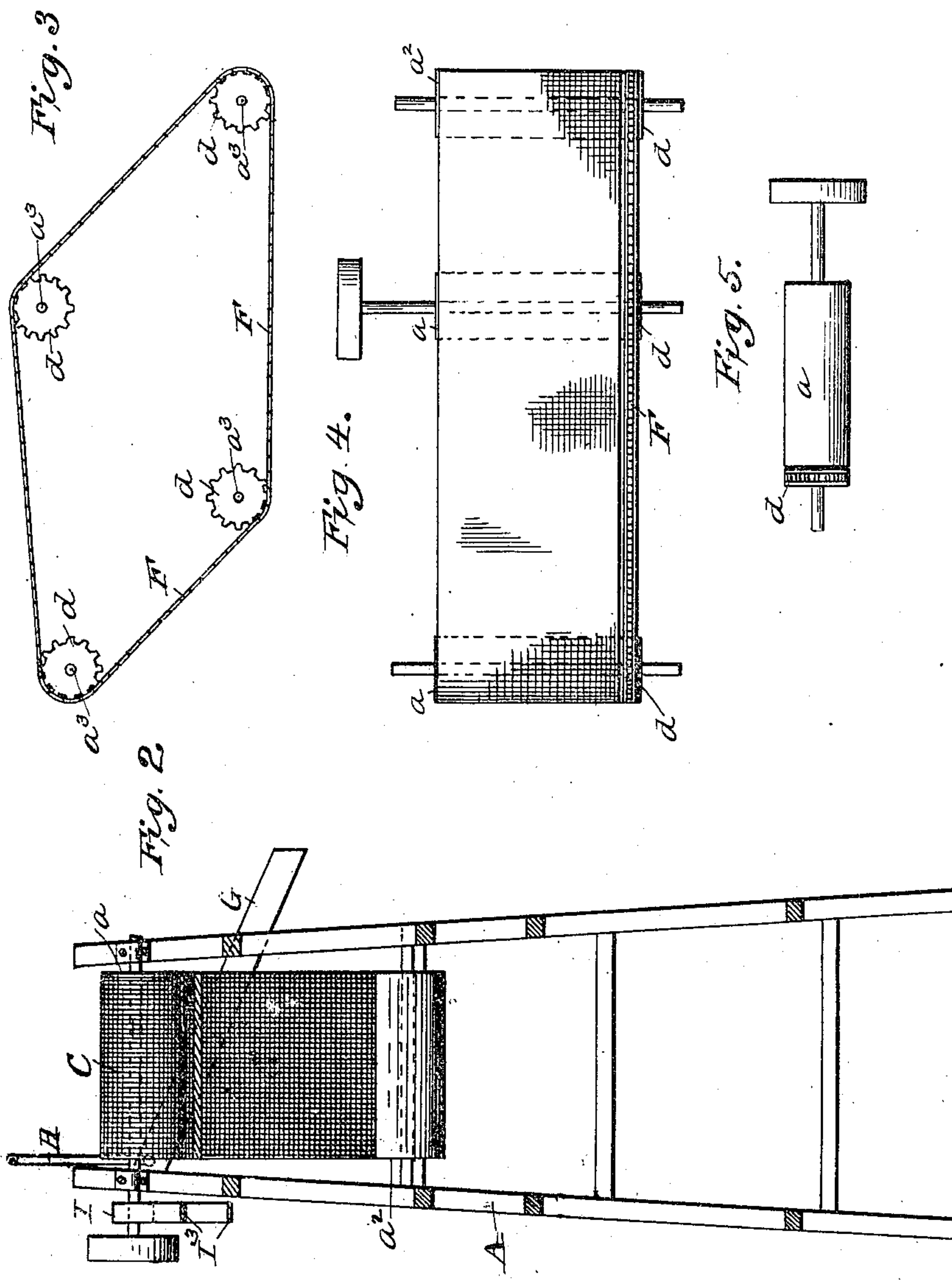
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UNITED STATES PATENT OFFICE.

