

C. F. STEHLIN.
SCREW PRESS.

APPLICATION FILED JULY 20, 1914.

1,152,857.

Patented Sept. 7, 1915.

2 SHEETS-SHEET 1.

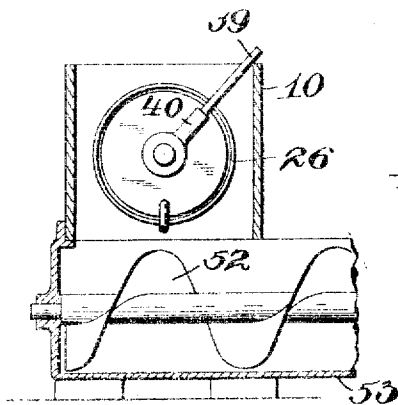
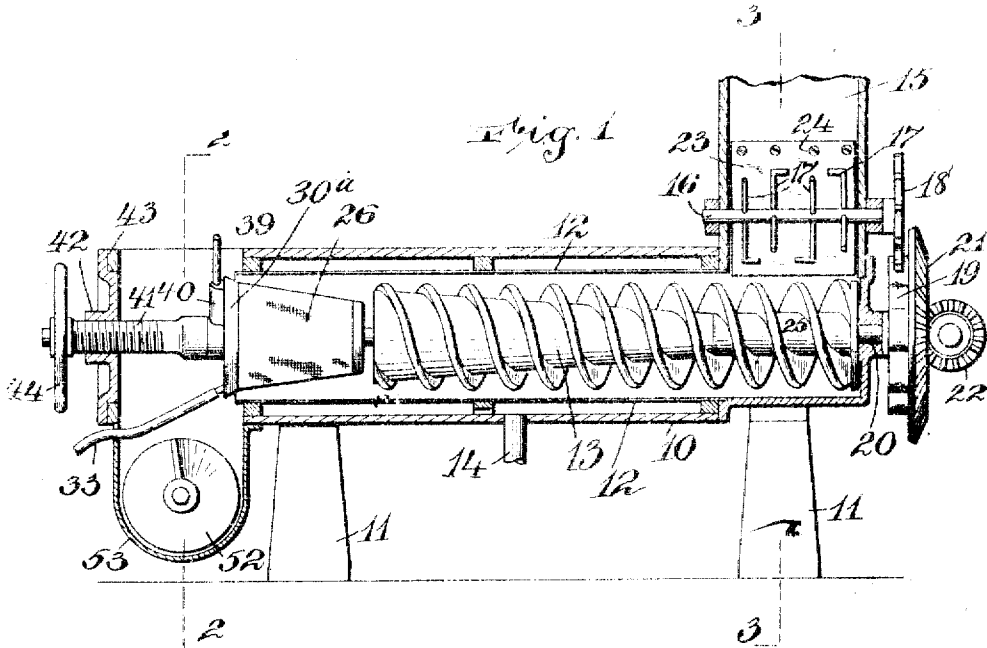


