No. 685,844. Patented Nov. 5, 1901.

H. O. JOHNSON.

GRAVEL AND SAND SEPARATOR.

(Application filed Apr. 25, 1901.)

(No Model.)

2 Sheets—Sheet 1.

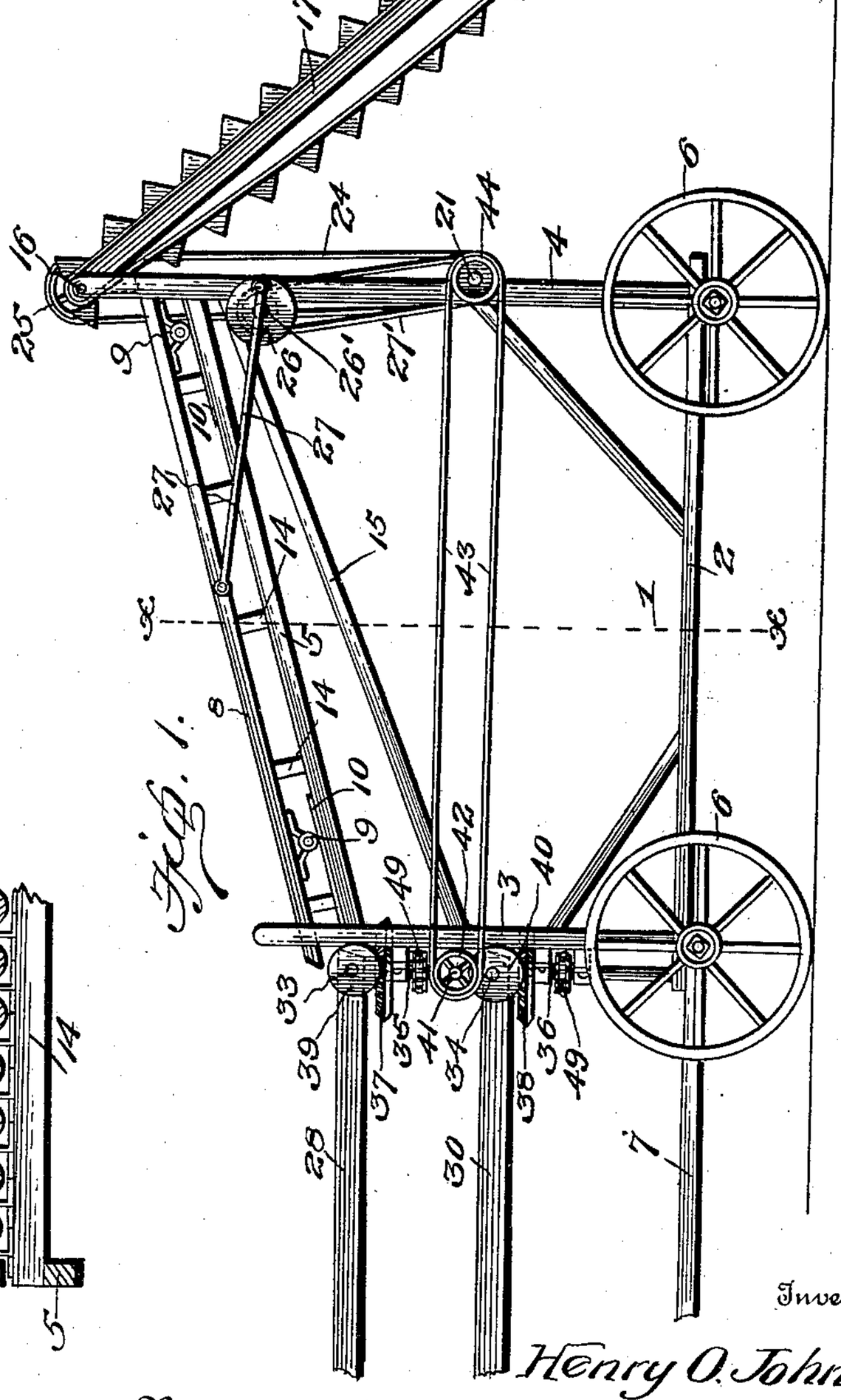

Fig. 1.

