April 23, 1968 A. WEHNER 3,379,309

SCREENING OR CONVEYING MACHINE

Filed Oct. 4, 1965 3 Sheets-Sheet 1

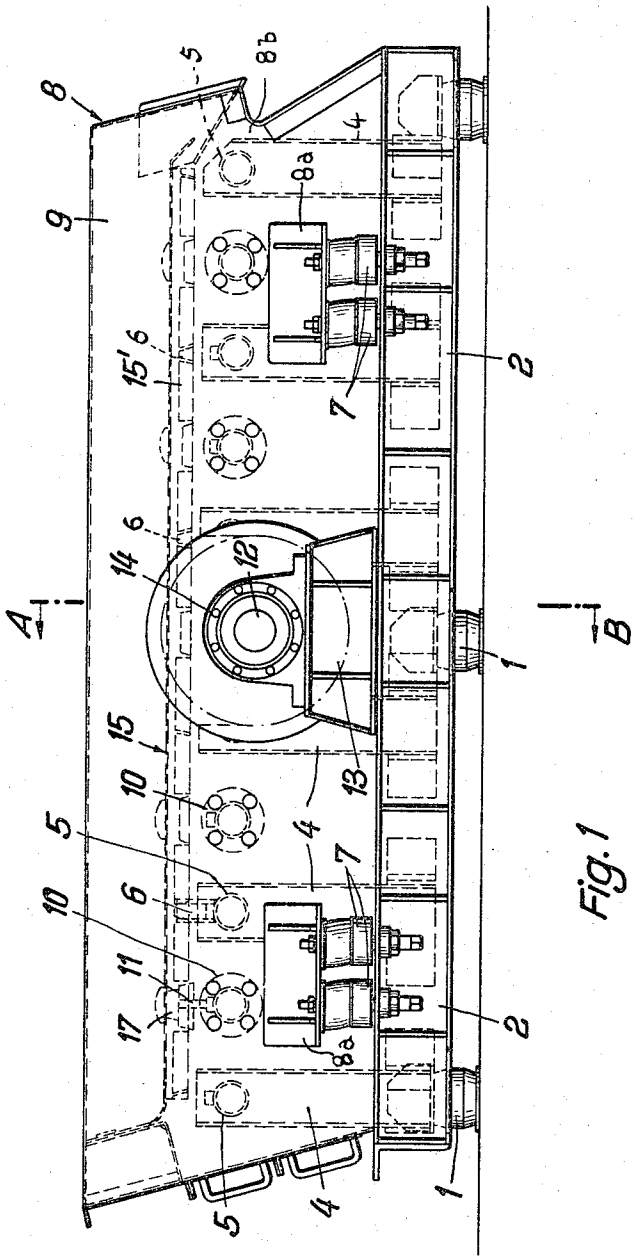


Fig. 1

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SCREENING OR CONVEYING MACHINE

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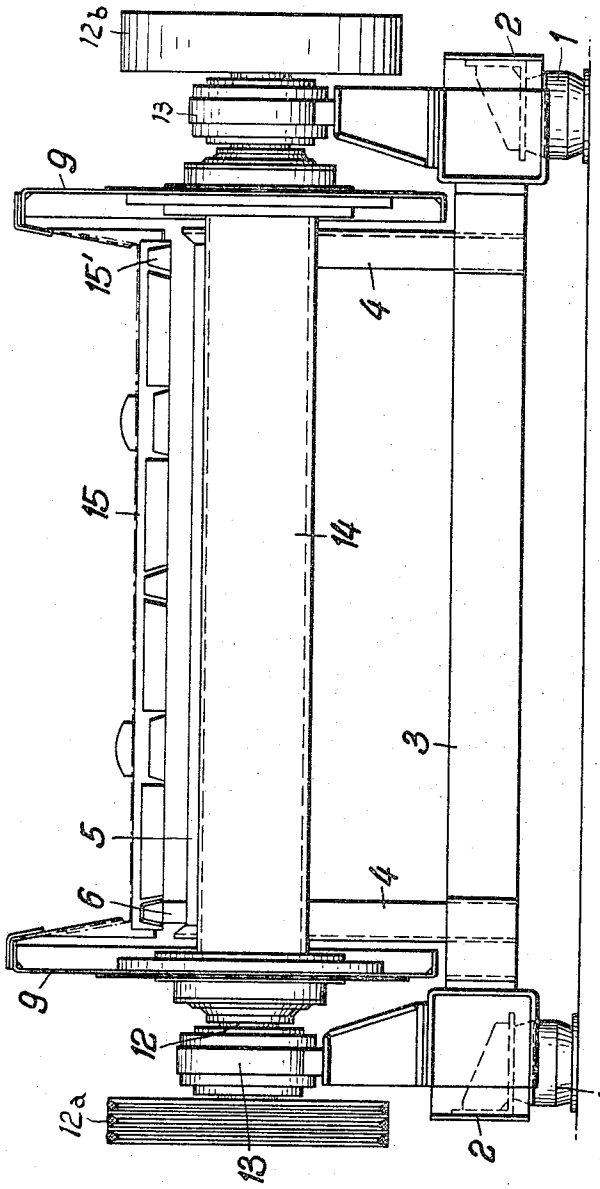