FREDERICK J. HOYT, OF CHICAGO, ILLINOIS.

GRAVEL OR ORE SCREEN.

SPECIFICATION forming part of Letters Patent No. 549,270, dated November 5, 1895.

Application filed January 22, 1895. Serial No. 535,843. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK J. HOYT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Gravel or Ore Screens; and I do hereby declare the following to be a full, clear, and exact description of the invention—such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to gravel and ore screens; and its objects are to furnish a screen with increased capacity for screening large quantities of gravel, coal, ore, &c., and for washing the same, if desired, and with great rapidity, beyond the capacity of screens commonly employed for these purposes, to lessen the expense in the construction of such devices, and to obviate the serious trouble of clogging which is now encountered with many forms of screens.

In the screening and washing of mixed sand and gravel, for instance, it is found desirable to make four separations of the same, viz: into sand, torpedo-gravel, roofing-gravel, and paving-gravel. By my invention I am enabled to take this material from the pit in large quantities, make this separation of the material, and wash and clear the same from all dirt by one handling.

To this end my invention consists of a screen and a series of screens and connections constructed and operated substantially in the manner hereinafter described.

The apparatus I have devised is illustrated in its preferable form in the accompanying drawings, in which—

Figure 1 is a side view in elevation of a series of the screens I have invented, with their connections, arranged on a suitable framework; Fig. 2, a transverse view in elevation on line *x x* of Fig. 1; Fig. 3, a view in elevation showing the opposite side and reverse position from that shown in Fig. 1 of the cog-wheels and sprocket-chain carrying the belt; Fig. 4, a top plan of Fig. 3; Fig. 5, a detail of roller and sprocket-wheel; and Fig. 6 a detail showing water-pipe.

Referring to the drawings, A is a framework of timbers, which is built up near the gravel-pit (when it is desired to work the apparatus on gravel) and of sufficient height and length to permit a series of my screens and their

separate discharge-troughs to be set at an incline, so as to better facilitate the discharge of the material screened by gravity; and also to enable it to be carried at such points and distances from the pit as will be most convenient for separating the material into its different grades and loading it into carts or cars.

At the front and top of the machine is placed a hopper B, or what is known as a "grizzly," it having a coarse grate form of screen *b*, on which is thrown the material from the pit and from off which are thrown the boulders and large stones. The sand and gravel are then led from the hopper-chute onto the first screen, which is a sand-screen C, a proper and convenient mesh for which would be one-sixteenth of an inch. As this is the same form of screen, except as to mesh, as the remaining ones of the series, it will now be described. It is shown best in Fig. 3 and is composed of an endless belt of wire. Wire is preferred, although my invention in principle covers a screen of any material that will answer the purpose. This belt is mounted on two sets of rollers, cylinders preferred, an upper set *a a* and a lower set *a' a'*. The lower set of rollers is placed at an inner angle, say, of about ten degrees from the upper set, so that the upper rollers are set in advance of the lower set, to afford room for placing the next lower screen near to the first screen and to facilitate the falling by gravity of the material from off the upper screen onto the lower one or onto any other receptacle. This arrangement of the rollers permits and requires the application of a longer and heavier belt than could be used with sets of rollers placed in a direct vertical line, and the avoidance of sharp corners over which the screen is turned is had, by which the strain and wear of such a heavy screen are much reduced; but the principal advantage consists in this, that in the use of this longer and heavier screen, in connection with adjusting device on one set of rollers, should a break or rupture take place in the body of the screen, a removal of the screen for repair is unnecessary, but all that is required to be done is to loosen the belt by the adjusting device and repair the break by the application of a new strip. If the belt is to be shortened thereby, sufficient leeway is afforded for the purpose, and readjustment is effected by moving the lower back roller.

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This is a great advantage over those arrangements in which no such leeway is given. All these advantages are multiplied, of course, in the arrangement of the screens in series, as each set can be repaired, tightened, and adjusted independently of and without disturbing the others.

