June 12, 1928. 1,673,186

H. A. CUMFER

SELF THREADING SATURATOR AND COATER

Filed Feb. 4, 1922 3 Sheets-Sheet 1

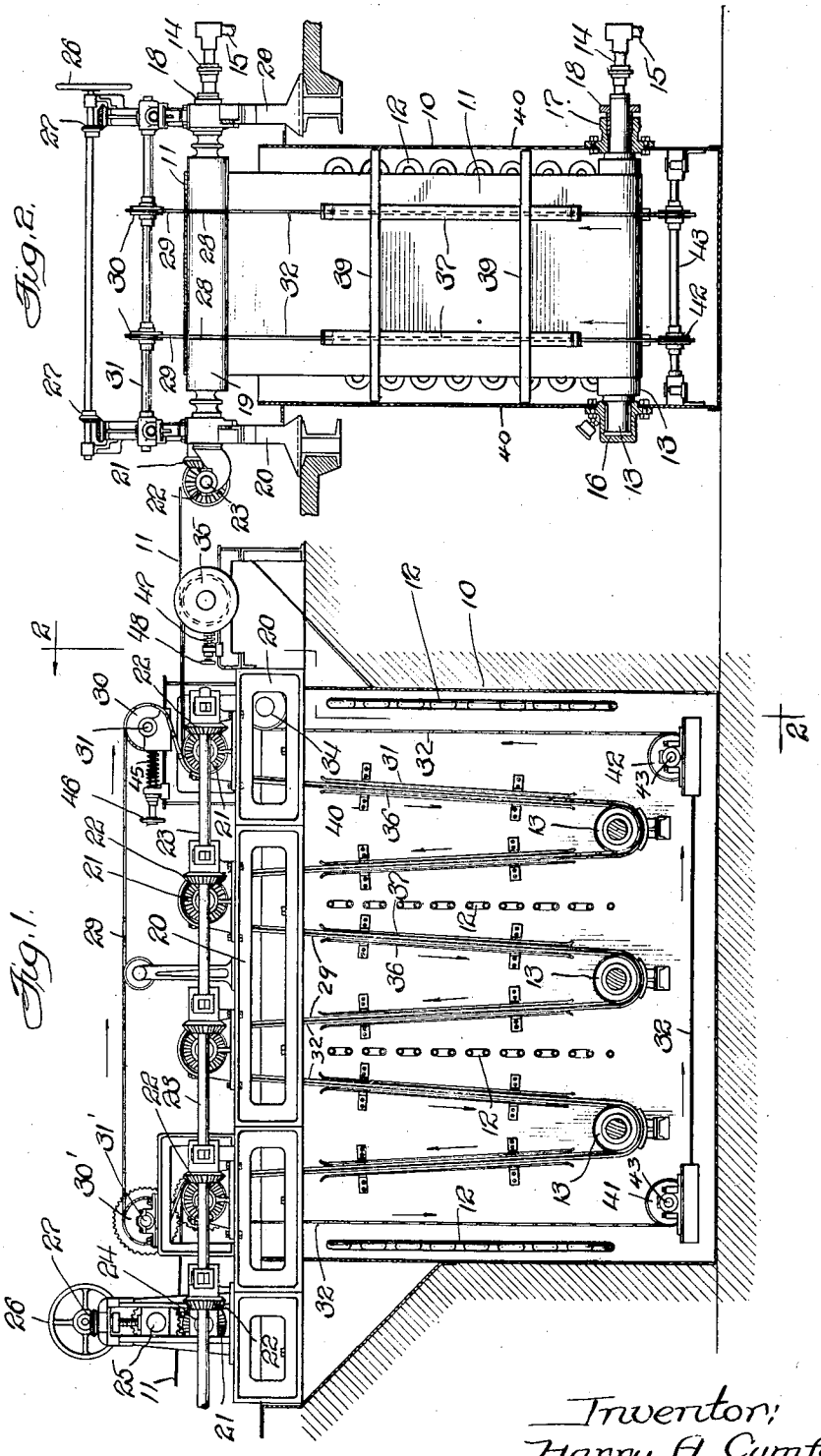


Fig. 2.