Fig. 2

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SCREENING OR CONVEYING MACHINE

Filed Oct. 4, 1965 3 Sheets-Sheet 3

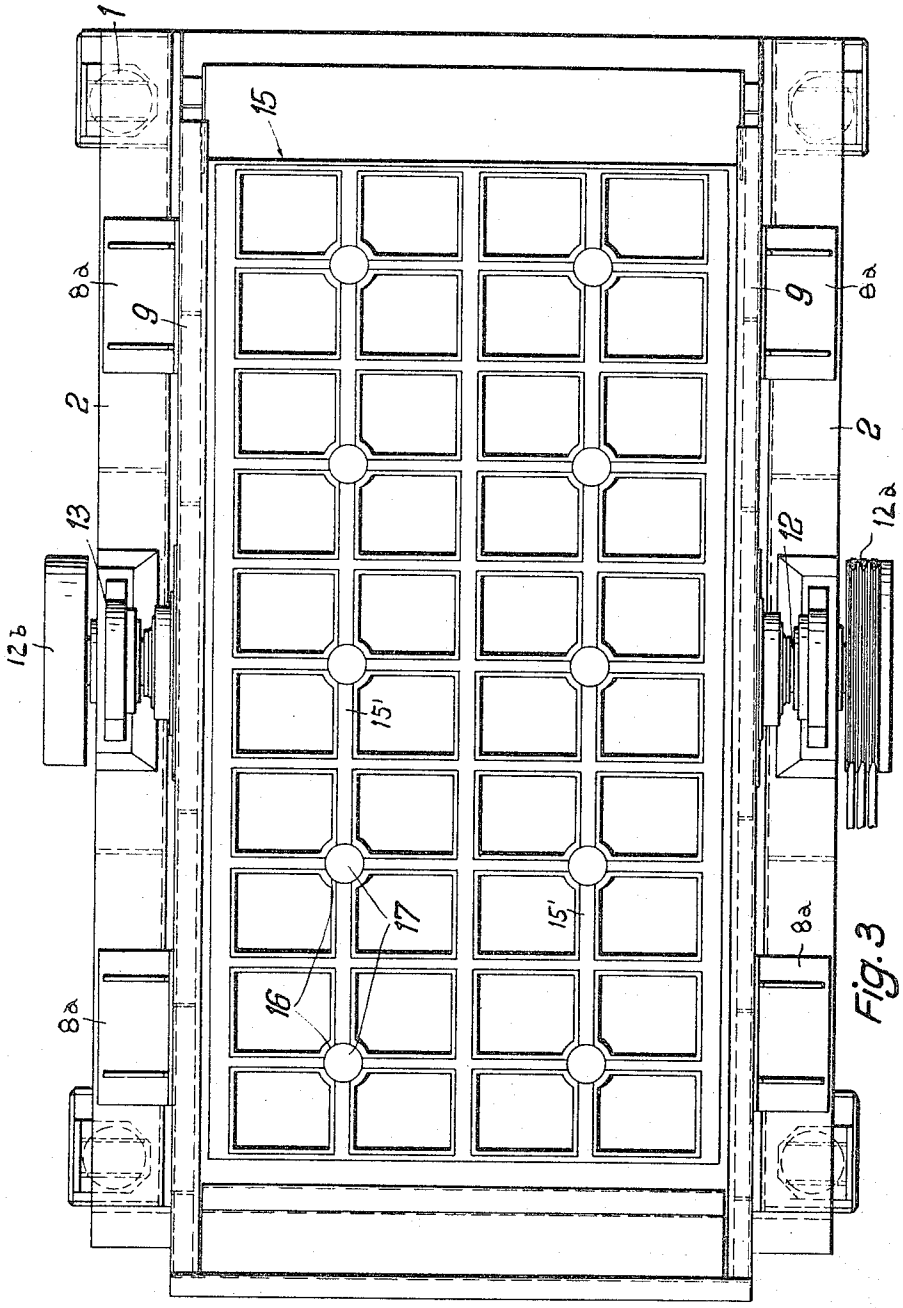


Fig. 3

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3,379,309

SCREENING OR CONVEYING MACHINE

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5 Claims. (Cl. 209—325)

