

No. 752,646.

PATENTED FEB. 23, 1904.

H. G. BOUGHTON.
COMBINED SAND SCREEN AND MIXER.

APPLICATION FILED DEC. 20, 1902.

3 SHEETS—SHEET 1.

NO MODEL.

Fig. 1

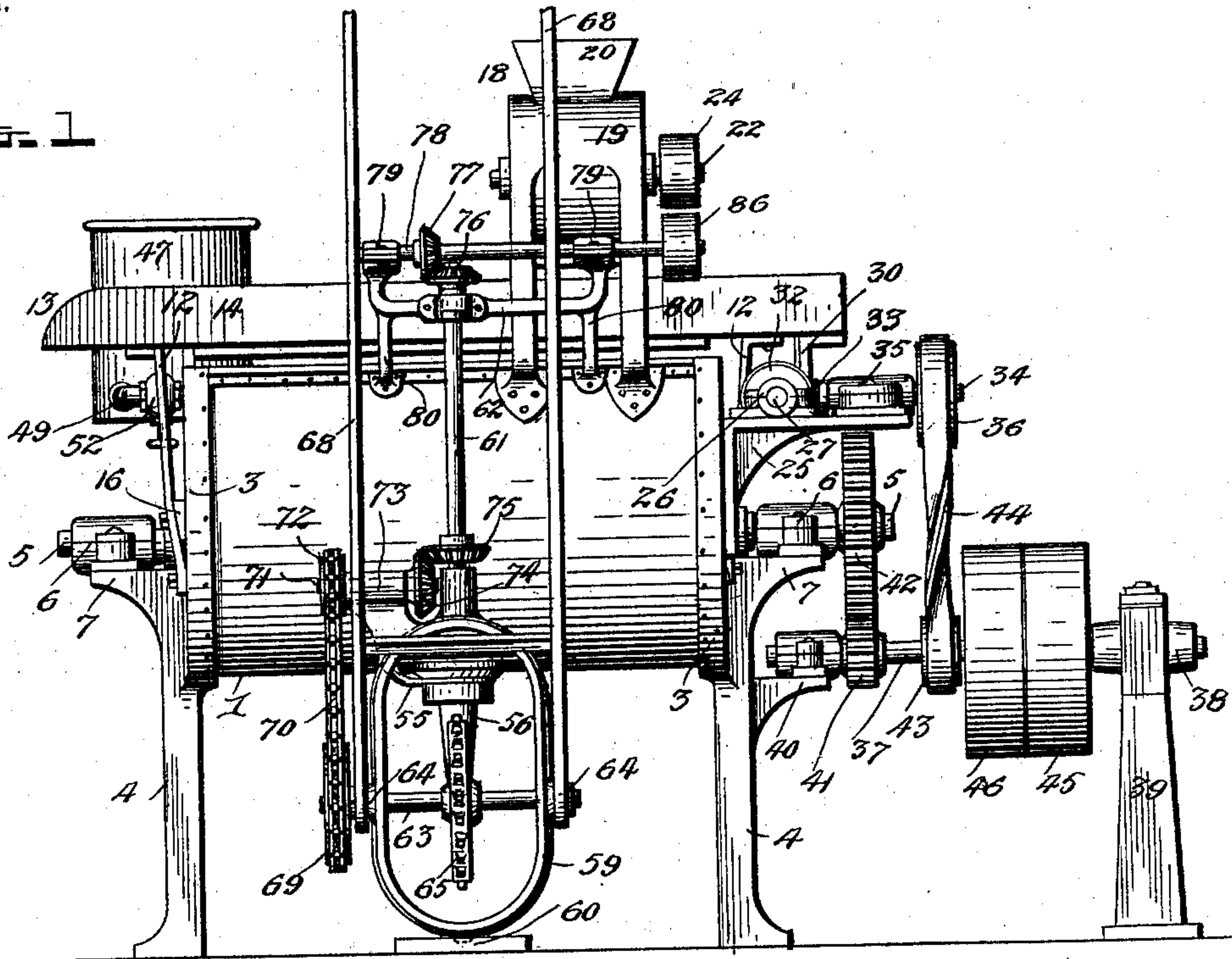
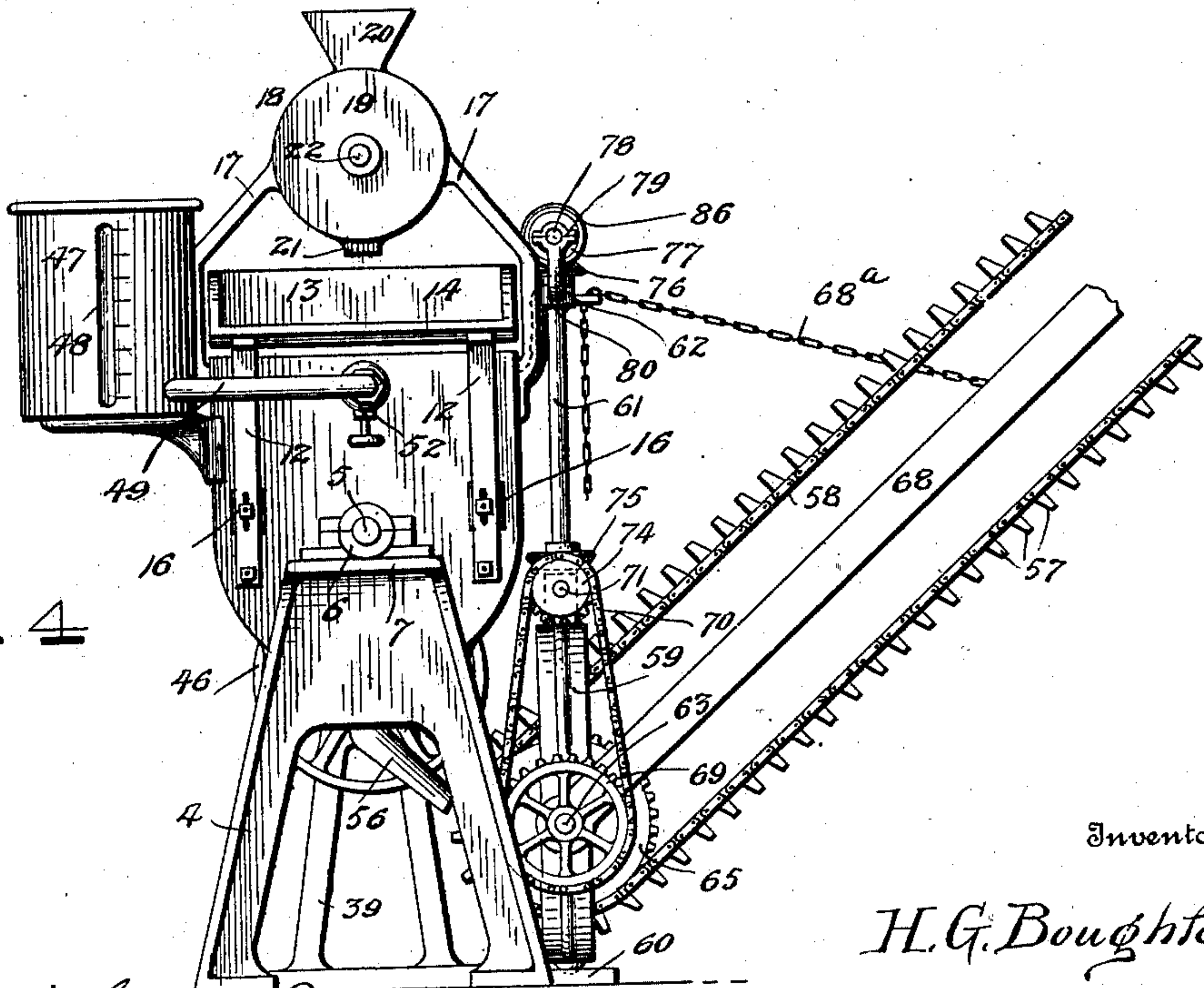