Fig. 1.

Inventor:
Harry A. Cumfer
By Foree Bain & Hinkle
Attys

June 12, 1928. 1,673,186

H. A. CUMFER

SELF THREADING SATURATOR AND COATER

Filed Feb. 4, 1922 3 Sheets-Sheet 2

Fig. 3.

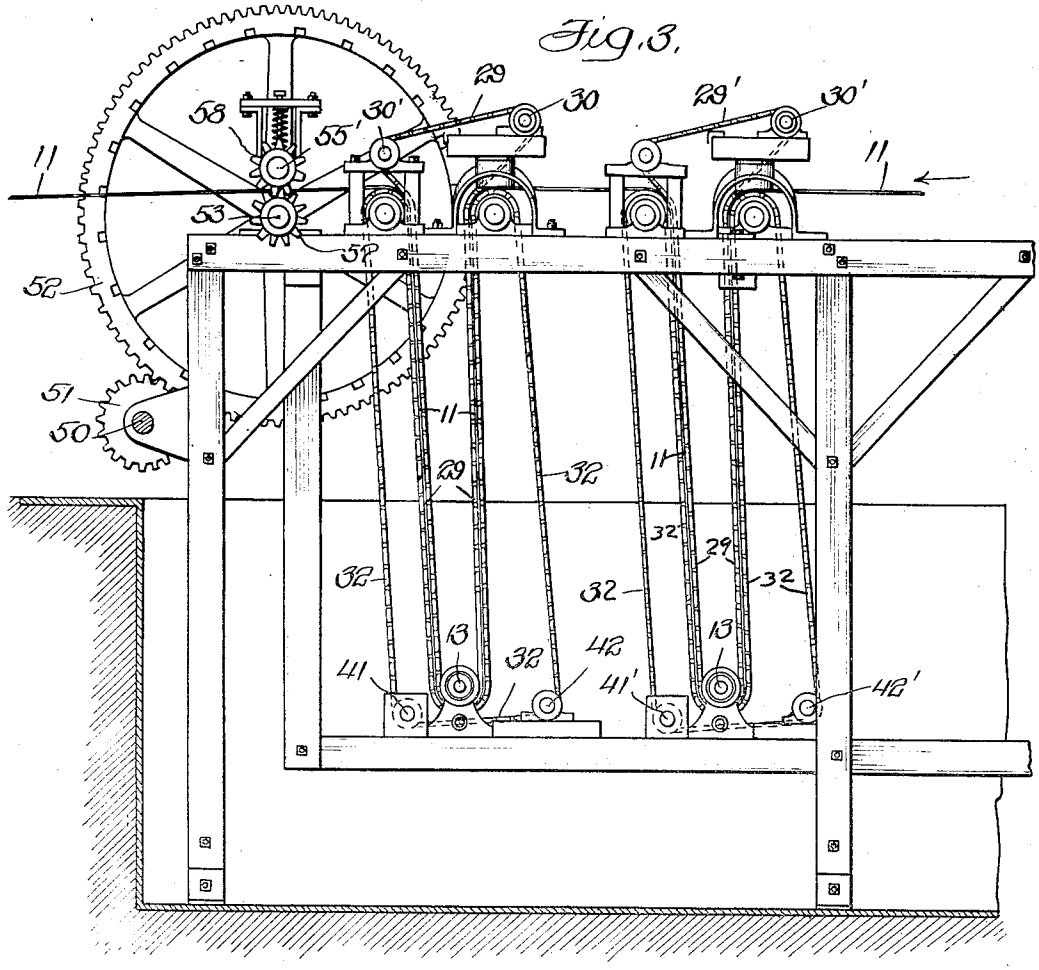


Fig. 7.