My invention relates to machines of the vibratory type, and in a particular aspect, to screening and conveying machines having two frames oscillating relatively to one another, each frame having tray supports extending transversely to the direction of conveyance. The support of the two frames are arranged side by side in alternate fashion at spaced intervals, substantially in a common horizontal plane and impart abruptly reversing, arcuate oscillations to a screening or conveying tray alternately carried by the respective supports of the two frames. The trays are continually entrained in the horizontal direction by engagement with entrainer members on the supports of the primary oscillating frame, this being the one frame that is driven by a vibration generating drive such as a revolving shaft which carries an eccentric or unbalance.

In one of the machines of this type, according to my own prior proposal, the primary oscillating frame cooperates in such manner with a resiliently mounted secondary oscillating frame, on which the screening or conveying tray rests during a half-phase of each oscillation, that the secondary oscillating frame can perform a horizontal entraining movement. In that case, the tray describes a semicircular oscillation, being borne on the supports of the primary oscillating frame while passing through the semicircular arc, and on the supports of the secondary oscillating frame during each rectilinear return travel to its initial position along the chord connecting the two ends of the arc.

It is an object of the present invention to considerably simplify machines of the above-mentioned type and to afford giving them a more compact construction for given functional or power requirements.

To this end, and in accordance with my invention, advantage is taken of the observation that the above-described semicircular oscillations of the tray can also be produced while the secondary oscillating frame is virtually at stand-still.

More specifically, according to a feature of my invention, the supports of the second oscillating frame are mounted on carrier structures arranged on a sprung machine base frame and are disposed within the side walls of the primary oscillating frame, which may be designed as a screening box, for example. The primary oscillating frame in turn is sprung with respect to the base frame and has the unbalance or eccentric shaft of the vibratory drive journalled in bearings provided on the base frame.

According to another feature of the invention, the vibration generating shaft of the primary oscillating frame is arranged below the screening or conveying tray and encased by a protective tube which also serves as one of the horizontal tray supports of the primary oscillating frame, the conventional balancing masses being arranged on the shaft.

According to still another feature of the invention, the screening or conveying tray may consist of a resilient screening frame of lattice-type construction whose underside is provided with longitudinal grooves. The grooves are glidingly engaged by pusher members mounted on the supports of the secondary oscillating frame and located level with the entrainers of the primary oscillating frame.

Further features and details of a screening or conveying machine according to the invention are described below with reference to the accompanying drawings, in which:

FIG. 1 shows the new machine in front view.

FIG. 2 shows the machine in section on the line A–B in FIG. 1; and

FIG. 3 is a plan view thereof.

A rigid base frame **2** is supported on rubber buffers **1**. A number of vertical standards **4** are mounted on transverse members **3** of the frame at both ends thereof. Transverse supports **5** are arranged in bridge fashion between each two opposite standards **4** and carry pusher members **6** on top. The above-described parts of the machine form the secondary oscillating frame.

Resiliently supported on the base frame **2** by means of rubber buffers **7** is a primary oscillating frame **8** which in this embodiment is constructed as a screening box. Angle irons **8***a* are laterally attached to the box and are each seated on top of two sets of the rubber buffers **7**. Mounted between the side walls **9** of frame **8** are transverse supports **10** with entrainer pins **11**. A drive shaft **12** traversing the primary oscillating frame is journalled at both ends in respective bearings **13** mounted on the base frame **2**. A protective tube **14** encasing the shaft **12** between the two side walls **9** is arranged at the height of the supports **5** and **10** which are located substantially in the same horizontal plane. Like the supports **10**, the protective tube **14** has entrainer pins **11** which support a screening or conveying tray **15** above the entire driving and reversing system. The shaft **12** carries a belt sheave **12***a* at one end and a fly wheel **12***b* at the other end. Eccentrics or unbalanced masses mounted on the shaft **12** inside the tube **14** cause the entire primary frame assembly to vibrate, when the shaft drive is in operation.