Fig. 2

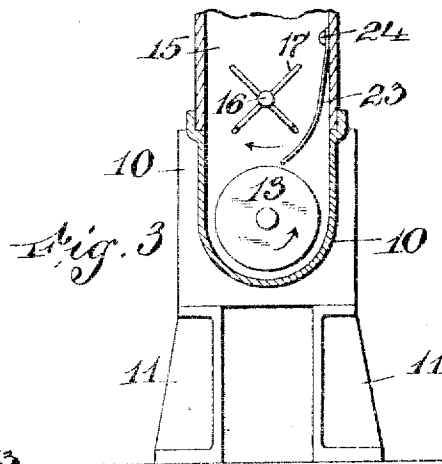


Fig. 3

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WITNESSES

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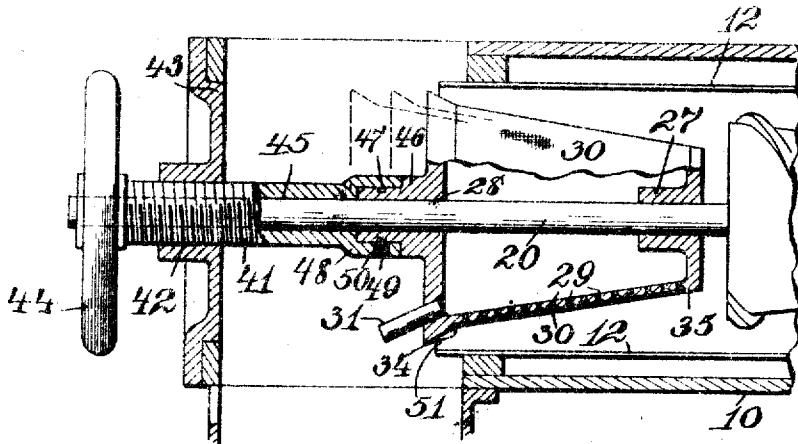


Fig. 4

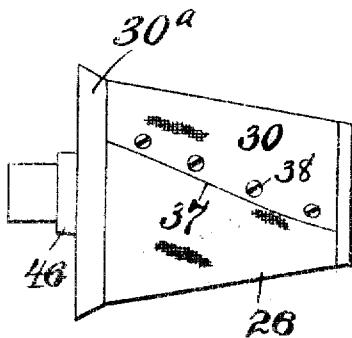


Fig. 5

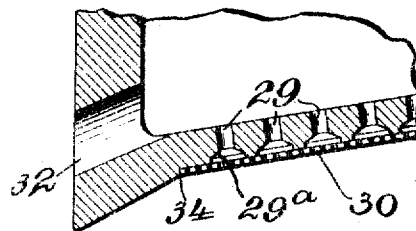


Fig. 6

WITNESSES
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UNITED STATES PATENT OFFICE.

CHARLES F. STEHLIN, OF NEW ROCHELLE, NEW YORK.

SCREW-PRESS.

1,152,857.

Specification of Letters Patent.

Patented Sept. 7, 1915.

Application filed July 20, 1914. Serial No. 851,853.

To all whom it may concern:

Be it known that I, CHARLES F. STEHLIN, a citizen of the United States, and a resident of New Rochelle, county of Westchester, and State of New York, have invented certain new and useful Improvements in Screw-Presses, of which the following is a specification.

My invention relates to screw presses for extracting water and other liquids from solid matters containing the same, and is designed to improve the same in several important particulars whereby the efficiency of such presses is greatly increased. One source of lost power and reduced efficiency in presses of this sort has been due to a churning action of the material in the hopper or chute where it is delivered to the screw. According to my invention means are provided for preventing such churning or regurgitation and thereby increasing the efficiency of the apparatus and preventing the loss of power in this respect.

My invention provides means whereby the moisture to be extracted may be driven inwardly as well as outwardly, thus obtaining more fluid extract and a drier solid product without the application of increased power.

Another feature of my invention consists in the provision of an improved form of outlet adjusting device whereby the size of the outlet may be readily and conveniently adjusted, thus facilitating the adjustment of the apparatus for working on materials of different kinds and for the various requirements which it has to meet.

With the foregoing and related objects in view, my invention consists in the parts, improvements and combinations herein set forth and claimed.

In the accompanying drawings forming part of this specification and wherein the same reference numerals are uniformly used to designate the same parts throughout, Figure 1 is a view, partly in central longitudinal section, of one form of screw press embodying my improvements. Fig. 2 is a cross-sectional view on the line 2-2, Fig. 1. Fig. 3 is a cross-sectional view on the line 3-3, Fig. 1. Fig. 4 is a fragmentary detail view similar to a portion of Fig. 1. Fig. 5 is an elevational view of the interior discharge member, and Fig. 6 is a fragmentary longitudinal sectional view showing the preferred construction of the interior discharge member.

The reference numeral 10 is applied to designate generally the box-like frame of the machine. In the form shown it is provided with legs 11, 11. Within the box 10 is the press casing 12 which is of the usual construction, being made of perforated metal and covered on its exterior with netting or sheet metal having fine perforations. This part of the apparatus being no part of the present invention, it is not illustrated in detail. Within the casing 12 is received the press screw 13, and the moisture or fluid extracted and passing through the walls of the casing 12 is permitted to escape, as by means of the pipe 14, in the usual manner. Any suitable means for supporting the casing 12 within the box 10 may be used.