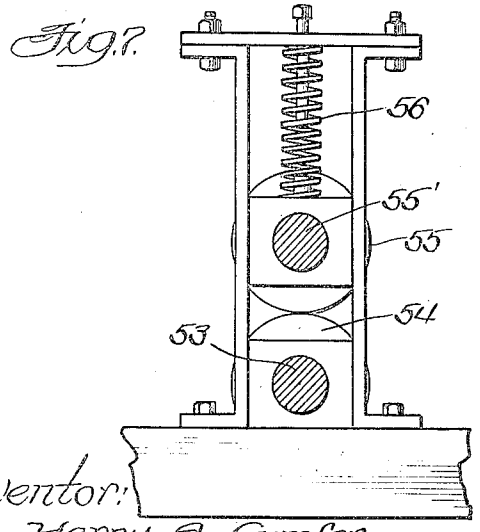
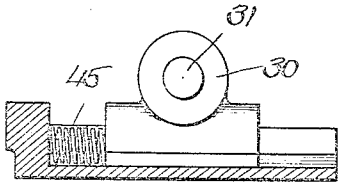


Fig. 6.



Inventor:
Harry A. Cumfer
By Forrel Rain & Hunkler Attys.

June 12, 1928. 1,673,186

H. A. CUMFER

SELF THREADING SATURATOR AND COATER

Filed Feb. 4, 1922 3 Sheets-Sheet 3

Fig. 4.

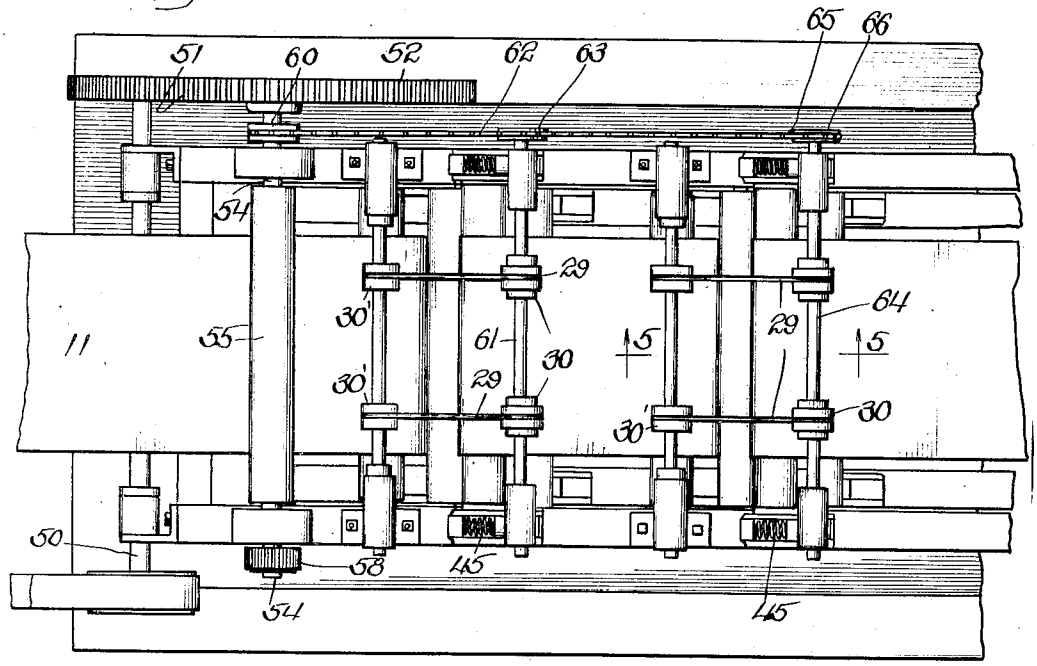
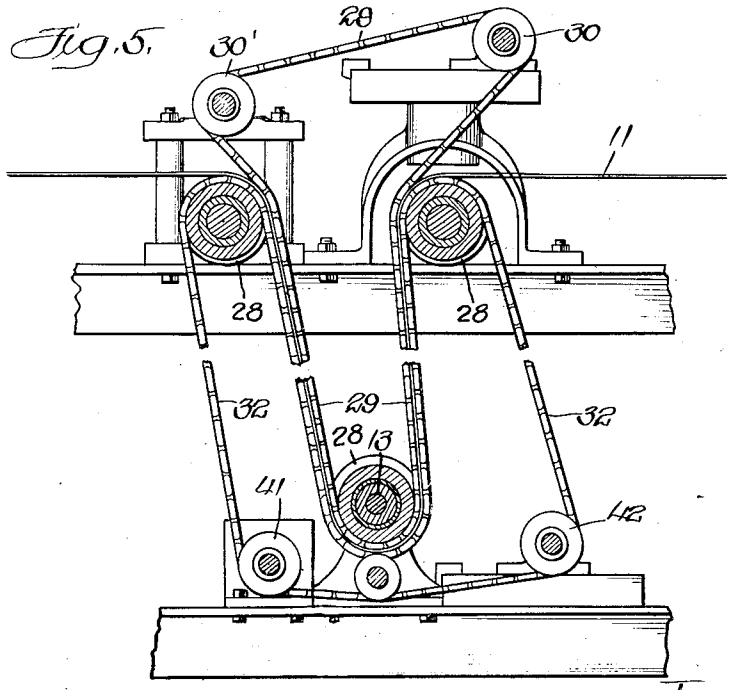


