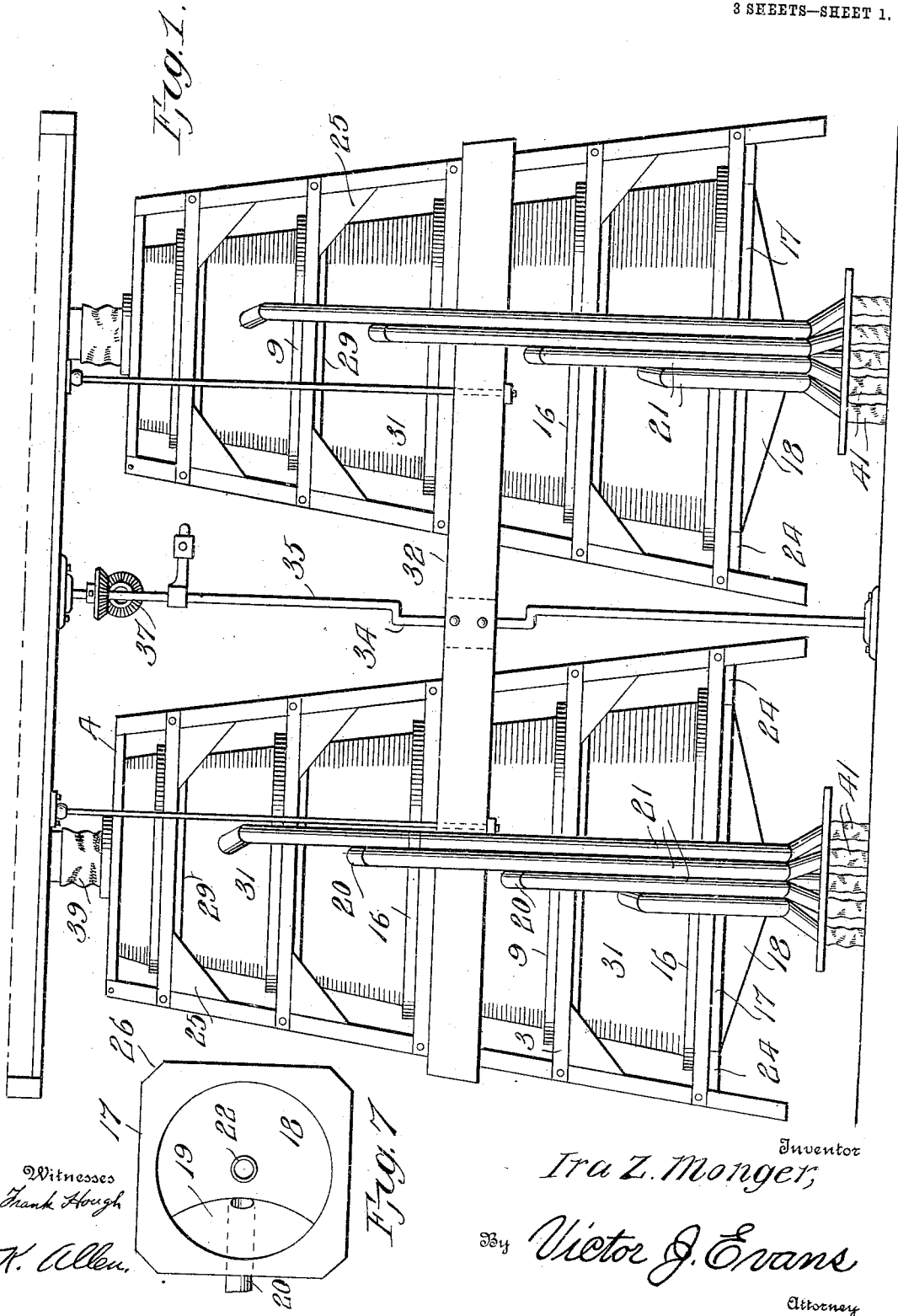


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