The chute or hopper through which the material to be treated is supplied to the press is indicated at 15, and an agitator for preventing such material from packing, and preferably comprising the shaft 16 and arms 17, is provided. Such agitator preferably is rotated intermittently, as by means of the intermittent rotating connections 18 on the shaft 16 and 19 on the shaft 20 of the press screw. The screw shaft 20 may be rotated from any convenient source of power which may be applied, for example, through the bevel gear 21 and pinion 22.

For preventing the churning action of the material fed to the screw press at the bottom of the hopper or chute 15, I provide a plate 23, preferably of thin metal, such as sheet steel or the like, and the same is free except at its upper edge where it may be secured, as for example to the walls of the chute or hopper 15 as by means of the screws 24. At its opposite edge it extends fairly close to the screw 13. (See Fig. 3.) The press screw 13 being rotated in the direction of the arrow in Fig. 3, when material is fed into the apparatus, the space beneath and behind the spring plate 23 is quickly filled with the material under treatment, and such material thereafter is fed to the front of the press screw and is readily taken hold of by such screw and fed into the space between the screw and casing. The plate 23 being of spring material will give somewhat, and thus serves to balance the pressures upon its faces, and if any solid objects, such as bolts or stones, find their way into the apparatus, the spring of such plate will

readily permit them to pass by without the breakage which might result if such plate were rigid and unable to give under excessive pressure. Another feature which contributes to the certainty of the feeding action of the screw and to preventing any churning or regurgitation consists in the formation of the portion of the press screw which is immediately beneath the hopper or chute. Such part of the press screw, indicated at 25, has the form of a simple conveyor and there is no enlargement of the screw core in this neighborhood so that the material is readily taken hold of by the screw and pushed forward into the region between the screw and casing, and there is no attempt in this neighborhood to exercise any compressing action on the material. This combined provision of the spring guide-plate 23 and the simple conveyor screw portion 25 results in a much improved feeding action and in there being no churning of the material at this point and substantially no failure of the screw to take hold of the material and advance it into the region where it should go.

At the opposite or discharge end of the casing 12 is provided the interior fluid discharge device which is designated by the reference numeral 26 and the construction whereof is shown clearly in Figs. 4, 5 and 6. This interior discharge member has the form of a hollow shell having axial perforations at 27 and 28 to permit the passage of the screw shaft 20 axially therethrough. The walls of such hollow casing are provided with fairly large perforations as indicated at 29 and such casing is covered on its exterior with a covering of reticulated or finely meshed material 30, this permitting the passage of fluid therethrough and its discharge into the interior of the casing through the openings 29. The openings 29 are preferably counterbored or otherwise enlarged near their outer ends, as indicated at 29', to bring them into communication with substantially all the small apertures in the outer screen 30. The member 26 is provided with an outer end portion 30', also frusto-conical in shape and flaring more markedly than the perforated portion of the member 26 back thereof. By means of the provision of such outer unperforated portion 30' the parts may be adjusted so as to leave a comparatively small opening around the member 26 and still have enough thickness of material between the casing 10 and member 26 to obtain a substantial expulsion of moisture to a neighborhood very close to the mouth of the casing 10. Any suitable discharge means, as, for instance, the nipple 31 inserted in an opening 32 and provided with an outlet hose 33 may be provided for conducting away the liquid which enters such interior discharge device. The

perforated or reticulated covering 30 is preferably let into the casing 26 as by providing shoulders 34, 35, as shown in Figs. 4 and 6. The edges of the covering 30 are preferably lapped over one another and secured in place along a diagonal line as 37 by means of fastening members, such as screws 38. It will be observed that the outer lap of the reticulated covering 30 is so placed as that the material rotating in the direction of the movement of the press screw 13 passes over such outer lap first and onto the under portion thereof, thus doing away with any tendency to tear away or to bend back the exposed edge of such reticulated covering 30. In the form shown the interior discharge member 26 is comparatively short and is formed with a fairly abrupt taper. It is understood, however, that the particular proportions illustrated may be varied and that, for example, such member may be much longer than shown. Furthermore, the press screw 13 is shown with the tapered core with which such screws are customarily provided. If preferred, however, such tapered core may be dispensed with and the screw may be used solely for the purpose of pressing the material between the interior discharge member and the casing of the press.