Fig. 5.



Inventor:
Harry A. Cumfer
By Fonce Bain & Hinkle
Attys.

Patented June 12, 1928. 1,673,186

UNITED STATES PATENT OFFICE.

HARRY A. CUMFER, OF CHICAGO, ILLINOIS, ASSIGNOR TO GUYTON & CUMFER MFG. CO., A CORPORATION OF ILLINOIS.

SELF-THREADING SATURATOR AND COATER.

Application filed February 4, 1922. Serial No. 534,256.

This invention relates to self-threading saturators and coaters.

One of the objects of the invention is to provide a saturator and coater, for a moving sheet, which is self-threading.

Another object is to provide a saturator and coater in which minimum surfaces of the sheet are covered, and in such small areas as not to interfere with the free and full absorption of the saturant.

Another object is to provide a saturator and coater by which the entire length of that portion of the sheet submerged in the hot saturant, and while relatively soft, is positively driven by continuous contact of a driving instrumentality, one on each side of the sheet.

Another object of the invention is to provide a saturator and coater which will feed a sheet thru a body of hot liquid saturant, or coating material, without requiring any adjustment of the parts to thread the sheet thru the machine.

Other objects and advantages of the invention will become readily apparent, to persons skilled in the art, from a consideration of the following description when taken in conjunction with the drawings, wherein:—

Fig. 1 is a side elevation of one form of the machine showing parts in section.

Fig. 2 is a section taken on line 2—2 of Fig. 1.

Fig. 3 is a side elevation of a modified form of the machine showing the tank and driving shaft in section.

Fig. 4 is a plan view of Fig. 3.

Fig. 5 is an enlarged section taken on line 5—5 of Fig. 4 showing one of the sheet-feeding units.

Fig. 6 is a side elevation of one of the bearings for the feed and guide chains to maintain them under proper tension.

Fig. 7 is an enlarged elevation of the bearing for sheet feeding rolls showing the shaft in sections.

In all the views the same reference characters are employed to indicate similar parts.

Figs. 1 and 2 show a plurality of loop units contained in a tank and a single pair of chains near each edge of the sheet common to all of the units, while Figs. 3 and 4 show a machine having a plurality of units and separate pairs of cooperating chains for each unit.

The machine is especially intended for feeding a sheet of felt, or other fibrous material, thru a hot saturant and coater, preferably of an asphaltic nature, in the process of making sheet roofing. In situations of this kind the sheet is of necessity kept in constant motion and to receive the best results it should be passed thru the saturant several times, or, in other words, it should remain in the saturant as long as may be necessary. To this end I arrange the saturator so that the sheet will traverse the tank in a series of loops to increase the extent of its surface contact with the saturant or coating material.