10 The screen is in width the length of the rollers. The length of the screen and its width may be of such dimensions as will best suit the character and amount of the work to be performed and the location of the plant.

15 The material of which the screen is composed is also made more or less flexible or light or heavy, according to the character of the material to be screened. The belt is passed over each roller, but not entirely around it. The object of the rollers is not only to support and carry the belt, but to obtain another and most important result, which is accomplished mostly by the upper outer roller, of keeping the belt screen clean and clear, which the roller does by its upward pressure against the under surface of the screen as the latter passes over it. The lower set of rollers act chiefly as guides for the screen. These rollers are each provided with a shaft a^3 , which has its bearings in boxes a^4 , attached to the framework. The shaft of the back lower roller a^2 is set in a movable box, which can be thrown back or forward by a screw a^5 to tighten or loosen the belt. On the opposite end of each shaft is placed a sprocket-wheel d of the same diameter as that of the cylinders. A sprocket-chain F is placed over and connects the wheels on each side. For greater certainty and safety in some cases and to keep the belt taut the wire screen is sometimes attached along its sides to the sprocket-chain; but in many instances the chain and the sprocket-wheels may be dispensed with, as the screen can be set to move true on the cylinders without them.

45 The top surface of the screen is inclined at an angle, say, of about ten degrees to facilitate the easy and quick travel and discharge of the material.

50 G is a trough secured to one side of the frame and extending down at an incline between the upper and lower sections thereof and terminating in a spout, from which the material screened is discharged into a cart or car or upon the ground. The trough is provided with side pieces and is inclined to such a degree as will permit the screened material to fall readily from it. To the upper end or butt of this trough is placed a water-pipe H , composed of a vertical and a horizontal arm, the latter being perforated. This pipe is connected with a pump or tank, by which such a supply of water is obtained as will dissolve and carry off the loam, clay, and dirt during the passage of the material screened to its receptacle.

65 As shown in Fig. 1, a series of these screens is arranged to form an entire and complete

apparatus when it is desired to separate the gravel or other material to be screened. In the case of screening gravel, for instance, the first screen, as already stated, is composed of a mesh of one-sixteenth of an inch for the first grade of sand and gravel, the second grade a one-eighth-inch mesh, and the third a three-eighth-inch mesh. In such an arrangement a pulley I is placed on the shaft of one of the cylinders of the lower screen part of the machine and another pulley I' on a shaft of one of the cylinders of the upper machine, and a belt I^3 is placed over these pulleys to connect the three machines. The shaft on which either of these pulleys is placed may be connected by belting with a main shaft driven by an engine.

It will be seen that each screen and its supports constitute a separate screening apparatus, and that when used together the first is set higher than the one following, and so on in regular order, and all are set to give the screens an incline from one end to the other of the apparatus.

It is unnecessary to describe the length of belts, the angles of the different inclines, and the dimensions of the various parts, as these may all be varied as experience and mechanical judgment may require.

What I claim is—

1. An endless screen belt in combination with two sets of rollers, an upper and a lower set, on which said belt is mounted and over which it travels, the said upper rollers set in advance of the lower rollers, each of said rollers provided with shafts, boxes in which said shafts are mounted, one of said boxes on the lower set of rollers movable on the framework, and an adjusting device connected with said movable box, whereby said box is set forward or back to tighten or loosen said belt, substantially as described.

2. In combination with a suitable supporting frame, a series of independent screens, each screen composed of an endless belt of wire work, each screen belt set at an incline, and below and in advance of a preceding screen, and each of said screens successively differing from the other in mesh from a finer to a coarser grade, a discharge trough extending transversely through each screen, upper and lower sets of rollers on which said screens are mounted and carried, the upper set of said rollers set in advance of the lower set, an adjusting device connected with the lower set for adjusting the rollers forward or back, a pulley and band mechanism connecting said screens, and a suitable motor for driving the same, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRED. J. HOYT.

Witnesses:

WILLIAM H. HOYT,
SARAH M. HOYT.