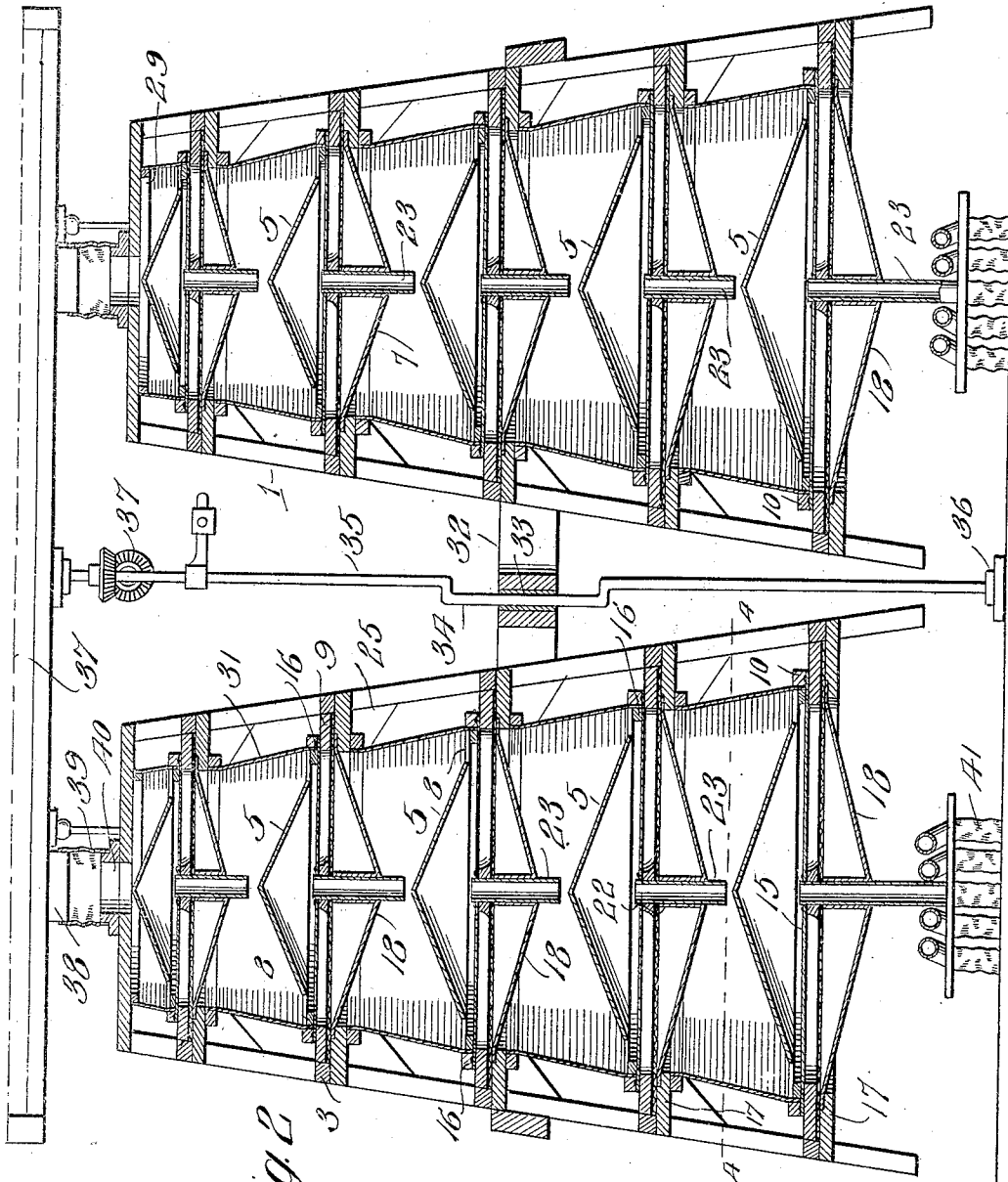