Fig. 4



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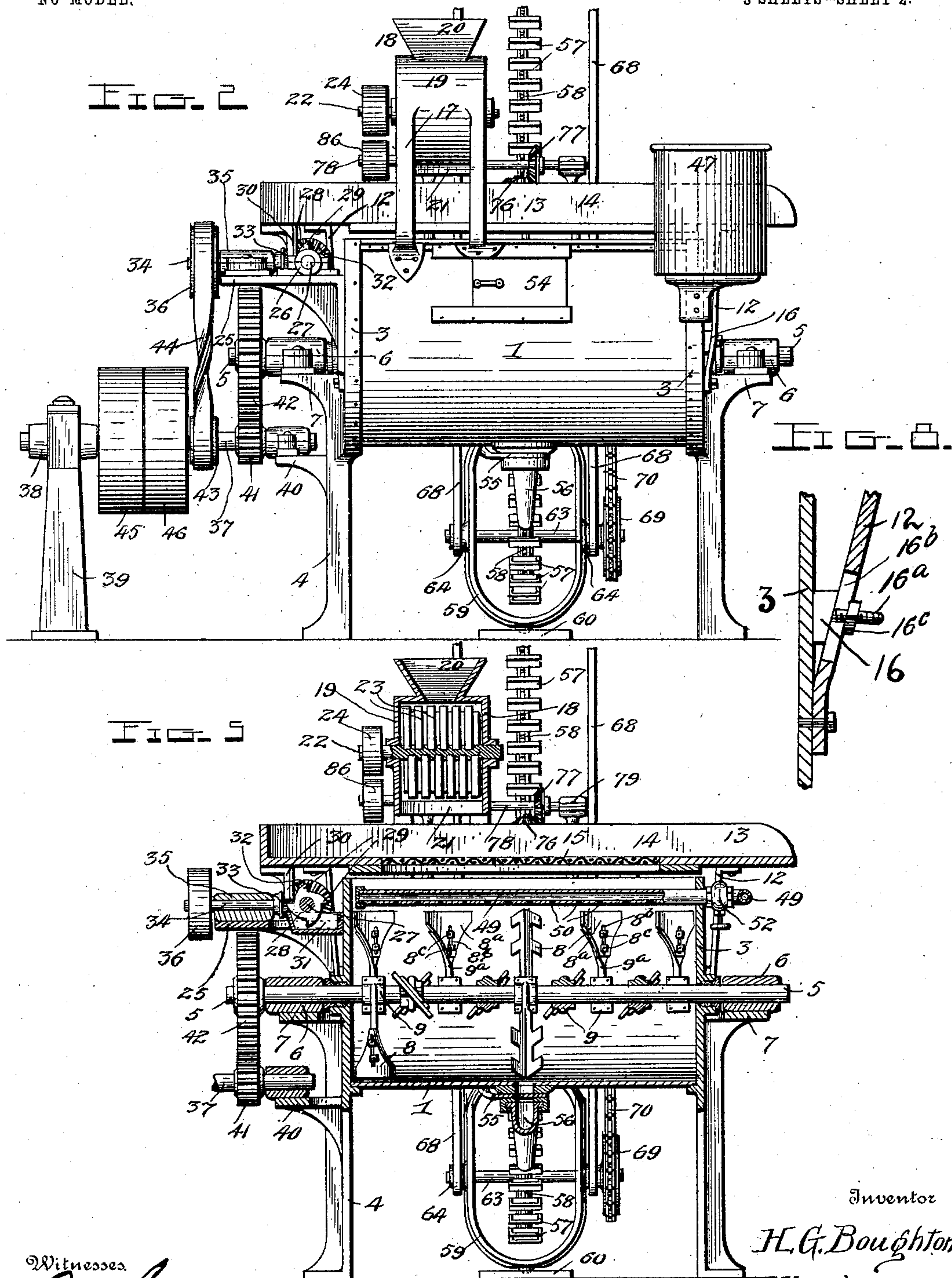
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