The interior discharge member 26 is prevented from rotating by any convenient means, as, for instance, the pin 39 entering an opening within the boss 40 and resting against the frame 10, or supported in any convenient manner.

The tapered interior discharge member 26 may be adjusted with relation to the press casing, and I have shown a very convenient and effective means for securing such adjustment, comprising the screw 41 received in a screw-threaded opening 42 in the frame member 43 and which is preferably so received in place as to be readily removable, thus facilitating assembly and taking apart for repairs. Such screw 41 is provided with any convenient means for manually imparting rotation thereto, as, for instance, the hand-wheel 44 which extends beyond the frame member 43 and is in a position where convenient access may be had thereto. The screw 41 has an axial bore 45 therethrough for the passage of the press screw shaft 20 and is so arranged with respect to the boss 46 on the interior discharge device 26 as to be capable of rotation with respect thereto, but incapable of lengthwise movement with respect thereto. In the form shown such relative arrangement is secured by providing the boss 46 with a circumferential groove 47 and providing the enlarged recessed portion 48 of the screw 41, in which the boss 46 is received, with a bolt 49 having an extension 50 received within the groove 47. With such arrangement the

screw 41 may be freely rotated without imparting any rotation to the member 26, but lengthwise movement of the screw 41 results in similar lengthwise movement of the member 26. It will be seen, therefore, that by rotating the hand-wheel 44 the position of the tapered member 26 with respect to the casing 12 may be varied at will and the extent of the annular opening 51 between the member 26 and the mouth of the casing 12 may be correspondingly varied. Several positions of the member 26 are indicated in dotted lines in Fig. 4. As will be readily understood, the member 26 is adjusted close to the casing 12 when an especially dry product is desired, and if more moisture is admissible to be retained in the solid product, the annular opening 51 is enlarged by withdrawing the member 26 from the mouth of the casing 12.

The operation of the apparatus is as follows: The moisture containing material is introduced through the chute or hopper 15 and is kept from packing by the agitator blades 17 and is delivered by gravity on top of the section 25 of the press screw 14 by which it is fed forward between the screw 13 and the casing 12, the churning up and failure to feed heretofore commonly exhibited being prevented by the spring plate 23. As the material progresses between the screw 13 and the casing 12 and is held back by the member 26, the moisture is extracted and a portion of it passes out through the openings in the casing 12 and the pipe 14. After leaving the screw 13 the material passes toward the annular outlet 51 and is compressed, by the material following it, between the walls of the chamber 26 and the casing 12, and the extended openings afforded in the chamber 26 permit the extraction of a much larger quantity of moisture than is possible through the casing walls 12 alone. Furthermore, the member 26 being substantially stationary except when it is adjusted lengthwise, and the material traveling fairly slowly thereover, very favorable opportunity is presented for the escape of any moisture which may be forced out by the compression. In order to vary the size of the discharge opening 51, the hand-wheel 44 is operated to turn the screw 41 already described. By means of the outlet pipe 33 the moisture discharged into the member 26 is conducted away from the dry material which falls into any suitable receptacle or conveyer, as, for instance, the worm conveyer 52 arranged in the trough 53, by means of which the dry product may be conveyed away to any desired point.

It is to be understood that the precise form of apparatus shown in the drawings is for the purpose of illustration only and that my invention is not confined to such specific structure, but that departure may be

made therefrom and modifications may be made therein, within the scope of my claims, without departing from my invention or sacrificing any of its advantages.

Having thus described my invention, I claim:

1. In a screw press, a screw, a casing, means for supplying material between said screw and casing at one side of the screw, and means at the opposite side of the screw for preventing the passing of material away from the screw, substantially as set forth.

2. In a screw press, a casing, a screw therein, a chute or hopper extending across the casing and in free communication with the space between the screw and casing on one side, and a plate on the other side of the screw for retaining material in contact with the screw, substantially as set forth.