Fig. 2

Inventor

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Attorney

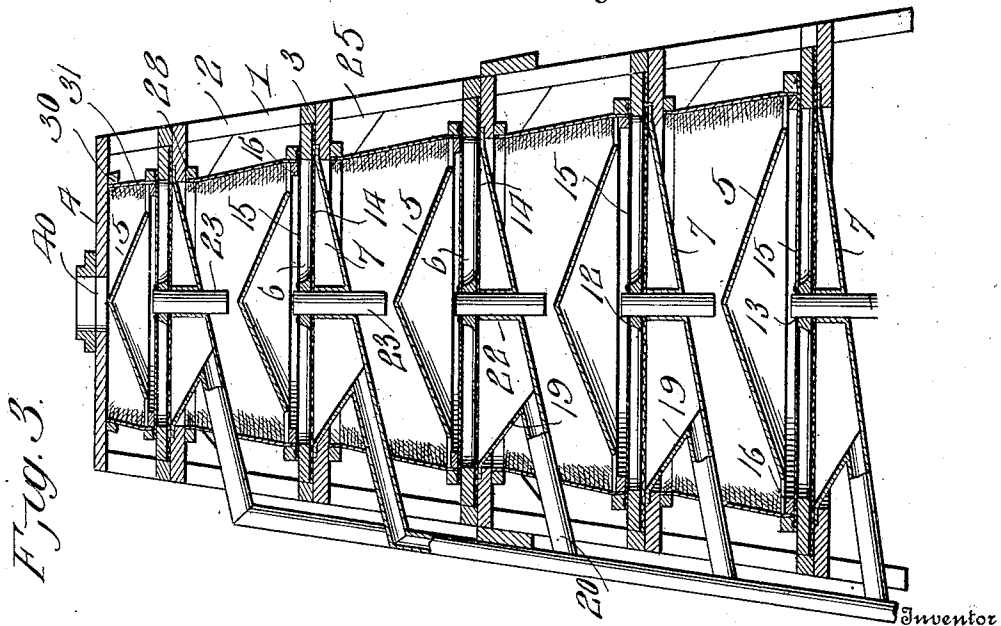
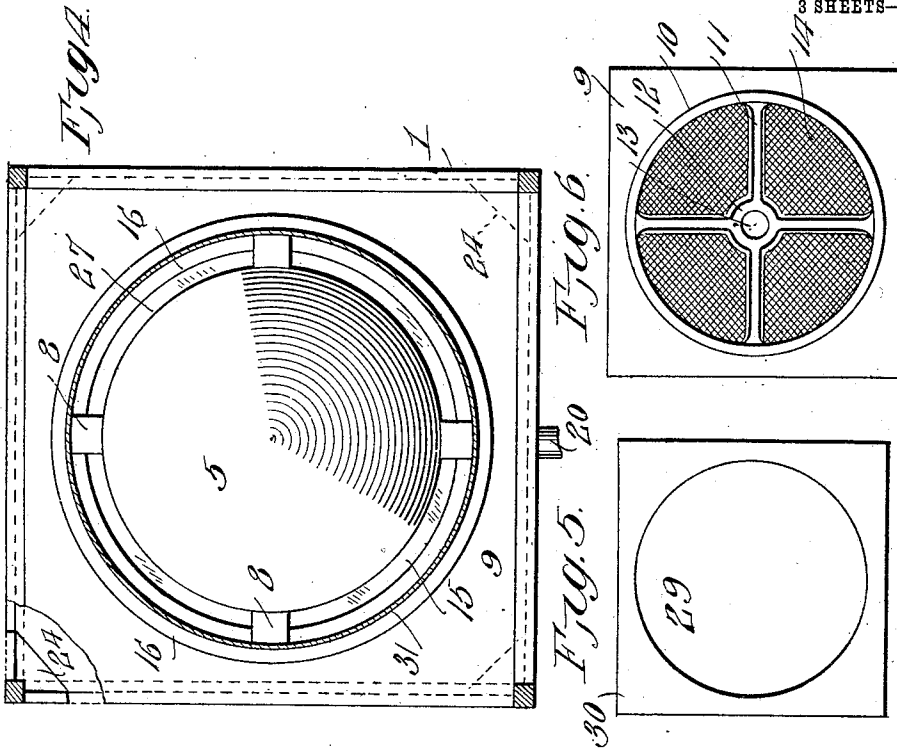
Witnesses  
Frank Hough  
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Witnesses  
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 Ira Z. Monger,  
 By Victor J. Evans  
 Attorney