FIG. 3

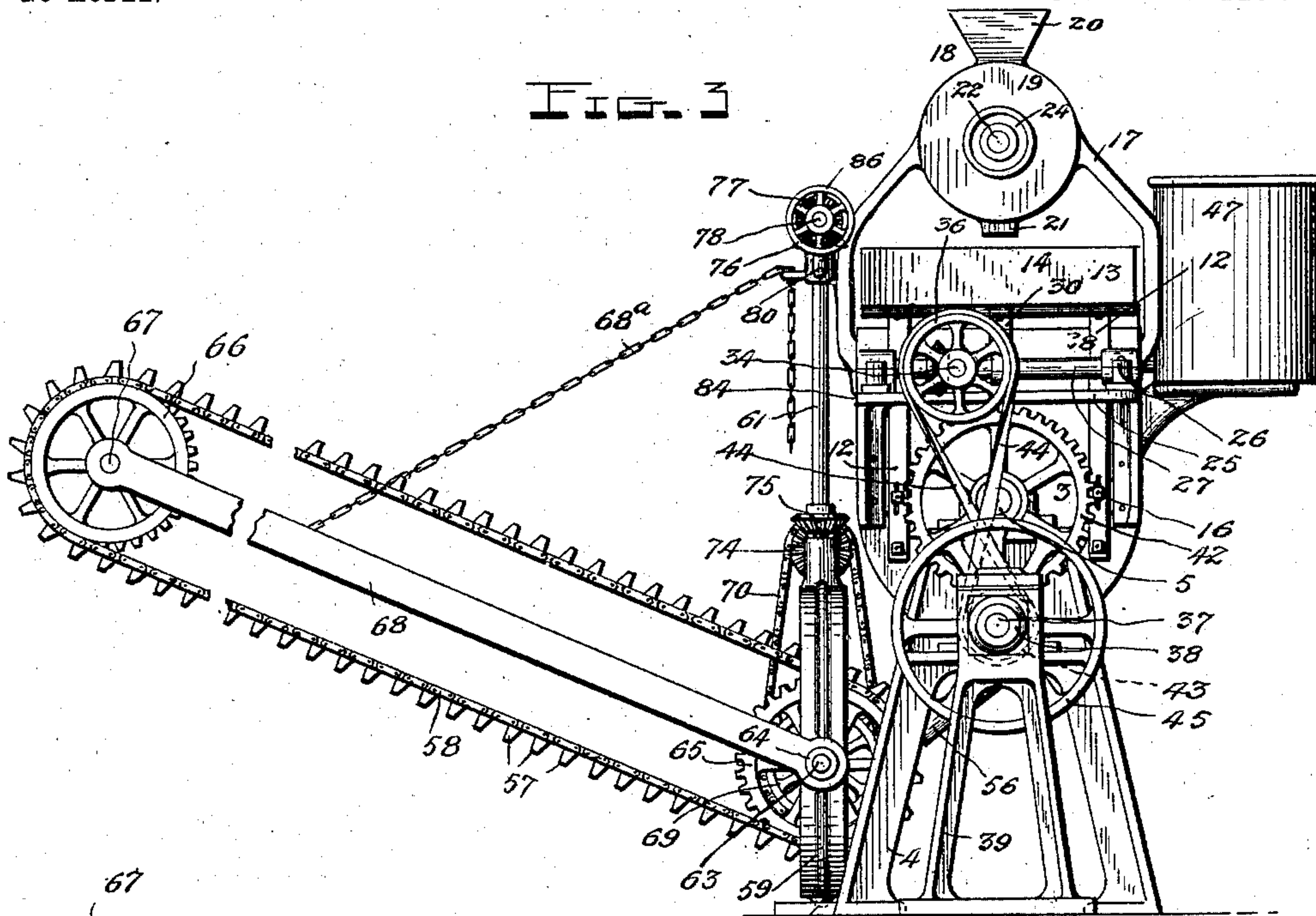


FIG. 6

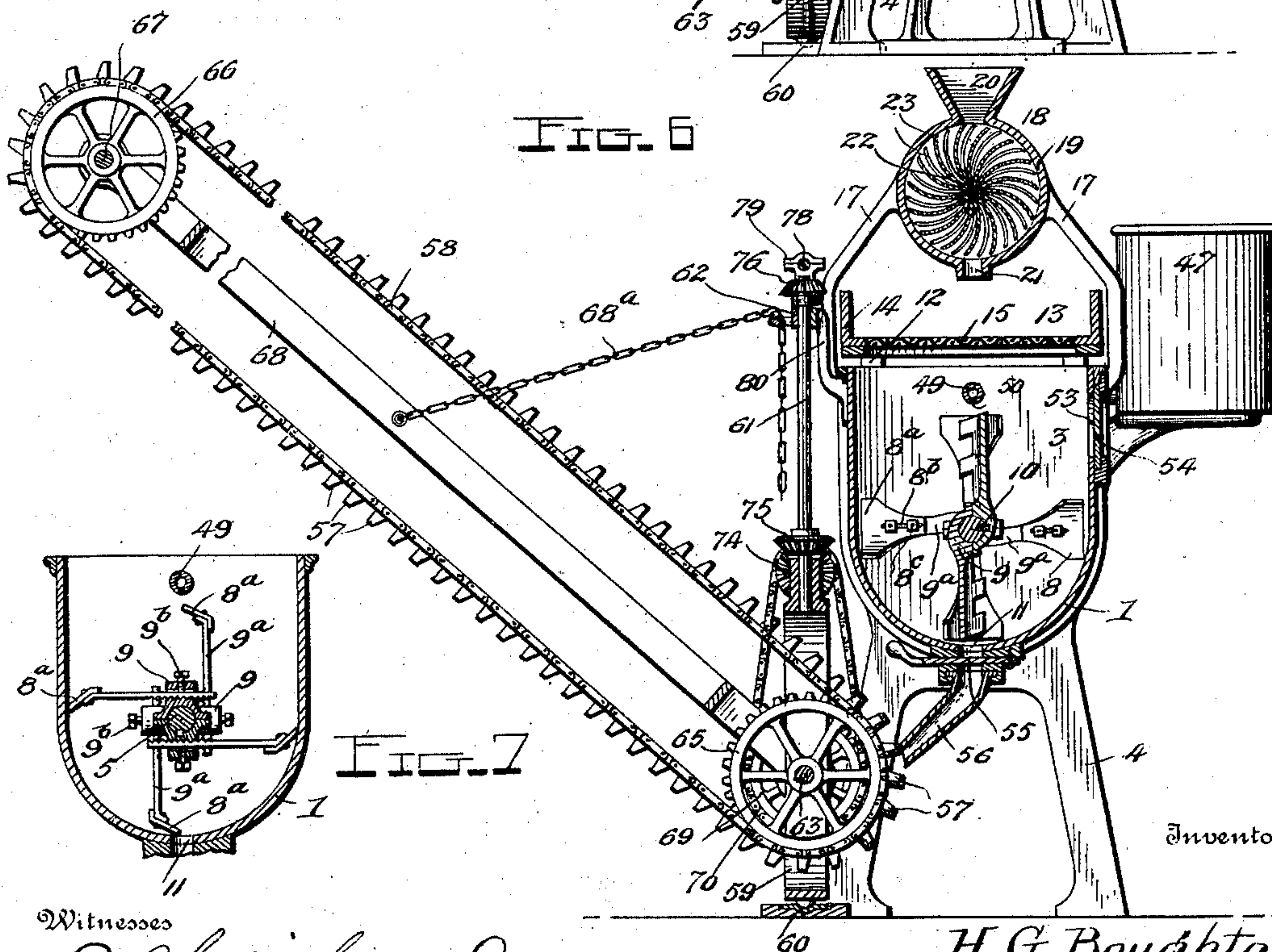