The saturator will be explained in connection with its use when employed for saturating continuously moving sheets, of fibrous material, in the process of making asphalt roofing, and the like.

A tank 10 is to be substantially filled with asphaltic composition heated to the proper temperature and with which the moving sheet 11 is to be saturated, or subsequently coated. In fact one of the saturators and coaters should be employed for saturating the sheet with an asphaltic compound of suitable character and subsequently another machine, of the same type, may be employed for coating the saturated sheet with a similar compound of a different character or consistency. In either case the sheet is automatically threaded thru the machine by the guiding and driving instrumentalities to be hereafter more specifically pointed out.

The asphalt may be heated in a tank 10 by any suitable means, such for example, as a series of steam or oil conveying coils 12, which may be connected to any suitable source of heat supply. Near the bottom of the tank 10 are located a series of spaced apart parallel rollers 13. The rollers may each be hollow and may be connected by a fitting 14 to a steam or oil conveying pipe 15 for the purpose of heating the rollers to a temperature substantially the same as the temperature of the compound contained in the tank. A bearing 16 is secured to the tank wall and is closed at one end so as to prevent leakage of the contents of the tank, and a similar bearing 17, is provided with a stuffing box 18 for the same purpose.

Another series of rollers 19 are substantially equally spaced apart and are located on a frame 20 at the upper end of the tank 10. Each of the rollers 19 is provided with a miter gear 21 that is in mesh with a similar gear 22 on the main driving shaft 23, so that each of the rollers 19 is positively driven in the same direction for the purpose of moving the sheet 11 thru the tank.

The sheet 11 is positively driven by the two cooperating pinch rolls 24 and 25, the latter being vertically adjustable by the hand wheel 26 and suitable gearing 27.

Near each end of the rollers 19 is a groove 28 shown in Fig. 2 and Fig. 5, to receive one of the flexible bands or guide chains 29, one near each end of the roller. The chain 29 passes over chain guiding sprocket wheels 30—30′ that are secured to shafts 31—31′, respectively, and then over the top of the moving sheet 11 and under the roller 13 in a groove similar to the groove 28, so that its outer surface is flush with the surface of the roller. The chain 29 then passes over the next roller 19 and then down under the next roller 13 in the tank, and so on thru the machine, thus forming a series of loops. Each chain 32, one near each edge of the sheet 11, passes upwardly at the right side of the tank, in Fig. 1, and over the roller 34 and then under the roller 35 under the sheet 11 and in a groove 28 of the first roller 19, the latter shown more clearly in Fig. 2, then downwardly over the sheet and under roller 13 and up in a groove 28 of the next roller 19, and so on thru the machine; so that in this way there is provided a chain on each side of the sheet, chain 29 always on one side and chain 32 on the other, and a pair of chains near each edge of the sheet, and therefore every portion of the sheet is guided and driven by the chains and rollers.

To maintain the chains in more intimate contact with the intervening sheet, fixed guide strips 36 and 37, one on each side, are secured to the transverse strips 39. The latter are secured at their ends to the tank's sides by plates 40. The chains 32 pass under grooved wheels 41 and 42 serving as chain guides near the bottom of the tank. There is a pair of such wheels at each end of the tank secured to shafts 43, as more clearly shown in Fig. 2, and thus the chains 29 pass idly over the top of the machine, while the chains 32 are returned near the bottom of the tank. To maintain proper tension of the chains 29 and 32 the wheel 30, in the first instance, is longitudinally movable and yieldingly held in place by an open helical spring 45, the tension of which may be adjusted by the hand wheel 46, while the roller 35 is provided with a similar spring 47 and a hand wheel 48, the operation of which will be readily understood.