# UNITED STATES PATENT OFFICE.

IRA Z. MONGER, OF LARNED, KANSAS.

## SCREENING AND SIFTING APPARATUS.

946,782.

Specification of Letters Patent.

Patented Jan. 18, 1910.

Application filed November 5, 1907. Serial No. 400,779.

To all whom it may concern:

Be it known that I, IRA Z. MONGER, a citizen of the United States, residing at Larned, in the county of Pawnee and State of Kansas, have invented new and useful Improvements in Screening and Sifting Apparatus, of which the following is a specification.

The invention relates to an improvement in screening and sifting apparatus, comprehending specifically a structure in which flour, meal, grain, seed or the like is readily and conveniently sifted and separated, the various grades of fineness of material produced by the apparatus being delivered separately therefrom.

The main object of the present invention is the provision of a sifting apparatus including one or more frames arranged for vibratory movement and each carrying a series of independently disposed screening sections, the sections having independent outlets for the material screened by the section and each section being in communication with the next lower section to permit passage to said latter section of all material prevented from passing through the screen of the particular section.

The invention will be described in the following specification, reference being had particularly to the accompanying drawings, in which:

Figure 1 is a view in side elevation illustrating my improved sifting apparatus. Fig. 2 is a vertical central section of the same, parts being shown in elevation. Fig. 3 is a transverse vertical section through one of the machines. Fig. 4 is a section on line 4—4 of Fig. 2. Fig. 5 is a plan of the upper attaching member for the flexible casing of each screening section. Fig. 6 is a plan of the screen member. Fig. 7 is a plan of the collecting member.

In the apparatus of the present invention I contemplate the use of one sifting machine or the combined arrangement and use of a number of such machines, depending entirely upon the character and amount of work to be performed. As each machine is of identical construction the following specification will be concerned with but one of said machines.

Each machine comprises a main frame 1, preferably of skeleton construction and including four uprights or legs 2 connected at appropriate intervals throughout their lengths by cross bars 3, said cross bars being

arranged in sets to provide a rectangular outline at appropriate intervals throughout the lengths of the uprights. The uprights are preferably arranged in inclined order resulting in a main frame of tower-like form provided at the end with a head platform 4 and at intervals below said platform with a rectangular frame of the full dimensions of the tower at the particular point, said rectangular frames being equal in number to the number of sifting sections desired.

Between each of the rectangular frames, and between the upper rectangular frame and the head platform is arranged a sifting section, the construction of these sections being identical, varying only in size.

Each section is made up of what may be termed a spreading member 5, a sifting member 6, and a collecting member 7, and these parts in each section are of identical construction. The spreading member is preferably a cone-shaped section constructed of thin sheet metal, the lower or base edge of the section having a series of radiating fingers 8, preferably four in number and arranged in diametrically opposite pairs, for a purpose which will presently appear.