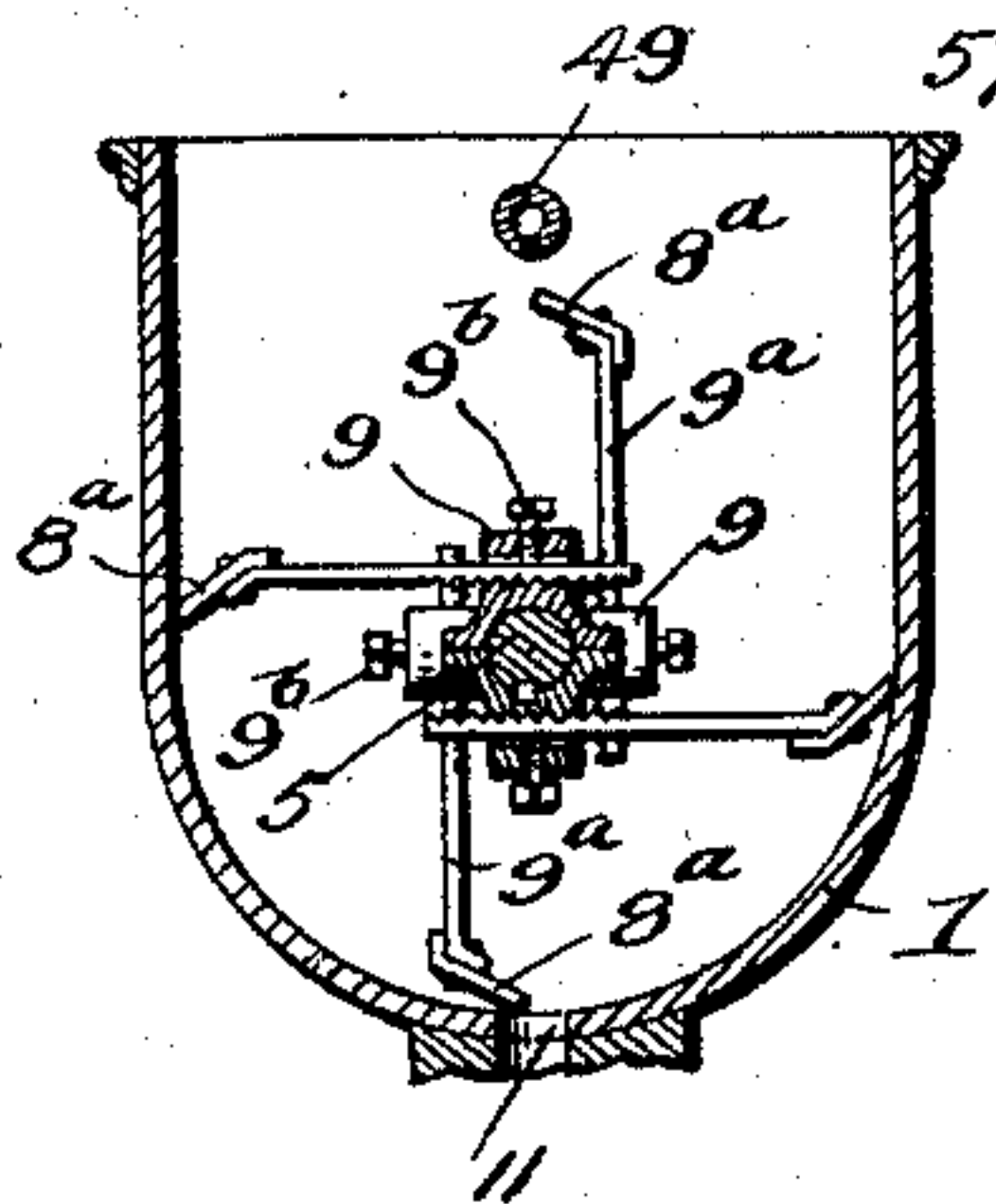


FIG. 7



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UNITED STATES PATENT OFFICE.