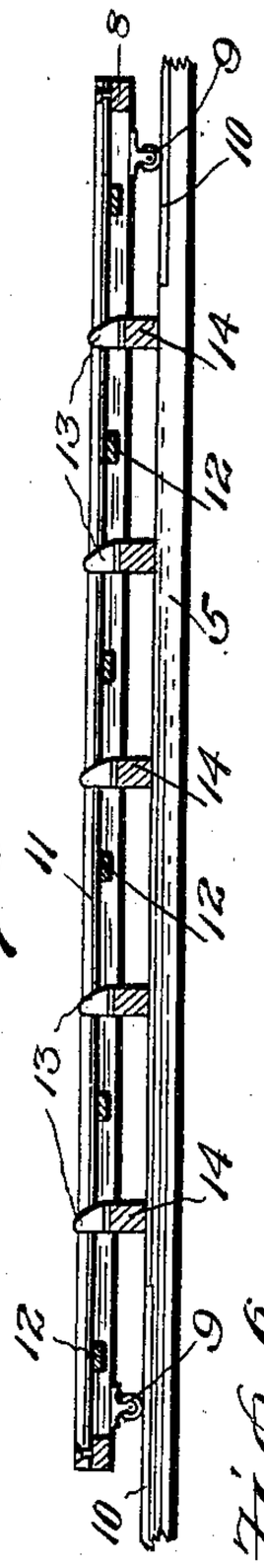

Fig. 5.

Fig. 6.

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Fig. 2.