The screening or conveying tray **15** is made of resilient material such as synthetic plastic. It constitutes a screening frame whose underside is provided with longitudinal grooves **15'** glidingly engaged by the pusher members **6** on the transverse supports **5** of the secondary oscillating frame. The screening frame **15** may be provided with a screen of any suitable screening material. The frame **15** has holes **16** into which driving heads **17** are inserted. The entrainer pins **11** disposed on the supports **10** of the primary oscillating frame engage in the driving heads with limited vertical clearance.

While the machine is running, the screening frame **15** carrying the screen proper rests during one-half phase of each oscillation on the entrainer pins **11** of the primary oscillating frame, and during the second half of each oscillation on the pusher members **6** of the secondary frame. In this way, the semicircular oscillatory movement of the frame **15** and thereby also that of the screening surface proper are produced. Whereas the screening frame **15** rests only on the entrainer pins **11** as it passes through the forward arc from 0 to 180° and is correspondingly driven by these entrainer pins, it rests solely on the pusher members **6** during the return movement from 180 to 0°, its horizontal driving movement, however, being then still produced by the entrainer pins **11**, which then move partially out of the driving heads **17**. Superimposed on this form of oscillation of the tray is a comparatively slight oscillation which is brought about by the resilient support of the base frame **2** through the medium of the rubber buffers **1** thereof.

Referring to FIG. 1, the semicircular oscillation thus periodically imparted to the screening frame **8** produces an intermittent throwing action from the left to the right. Hence, material charged onto the screen is thoroughly screened as it is being conveyed from the left to the right. The fines pass through the screen, and the rough residue

reaches the right-hand end of the screen to drain laterally through an outlet opening 8*b* of the machine.

The pusher members 6 may be constituted by trapezoidally bent plates of sheet-metal. If desired, plates or coverings may be provided which afford protection against sliding at those parts of the grooves 15′ on the underside of the screening frame 15 where the grooves are engaged by the pusher members 6. Moreover, the brake linings interposed between the pusher members 6 and the screening frame 15 may be of such nature as to cause the frame 15 to perform supplementary oscillations of higher frequency.

By simply reversing the direction of rotation of the drive shaft 12, this screening or conveying machine can be operated optionally in such manner that the semicircular oscillations of the screening or conveying tray cause a conveying travel in one or the other direction. Furthermore, screening or conveying machines according to the invention may be modified in various ways. For example, the frame 15 may be provided with roller joints or deflector springs over which the reversing push members 6 will glide.

Holes for receiving transversely extending rods or lengths of straight wire may be provided in the screening frame 15, the rods being either clamped or mounted with clearance in the receiving holes. The members 6 may also be equipped with sliding rollers and the sliding surfaces on the members 6 and on the screening frame 15 may consist of self-lubricating materials, such as sintered bronze.

Upon a study of this disclosure, such and other modifications will be obvious to those skilled in the art that my invention is amenable to a variety of other modifications and may be given embodiments other than illustrated and described herein, without departing from the essential features of the invention and within the scope of the claims annexed hereto.

I claim:

1. A vibratory machine having two frames oscillatingly movable relative to one another, one of said frames having side walls, and the second of said frames comprising vertical standards each of said frames having tray supports extending transversely to a given forward direction, the supports of the two frames being arranged side by side in alternate fashion at spaced intervals and disposed horizontally in a common plane, a tray alternately resting on the supports of said respective two frames and in driven engagement with one of said frames so as to be moved in said forward direction; vibration generating means disposed transversely of said given forward direction and extending through said side walls and below said tray supports having a shaft revolvable on said one frame, a sprung machine base frame said vertical standards being mounted thereon, said supports of the second oscillating frame being mounted on said vertical standards and disposed within the side walls of said one oscillating frame, said one oscillating frame being sprung with respect to said base frame, said base frame extending transversely beyond the confines of said side walls having bearings mounted thereon, and said one frame having said shaft journalled in said bearings.

2. In a machine according to claim 1, said shaft of said one oscillating frame being arranged below said tray, a protective tube enclosing said shaft and forming one of said supports of said primary oscillating frame.

3. In a machine according to claim 1, said tray consisting of a resilient screening frame of lattice-like form which is provided on its underside with grooves, pusher members disposed on said supports of said second oscillating frame and located level with the entrainer members of the primary oscillating frame, said pusher members being in gliding engagement with said grooves.

4. In a machine according to claim 3, said pusher members consisting of trapezoidally bent plates.

5. A machine according to claim 3, comprising friction lining means disposed between said pusher members and said grooves for causing said tray frame to perform supplementary oscillations of higher frequency.

No references cited.

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