3. A screw press comprising a screw and a perforated casing, means for supplying material to said casing, and a plate of resilient material extending into the neighborhood of the periphery of the screw, substantially as set forth.

4. In a screw press, a screw, a perforated casing therefor, a chute or hopper for supplying material, and a plate of resilient material secured to the chute or hopper at one margin and extending into the neighborhood of the screw at the other margin, substantially as set forth.

5. In a screw press, a screw, a perforated casing therefor, a chute or hopper for supplying material, an agitator therein, and a thin curved plate of resilient material in said chute or hopper and secured thereto at one margin and extending into the neighborhood of the screw at the opposite margin, substantially as set forth.

6. In a screw press, a press screw and a casing therefor, a chute or hopper for supplying material, and a plate of resilient material secured to the side of said chute or hopper at one margin and extending over said screw at the opposite margin, substantially as set forth.

7. In a screw press, the combination of a screw having its core partly tapered and partly substantially cylindrical, a casing encircling said screw, a chute or hopper for delivering material in the neighborhood where the core is substantially cylindrical, and a resilient guiding means in said chute or hopper and extending into the neighborhood of said screw, substantially as set forth.

8. In a screw press, a press screw having a tapered core for a portion of its length and another substantially cylindrical portion, a casing therefor, and means for supplying material to said press in the neighborhood where the core of the screw is substantially cylindrical, substantially as set forth.

9. In a screw press, a perforated casing, a press screw therein, resilient means for directing material to said press screw at the feeding side thereof, and an agitating device adjacent to the resilient directing means, substantially as set forth.

10. In a screw press, a substantially cylindrical casing, a hollow tapered member within said casing and provided with perforated walls, said member having its largest or outer end of greater flare than the inner portion thereof, and means for forcing material between the walls of said casing and those of the said tapered member, substantially as set forth.

11. In a screw press, a substantially cylindrical casing, a hollow tapered member coaxial therewith and arranged within the mouth of said cylindrical member and provided with perforations in its walls, a pipe communicating with the interior of said tapered member for forming a discharge from the interior thereof, and means for forcing material between said casing and the tapered member, substantially as set forth.

12. In a screw press, a substantially cylindrical casing, a hollow tapered member with perforated walls coaxially arranged within said casing and having an increased flare at its outer unperforated end, a screw in said casing, a shaft extending through said tapered member, and means for preventing rotation of said tapered member and screw relative to said casing, substantially as set forth.

13. In a screw press, a substantially cylindrical casing open at one end, a frusto-

conical member with perforated walls axially arranged in the mouth of the casing, and having an outer unperforated part of increased flare, means for adjusting said member longitudinally of the casing to vary the extent of annular opening between said casing and member, and means for forcing material between said casing and member, substantially as set forth.

14. In a screw press, a substantially cylindrical casing, a screw therein and having a shaft arranged axially thereof, a frusto-conical member with perforated walls and having a central aperture through which the shaft extends, a screw-threaded sleeve having a bore through which the shaft also extends, a fixed abutment having a screw-threaded opening for said screw, and means of swivel connection between said sleeve and member, substantially as set forth.

15. In a screw press, a substantially cylindrical casing, a shaft extending axially therethrough, a screw on a part of said shaft, a frusto-conical member with perforated walls axially arranged on said shaft, means to prevent the rotation of said member, a screw-threaded sleeve on said shaft and having a swivel connection with said member, and means for imparting rotation to said threaded sleeve, substantially as set forth.

In testimony that I claim the foregoing, I have hereunto set my hand, this 17th day of July, 1914.

CHARLES F. STEHLIN.

Witnesses:

M. A. JOHNSON,
H. TRAUTVETTER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

It is hereby certified that in Letters Patent No. 1,152,857, granted September 7, 1915, upon the application of Charles F. Stehlin of New Rochelle New York, for an improvement in "Screw-Presses," errors appear in the printed specification requiring correction as follows: Page 4, line 33, claim 12, after the word "member" insert the words *and screw*; same page, line 35, strike out the words "and screw;" and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of September, A. D., 1915.

[SEAL.]

J. T. NEWTON,

Acting Commissioner of Patents.