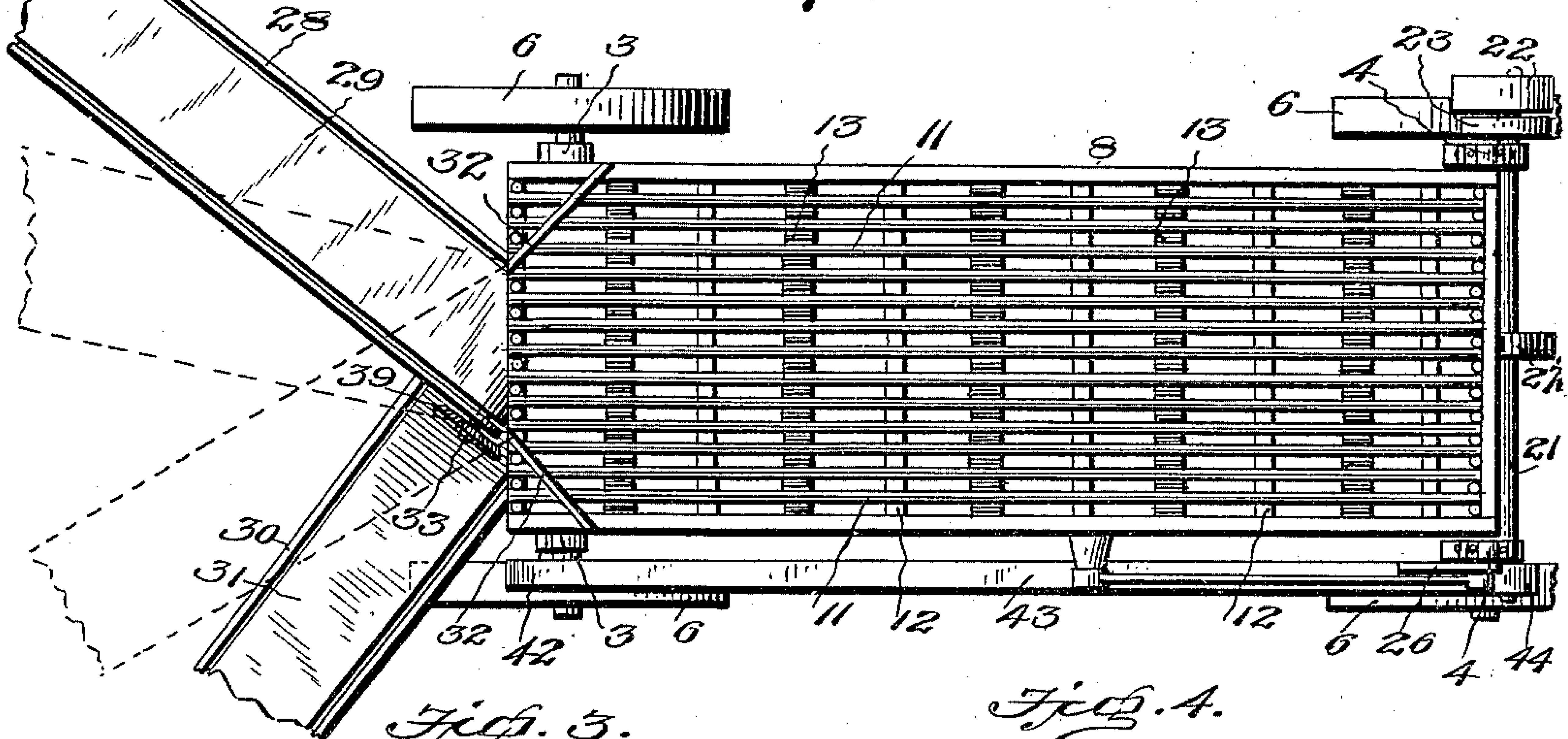


Fig. 3.