HORACE G. BOUGHTON, OF CLEVELAND, OHIO.

COMBINED SAND SCREEN AND MIXER.

SPECIFICATION forming part of Letters Patent No. 752,646, dated February 23, 1904.

Application filed December 20, 1902. Serial No. 136,024. (No model.)

To all whom it may concern:

Be it known that I, HORACE G. BOUGHTON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in a Combined Sand Screen and Mixer; 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 certain new and useful improvements in devices for screening, mixing, and tempering all kinds of core and facing sands for foundry uses, also for mixing wall-plaster and other materials.

The main objects of the invention are, first, to provide a machine of this character in which the various sand mixtures for foundry purposes may be quickly and thoroughly screened, mixed, and tempered with but one handling of the material; second, to provide a disintegrator attachment over the screen to pulverize the lumps, and hence prevent the waste of this portion of the material; third, to provide a conveyer attachment for receiving the discharged stock from the machine and delivering same to the different stock piles or bins.

With the above and other objects in view, which will readily appear as the nature of the invention is better understood, said invention consists in certain novel features of construction and combination and arrangement of parts, which will be hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is an elevation of the improved machine looking toward the side upon which the discharge-conveyer is located. Fig. 2 is a similar elevation of the opposite side of the machine. Fig. 3 is a forward end elevation showing the gearing. Fig. 4 is an elevation of the opposite end of the machine. Fig. 5 is a central vertical longitudinal section through the machine. Fig. 6 is a vertical cross-section through the machine on the line of the discharge opening or gate. Fig. 7 is a detail cross-sectional view through the body or shell of the mixer, showing a modified form of ad-

justable mixing-paddles or agitators. Fig. 8 is a detail view showing the tension or take-up device.

Referring more particularly to the drawings, the numeral 1 denotes the body or shell of the mixer, which is made of a single sheet of metal bent to form a curved bottom and having an open top. The ends of this shell are closed by the cast heads 3, upon which the supporting-legs 4 are formed. The shell may be secured to these heads in any desired manner, but preferably by riveting or bolting, as seen in the drawings. Extending longitudinally through the center of the body or shell is the shaft 5, which is journaled in bearings 6, mounted upon brackets 7, which are formed upon the legs 4. The portion of this shaft within the body carries a series of mixing-paddles or agitators 8, which are arranged in pairs and set alternately at an angle of about forty-five degrees to the right and left—that is, the paddles diametrically opposite each other have their blades set at an angle and have their inner ends formed with blocks 9, which are bolted together and through which the shaft 5 passes. A longitudinal key 10, running the length of the body, locks these blocks to prevent their turning upon the shaft. Owing to the angle of these agitators, the sand or other material within the body is worked back and forth and thoroughly mixed upon the rotation of the shaft. The blades which work the material toward the center of the shell are of greater width than the others, so that the mixture will be directed to the outlet-opening 11, formed in the center of the bottom of the shell. In order to provide for the wear upon the ends of the blades and to provide for their adjustment, the blades proper, which are denoted by 8^a, are formed with a slot 8^b, through which the bolts 8^c pass to secure them to the arms 9^a, upon which the blocks 9 are formed. In the construction of adjustable agitators shown in Fig. 7 it will be seen that the blocks 9 are formed with an opening one wall of which is serrated to engage the serrated portion of the arms 9^a, and a set-screw 9^b binds said arm to said block. The blades 8^a are secured upon the outer ends of the arms 9^a.

Supported directly above the open top of

the body upon the four flat vertical steel springs 12 is the screen 13, through which the sand or other material is fed into the shell or body. The screen consists of the frame or tray 14, the opening in the bottom of which is covered by a suitable wire-netting or foraminous material 15, and the rear end of which is open for the discharge of the coarser material which fails to pass through the screen into the body of the mixer. The springs 12, which support the screen 13, have their lower ends secured upon the outside of the ends or heads 3 of the body and are provided with the tension or take-up 16 to regulate the vibration of the screen. Each tension or take-up device comprises a wedge-shaped or tapered block having a threaded stem 16^a projecting therefrom. This stem 16^a extends through a slot 16^b in the spring 12 and is provided with a clamping-nut 16^c. By this construction the block may be adjusted to a limited extent up or down to limit the movement of the spring, and thus regulate its vibration, and consequently the vibration of the screen 13, as will be readily understood.