The sifting member includes a supporting plate 9 centrally formed with an opening 10 bridged by diametrically arranged cross arms, said arms terminating centrally of the opening in an annular member 12 having a central aperture 13. Secured to the under side of the plate 9 and bridging the opening 10 is a screen 14, while overlying and resting upon the upper surfaces of the arms 11 is a section of bolting cloth 15, said cloth being secured, by tacking or otherwise, to the plate 9 beyond the opening 10. The metallic ring is arranged to overlie the opening 10 in the plate 9, said ring fitting within a plate 28 designed to rest upon the section 9, which plate is formed with an opening coextensive with the opening 10 in plate 9. The collecting member is more particularly illustrated in Fig. 7 and comprises a supporting section or plate 17 formed with a central aperture in which is secured a collecting pan 18. This pan is of true inverted cone-shape in transverse section in one direction, while in the other direction the bottom slopes downwardly from its connection with plate 17 to a point beyond the center, being there connected with an inclined wall 19, so that the collecting plate 18 tends to direct the material de-

livered thereto to the lowest point of said plate, which is the juncture of the plates 18 and 19. At this point an opening is formed in the collecting plate for the reception of  
 5 a conduit 20 which extends from the collecting plate approximately in alinement with the slope of the plate 18, the outer end of the conduit being connected with a conveyer pipe 21 beyond the main frame of the apparatus. The conveyer pipe from each sifting  
 10 section depends vertically lengthwise the apparatus to a point below the same for a purpose which will presently appear.

The collecting plate at its central point  
 15 is formed with an upwardly extending cylindrical member 22, in which is adapted to fit a pipe section 23, the upper end of which is in turn held in the opening 13 in the sifting member. The upper end of the pipe 23  
 20 extends slightly above the bolting cloth 15 when the parts are in operative relation, the lower end of said pipe terminating below the collecting plate 18 and immediately above the apex of the spreading member  
 25 or cone 5 of the next lower sifting section.

Each sifting section is supported by one of the rectangular frames formed by the cross bars 3. These cross bars at their juncture with each other and with the uprights of the frame are connected by triangular corner  
 30 braces 24 arranged between the adjacent cross bars and triangular corner braces 25 arranged between each cross bar and the proximate edge of the adjacent upright. In  
 35 assembling the sections within the frame the supporting plate 9 of the sifting section rests directly upon the corner braces 24 as a support, while the collecting section is arranged between the corner braces 25 with the corners  
 40 of the plate 17 of said section cutaway, as at 26, to permit said plate to fit between and in the same plane as the corner braces 24. The spreading section or cone is designed to be supported by the sifting section,  
 45 the projections 8 of said cone resting directly upon the ring 16 of the sifting section, the diameter of the cone base being less than the interior diameter of the ring, whereby an annular space 27 is provided between the  
 50 edge of the cone base and the inner edge of the ring to permit the passage of the material to the bolting cloth. Frame plates 28 are secured to the upper surface of plate 9 of the sifting member and to the lower surface  
 55 of plate 17 of the collecting member, each of which plates is formed with a cylindrical opening 29, a similar plate 30 being secured to the under surface of the platform 4. These respective lower plates 28 are adapted  
 60 to receive flexible cylinders 31 of canvas or the like which inclose the respective sections and also entirely inclose the path of the material throughout the apparatus. These sections, which are simply flexible  
 65 bag-like bodies open at both ends, are se-

cured at their respective ends to the plates 28 and rings 16, the upper end of one closure being secured to the block 28 underlying the plate 17 of the collecting member of one section, while the lower end of said closure is  
 70 secured to the ring 16 in the opening of the plate 28 overlying the supporting plate 9 of the sifting member of the next lower section.

By this construction the path of the material throughout the apparatus is inclosed, it  
 75 being understood, of course, that the wall of the closure is suitably formed to permit the passage of the conduit 20 from each collecting member. The fabric sections forming the closures are preferably secured to the  
 80 plates by attaching them to the opening 29 in each of said plates, the upper edge of the uppermost closure being secured to the plate 30 beneath the platform 4.

As thus described each sifting apparatus  
 85 comprises a series of entirely independent sifting sections each of which has a conduit leading from its collecting member, and each of which is provided with an independent conduit leading through said collecting mem-  
 90 ber and opening immediately above the spreading member of the next lower section. By preference the respective sections progressively from the top to the bottom are increased in size, which, while desirable in  
 95 handling some classes of material, is not essential with all, and I, of course, contemplate the provision of these sections of identical size.