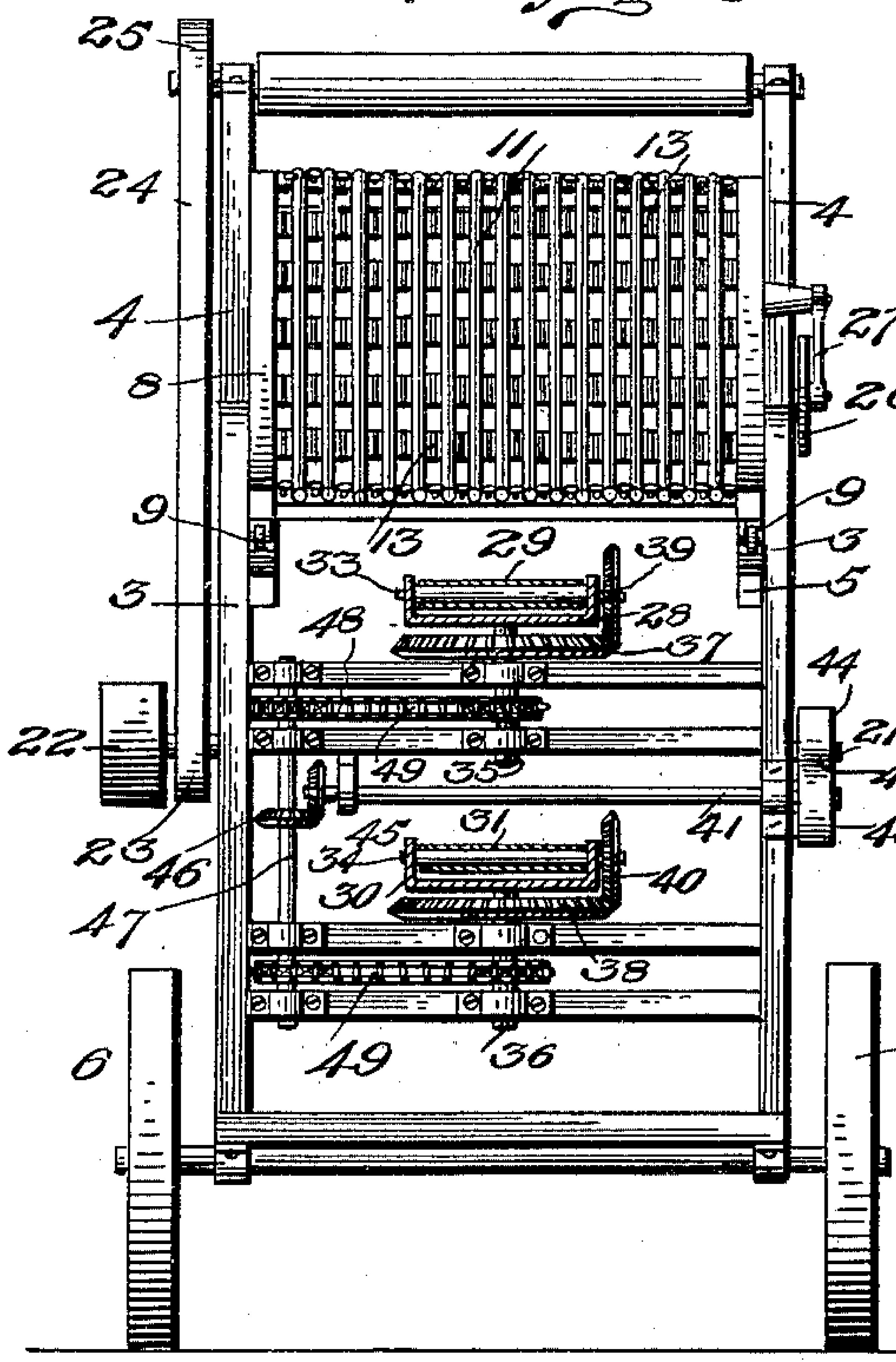
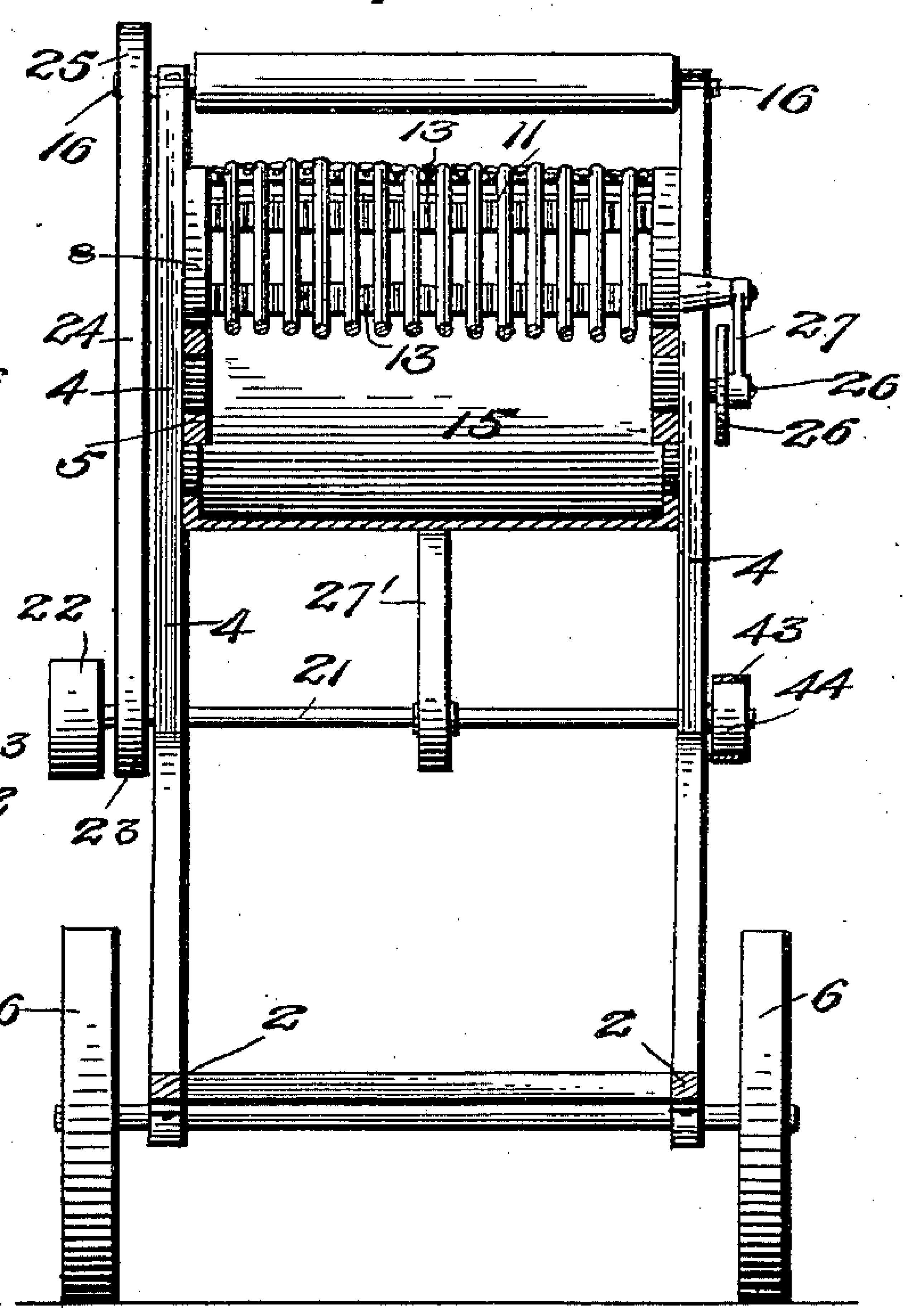


Fig. 4.