Located directly above the screen 13 and supported by the brackets 17, which are secured to the sides of the shell 1, is a disintegrator 18 for the purpose of braking up and pulverizing the lumps of sand or other material before they reach the screen 13. The same consists of the casing or shell 19, provided with a hopper 20 at its top, into which the sand or other material is fed, and with the discharge-opening 21 in its bottom, which is located directly above the screen 13. A shaft 22 extends through the casing 19 and is journaled in its end walls. Said shaft carries a series of curved steel arms 23, set in longitudinal rows and arranged to overlap each other. A belt-pulley 24 is secured upon one end of the shaft 22, which extends through the casing 19. It will thus be seen that when lumpy sand is deposited in the hopper 20 and the shaft 22 rotated the sand as it passes between the arms 23 will be thoroughly pulverized.

Bolted or otherwise secured upon the forward end or head 3 of the body is a bracket 25, upon which the bearings 26 are formed. A transverse shaft 27 is journaled in said bearings and carries a cam or tappet wheel 28, having tappet-fingers or projections 29, preferably four in number. Said fingers or projections are adapted to contact with a steel-faced knocker-arm or bracket 30, secured upon the bottom of the forward end of the screen 13 to impart a swinging or oscillatory motion to said screen. The said cam is adapted to rotate in an oil-well 31 to provide the proper lubrication. Secured upon the shaft 27 is a beveled gear 32, which is in mesh with a beveled pinion 33, secured upon the inner end of a shaft 34, journaled in bearings 35 upon the

bracket 25. A band wheel or pulley 36 is secured upon the outer end of this shaft 34.

Upon a longitudinal shaft 37, having one end journaled in bearings 38 in the standard or upright 39 and having its opposite end journaled in bearings formed upon a bracket 40, projecting from the forward supporting-legs 4, is a pinion 41, which meshes with the gear 42, secured upon the forward end of the shaft 5, whereby said shaft 5 may be rotated to impart motion to the agitators or paddles within the body of the mixer. The shaft 37 also carries the fixed pulley 43, which is connected by the crossed belt or band 44 with the pulley 36 upon the shaft 34. Fixed and loose pulleys 45 and 46 are also mounted upon the shaft 37, and by means of a belt or band (not shown) which is adapted to be passed around these pulleys power may be applied to operate the mixer and screen.

In order that the mixture of sands or other material within the body may be charged with water or other liquids used in making up the different kinds of mixtures for foundry uses, a supply-tank 47 to contain such liquid is provided and supported by a bracket upon one side at the rear end of the body. The tank is provided with a gage or indicator 48, by means of which the amount of liquid may be measured. The supply-pipe 49, leading from the tank, enters the rear end or head 3 and extends longitudinally the entire length of the body. Perforations or openings 50 in the under side of this pipe permit the liquid to drop into the body, and a globe-valve 52 in the supply-pipe controls the flow of liquid from the tank. An observation-opening 53, closed by a sliding door 54, is located in one side of the shell or body to permit the contents of the same to be viewed.

The outlet or discharge-opening 11 in the center of the bottom of the shell 2 is adapted to be closed by a pivoted gate 55. A swiveled spout or chute 56 is attached to the bottom of the shell at the opening 11 to direct the discharging mixture into the buckets 57 upon the endless conveyer-chain 58.

The conveyer consists of a swinging frame or yoke 59, which is swiveled at its lower end in a block 60 and at its upper end upon the lower end of a vertical shaft 61, which is journaled in the bearings formed in the bracket 62. A horizontal shaft 63 is journaled in bearings 64 upon the sides of the swiveled yoke 59, and upon this shaft is fixed a sprocket-wheel 65, about which the endless conveyer-chain 58 passes. This chain also passes over a similar sprocket 66, secured to a shaft 67, journaled in adjustable take-up bearings upon the outer end of a frame 68, the inner end of which is pivoted or journaled upon the bearings 64, which act as trunnions, so that said frame 68 and the endless conveyer may be swung or raised and lowered in a vertical

plane, while by means of the swiveled yoke 59 the same may be swung in a horizontal plane.

A chain or cable 68^a, one end of which is secured to the frame 68, is adapted to have its
5 opposite end secured to the bracket 62, so that by changing the length of the same the frame 68, which carries the endless conveyer, may be raised or lowered and held in any desired position.