It is the purpose of the present invention  
 100 to mount one or more of the apparatus described for the movement necessary for sifting or screening the material, and for this purpose I connect the desired number of these apparatus by a frame 32 in which at  
 105 an appropriate point is formed a bearing 33 for the crank or offset portion 34 of an operating shaft 35. The shaft is at its lower end mounted in bearings 36 carried by a suitable  
 110 fixture and at its upper end adapted to be driven by any source of power as by gear wheels 37. Movement of the shaft will, therefore, impart a rapid reciprocatory motion to the apparatus carried by the frame  
 115 32 with the effect to impart that movement to the material necessary for a proper sifting.

If desired the material may be delivered from a storage receptacle 37 which communicates through openings 38 in the bottom of said receptacle and through a flexible  
 120 pipe 39 with an opening 40 in the platform 4 of each apparatus, whereby the material is delivered to the sifting apparatus automatically in the movement of the latter.

In operation the material delivered  
 125 through the opening 40 in the platform 4 will by the spreading member of the upper sifting section be evenly divided and delivered to the bolting cloth 15 of said section. Such material as may find its way  
 130

through this bolting cloth is delivered to the collecting member of the upper section and from thence to the conduit 20 and conveyor 21 leading from that section. The material which is too coarse to pass through the bolting cloth of the upper section will find its way through the pipe section 23 onto the spreading member of the next lower section. The operation will thus be continued throughout the apparatus, it being understood that if desired the bolting cloths of the respective sections may be graduated in fineness, whereby the material will be graded as desired, or said bolting cloths may be all of the same mesh and the apparatus used to subject the material to a number of sifting operations to obtain one single grade therefrom.

The conveyor pipes 21 may terminate in flexible pipe sections 41 leading to any receptacle or other place of deposit, so that the material will be constantly delivered notwithstanding the movement of the apparatus.

The invention is particularly desirable in that the spreading member insures an even separation of the material delivered to any particular section so that the bolting cloth is always evenly covered throughout its surface with the material while being entirely protected from the weight of the material above it. A more regular separation and greater capacity for such separation are thus afforded. Furthermore, the material is consistently handled throughout the apparatus, that material separated being delivered directly to a conduit, while that portion of the material not passing through the separating means being delivered directly to another section for a subsequent separating operation. The apparatus is adapted for the separation of any materials of a granular nature, it being, of course, understood that for the particular materials the various parts, as the bolting cloth, screen, etc., will be constructed in an appropriate size and of appropriate material.

Having thus described the invention what is claimed as new, is:—

1. A sifting apparatus comprising a series of sifting sections, each section having a sifting member including a supporting plate, a bolting cloth carried thereby, and a ring for securing said cloth in place, a spreading member overlying the sifting member and comprising a cone having its base of less diameter than the ring of the sifting member, and projections upon the cone resting upon the ring, a collecting member including a supporting plate to underlie the sifting member, a collecting plate upon the supporting plate and adapted to receive the material passing through the bolting cloth, the collecting plate having a receiving point at one side of the center of said plate, a conduit in open communication with the collecting plate at the lowest point thereof, and a vertical pipe section carried by the collecting plate at its center and having a portion passed through the central portion of the sifting member so that its upper extremity is disposed slightly above the bolting cloth and having its lower end disposed above the apex of the cone of one of the spreading members and in spaced relation thereto.

2. A sifting apparatus comprising a series of spreading members of cone form arranged in superimposed relation, a series of collecting members located beneath the spreading members, a series of sifting members disposed between the spreading and collecting members, and a vertical series of pipe sections having their upper ends disposed slightly above the central portions of the sifting members and having their lower ends disposed slightly above the central portions of the spreading members.

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

IRA Z. MONGER.

Witnesses:

H. M. LAWTON,  
J. J. STOCKMAN.