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UNITED STATES PATENT OFFICE.

HENRY O. JOHNSON, OF BUDA, ILLINOIS.

GRAVEL AND SAND SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 685,844, dated November 5, 1901.

Application filed April 25, 1901. Serial No. 57,355. (No model.)

To all whom it may concern:

Be it known that I, HENRY O. JOHNSON, a citizen of the United States, residing at Buda, in the county of Bureau and State of Illinois, have invented certain new and useful Improvements in Gravel and Sand Separators; and I do 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.

This invention relates to an apparatus for separating gravel from sand and refuse, and has for its object to provide power mechanism whereby the separating operation may be speedily and economically performed.

A further object of the invention is to provide a separator of this character mounted upon a wheeled supporting-frame, so as to be transported from place to place for use.

With these and other objects in view, which will appear as the nature of the invention is better understood, the invention consists in certain novel features of construction, combination, and arrangement of parts, as will be hereinafter more fully described, and particularly pointed out in the appended claim.

In the accompanying drawings, Figure 1 is a side elevation of a gravel and sand separating apparatus constructed in accordance with my invention. Fig. 2 is a top plan view of the same. Fig. 3 is a front elevation showing the gravel and sand conveyers in transverse section. Fig. 4 is a vertical transverse section on the line *x x* of Fig. 1. Fig. 5 is a longitudinal section of the screen-frame, and Fig. 6 is a fragmentary cross-sectional view of the screen.

Referring now more particularly to the drawings, the numeral 1 designates a skeleton supporting-frame comprising one or more longitudinal base bars or beams 2, suitably connected and braced, front and rear pairs of supporting-standards 3 and 4, the rear standards 4 extending above the standards 3, and upper longitudinal supporting bars or beams 5, extending on a downward inclination from the said rear standards 4 to the front standards 3. For convenience in transporting the apparatus from place to place the frame 1 is mounted upon supporting-wheels 6 and is provided with a draft-pole or thill 7 for the attachment of draft-animals.

In the upper portion of the frame is mounted a longitudinally-reciprocating rectangular screen-frame 8, which is provided with rollers 9, traversing the track-rails 10 on the bars 5, to reduce friction and insure ease of operation of the frame. Between the side and end pieces of this frame are arranged a series of longitudinal parallel rods 11, bolted or otherwise secured to the end pieces of the frame and stayed at intervals by cross-bars 12, connected to the side pieces of the frame. These parallel rods 11 are spaced apart a suitable distance to allow the sand and refuse deposited thereon with the gravel to fall through and constitute a screen which separates the gravel which is retained thereon from the sand and refuse. Between the rods are located at suitable intervals transverse rows of cleaner-blades 13, which are secured to bars 14, extending between the inclined rails 5, and serve as the screen is reciprocated to stir up the mass of gravel and sand thereon and to loosen up the sand from the gravel, so as to allow the same to readily drop through the spaces between the bars 11 of the frame. As shown, the screen extends longitudinally of the frame on a downward inclination corresponding to the inclination of the rails 5 from the rear supporting-standards 4 to the front supporting-standards 3 to cause the gravel to travel by gravity to the front of the supporting-frame, where it is deposited upon a gravel-conveyer which carries it to a desired point of deposit, as hereinafter described. The sand and refuse falling from the screen drop down upon an inclined conductor 15, down which it slides by gravity to the front portion of the frame and is discharged upon the sand and refuse conveyer, also fully hereinafter described, which carries it to the point where it is to be deposited.

Mounted in bearings on the upper ends of the rear supporting-standards 4 is a transverse shaft 16, carried by an elevator-frame 17, which has journaled therein at its opposite end a shaft 18, the said two shafts 16 and 18 being provided with drums or rollers,