10 The outer end of the shaft 63 carries a sprocket-gear 69, which is connected by the chain 70 to a sprocket-wheel 71 upon the outer end of a stub-shaft 72, journaled in a bearing-bracket 73, formed upon the upper portion of
15 the yoke 59. The inner end of this shaft 72 has secured to it the miter-gear 74, which is in mesh with a similar gear 75, fixed upon the lower end of the vertical shaft 61. The upper end of this shaft 61 carries a beveled gear
20 76, which meshes with a similar gear 77 upon a horizontal longitudinal shaft 78, which is journaled in bearings 79 upon the brackets 80, which are secured to one side of the shell or body 1. This shaft 78 extends forwardly and
25 carries upon its forward end the fixed pulley 86, which may be driven from any suitable source of power-supply by means of a belt. (Not shown.) The belt-pulley 24 upon the end of the shaft 22 extending through the
30 disintegrator 18 is also driven from the same source of power-supply by means of a belt. (Not shown.)

The operation of the machine is as follows: When it is desired to make any of the various
35 mixtures of core or facing sands for foundry uses, the sand, together with the different kinds of facing or core mixtures and compounds, are assembled in proper proportions and fed into the hopper of the disintegrator
40 18, preferably by means of a stationary conveyer, (not shown,) and the liquid for spraying and tempering the mixture is poured into the tank 47. The machine is then set in operation by applying power to the fixed pulleys
45 45, 86, and 24, and through the gearing previously described the various parts of the machine will receive motion. The material as it travels through the disintegrator will be thoroughly pulverized and then discharged upon
50 the vibrating screen 13, through which it passes into the body 1 of the mixer, where the paddles or agitators 8 will thoroughly mix and commingle the same. By opening the globe-valve 52 in the supply-pipe leading from
55 the tank 47 and by observing the indicator or gage upon the tank the proper amount of liquid may be sprayed into the body 1. When the material has been thoroughly mixed, the discharge-gate 55 is opened to allow the mixture to discharge through the opening 11 and
60 the spout 56 into the buckets 57 upon the endless conveyer 58, from which it is delivered into a bin or pile.

While I have described my invention as
65 adapted particularly for the mixing of facing

and core sands for foundry uses, I wish it distinctly understood that the same can be used for various other purposes.

From the foregoing description, taken in connection with the accompanying drawings, 70 it is thought that the construction, operation, and advantages of my improved combined sand screen and mixer will be readily apparent without requiring a more extended explanation.

Various changes in the form, proportion, 75 and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described my invention, what I 80 claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the character described, the combination with a mixer provided with suitable driving mechanism, of a vibratory 85 screen disposed above said mixer, springs for supporting said screen, tension devices for regulating the springs, and means for imparting motion to said screen from the driving mechanism of the mixer, substantially as set forth. 90

2. In a device of the character described, the combination with a mixer having suitable driving mechanism, of a disintegrator supported above said mixer, means for imparting 95 motion to said disintegrator, a spring-supported, vibratory screen interposed between said disintegrator and mixer, and means for imparting motion to said screen from the driving mechanism of the mixer, substantially as set forth. 100

3. The combination with a mixer of the character described having suitable driving mechanism, of a disintegrator supported above said mixer comprising a casing provided with 105 hopper and a discharge-outlet, a shaft journaled in said casing, curved arms arranged in longitudinal overlapping rows upon said shaft, and means for imparting motion to said shaft, substantially as set forth.

4. In a device of the character described, 110 the combination with a mixer having a valve-controlled discharge-spout, of a swiveled yoke having movement in a horizontal plane, a swinging frame journaled or pivoted upon said yoke, and an endless conveyer mounted 115 in said yoke and frame and adapted to receive the discharge from said spout of the mixer, substantially as set forth.

5. A mixer of the character described, comprising a cylindrical body or shell having a 120 central discharge-opening, a shaft in said body, means for imparting motion to said shaft, and paddles or agitators secured to the shaft and arranged in pairs and set alternately at an angle to the right and left, some of said paddles 125 being wider than the others to direct the material toward said discharge-opening, substantially as described.

6. A mixer of the character described, comprising a body or shell, a shaft in said body, 130

means for imparting motion to said shaft, and
paddles or agitators carried by the shaft and
disposed in pairs, the paddles of each pair pro-
jecting in diametrically opposite directions
5 and having their blades set at different angles
to the shaft, some of said pairs of paddles be-
ing set at right angles to the other pairs of
paddles and the several sets of paddles having
their blades alternately set at different angles,
10 the blades of the several pairs being adjust-

ably mounted and some of the blades being
wider than the other blades to direct the ma-
terial toward the outlet, substantially as de-
scribed.

In testimony whereof I have hereunto set my 15
hand in presence of two subscribing witnesses.

HORACE G. BOUGHTON.

Witnesses:

HARRY E. BOUGHTON,
ALBINA BOUGHTON.