around which travels an endless bucket elevator 19 of any approved construction. In practice the frame 17 extends on a downward inclination from the rear of the frame 1 of the separating apparatus and is supported at its outer and lower end in a box or hopper 20, into which the sand and gravel from the gravel bank are shoveled, such sand and gravel being taken up by the buckets of the elevator and discharged upon the screen 8. By disconnecting the shaft 16 from its bearings on the supporting-standard 4 the bucket elevator may be removed from the frame 1 for convenience in storage when the apparatus is not in use or transportation when the apparatus is being moved from one point to another for use, the elevator being carried upon the base portion of the frame or in an auxiliary conveyance. A drive-shaft 21 is journaled in bearings on the rear supporting-standard 4 and carries at one end a band-pulley 22 for transmitting motion thereto from a suitable source of power. Upon the same end of the shaft is located a pulley 23, around which passes a drive-belt 24, which runs at its upper end over a pulley 25 on the shaft 16 and imparts motion to said shaft to drive the endless bucket conveyer 19. A crank wheel or disk 26 is mounted on one end of a shaft 26′ and has connected thereto a pitman-rod 27, which is also connected to the reciprocating screen 8 and imparts a rapid shaking or vibratory action thereto. This shaft 26′ is driven by a belt 27′ from the shaft 21. A gravel-chute 28 and a gravel-conveyer 29 are mounted at the front portion of the frame above the corresponding sand and refuse chute 30 and coöperating conveyer 31, and to conduct the gravel and sand thereto the screen-frame 8 and inclined conductor 15 are provided with corresponding deflectors 32. The gravel-conveyer 29 and the sand and waste conveyer 31 are of the endless-belt type, and each is mounted at its inner end on a transverse shaft (designated 33 and 34, respectively) journaled in the side walls of their said respective chutes 28 and 30. Said chutes 28 and 30 are removably mounted at their inner ends, so as to swing laterally of the frame, upon vertical pivot-shafts 35 and 36, arranged in vertical alinement and journaled in suitable bearings on the frame 1, and said shafts carry at their upper ends horizontal bevel gear-wheels 37 and 38, with which mesh pinions 39 and 40 upon the said shafts 33 and 34, whereby motion is communicated to the conveyers. By this construction it will be seen that the two chutes 28 and 30 may be swung toward and from each other in a direction laterally or transversely of the frame 1, so as to convey the gravel at any desired point upon one side of the frame and the sand and refuse at a similar point upon the opposite side of the frame, while at the same time the gear connections between the shafts 33, 34, 35, and 36 will at all times be preserved.

An auxiliary drive-shaft 41 is journaled in bearings upon the front portion of the frame 1 and is provided at one end with a pulley 42, around which passes a belt 43, which connects said pulley 42 with a pulley 44 on the drive-shaft 21, by means of which said transverse shaft 41 is driven. This transverse shaft communicates motion through the medium of intermeshing bevel-gears 45 and 46 to a vertical shaft 47, journaled upon the front portion of the frame, and which shaft 47 is connected by means of chain-and-sprocket gearing 49 with the shafts 35 and 36, whereby the latter are driven to communicate motion to the conveyers 29 and 31.

In the operation of the apparatus the gravel, sand, and refuse are shoveled into the hopper 18 and conveyed therefrom and deposited onto the screen-frame 8 by the endless bucket elevator 19. The rapid reciprocating action of the screen 8, in conjunction with the separating action of the cleaner-blades 13, effects the quick separation of the gravel from the sand and refuse, the latter falling down through the spaces between the screen-rods 11 onto the inclined conductor 15 and discharging by gravity therefrom onto the frame and the refuse-conveyer 31, which conveys the same to the place of deposit. The gravel is retained upon the screen 8 and travels by gravity down the same and discharges onto the conveyer 29, which conveys it to its point of deposit.

From the foregoing description, taken in connection with the accompanying drawings, the construction, mode of operation, and advantages of the invention will be readily understood, and it will be seen that the invention provides an apparatus which may be transported from place to place for use and which is adapted to speedily and economically perform the operation of separating the gravel from the refuse.

While the preferred embodiment of the invention is as herein described, changes in the form, proportion, and minor details of construction may be made within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

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

In an apparatus of the character described, a wheeled supporting-frame, a screen carried thereby, a conductor below the screen, an elevator for conveying the material to be separated to the screen, a main drive-shaft, connections between the drive-shaft and the screen and elevator, an auxiliary drive-shaft receiving motion from said main drive-shaft, two vertically-alined pivot-shafts at the front

of the frame, conveyers mounted upon said shafts to swing laterally of the frame, a third vertical shaft mounted upon the front of the frame parallel with said pivot-shafts, sprocket-gearing between said alined vertical shafts and said third vertical shaft, and gearing between the auxiliary drive-shaft and the third vertical shaft, substantially as specified.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HENRY O. JOHNSON.

Witnesses:
J. H. MORGAN,
A. J. DUNLAP.