In Figs. 1 and 2 I have shown a single pair of chains on each side of the machine for guiding the sheet 11 consecutively thru three depending loops, while in Figs. 3, 4 and 5 I have shown a pair of chains on each side of the sheet for each loop forming separate units, each being positively driven by the mechanism that provides means for moving the sheet.

In Figs. 1 and 2 the main drive shaft 23 may be rotated by any suitable means, while in Fig. 3 the drive shaft 50 is provided with a geared pinion 51, which is in mesh with a gear wheel 52 on the shaft 53 and this shaft carries the feed roll 54 which is in cooperation with the pinch roll 55 that is on the shaft 55′ drives the sheet 11 thru the machine. The feed rolls 54 and 55 are yieldingly held together by means of the spring 56, more clearly shown in Fig. 7, and the shafts 53 and 55′ carrying these rolls are geared together by pinions 57 and 58. The shaft 55′ carrying the roll 55 also carries a pulley 60 which drives a shaft 61 carrying the pulleys 30 by a chain 62 and a sprocket wheel 63, and the shaft 64 carrying the chain pulleys 30 positively driven by a chain 65 on the sprocket wheel 66.

While I have herein shown two embodiments of the device in which a series of loops are driven by two pairs of chains, and the modification in which a single loop is driven by an individual pair of chains, it is manifest that other changes of structure and modifications are possible within the scope of the appended claims. The distinctive feature of the invention lies in the fact that a sheet to be impregnated or coated with a material within the tank may be threaded thru the machine automatically by means of the feeding arrangement and the chain guides and fixed guides to hold the chains in contact with the sheet and without the necessity of moving any of the sheet feeding means out of the tank.

The chains, one on each side of the sheet, serve as guides to conduct and direct the sheet about and below the submerged rollers and above and over the upper rollers, so that when a sheet is started into the machine the guiding and driving instrumentalities will carry it thru the machine without further attention.

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

1. In a device of the character described, the combination with a tank, of a series of grooved parallel spaced rollers in a horizontal plane near the top of said tank, another series of grooved parallel rollers spaced in vertical planes intermediate said other rollers, a plurality of flexible bands associated with said rollers to engage the grooves in the rollers individual to said bands whereby said bands are adapted to receive a sheet

therebetween, and means for driving said rollers.

2. In a device of the character described, a tank, a plurality of grooved parallel rollers spaced near the top of said tank, a plurality of grooved parallel rollers spaced near the bottom of said tank intermediate said first named rollers, flexible means trained in the grooves of the lower rollers and movable therewith, other flexible means extending about said lower rollers and trained in the grooves of the upper rollers whereby said flexible means are adapted to receive a sheet therebetween, and driving means for the upper rollers.

3. A self-threading saturator and coater comprising a tank; a frame mounted above the tank; a series of upper rollers rotatably supported on the frame; a series of lower rollers supported near the bottom of the tank, all said rollers having grooves near their respective ends; a continuous chain, at each end, passing thru the grooves of the lower rollers and above the upper rollers; another continuous chain near each end of said rollers passing below the lower rollers and thru the grooves of the upper rollers and means to drive the chains and a sheet to be contained therebetween.

4. A self-threading saturator and coater comprising a tank; a frame mounted above the tank; a series of upper rollers rotatably supported on the frame; a series of lower rollers supported near the bottom of the tank, all said rollers having grooves near their respective ends; a continuous chain, at each end, passing thru the grooves of the lower rollers and above the upper rollers; another continuous chain near each end of said rollers passing below the lower rollers and thru the grooves of the upper rollers; chain guides above the upper rollers to return one pair of chains; chain guides below the lower rollers to return the other pair of chains and means to drive the chains and a sheet to be contained therebetween.

5. In a machine, the combination with a tank, of a multiple series of alternately spaced grooved upper and lower rollers, the rollers of each of said series being rotatably mounted in horizontal planes, sheet carrying means comprising continuous flexible bands in confronting relation, one of said bands in grooves of the upper rollers and the other band in grooves of the lower rollers to cause the sheet to engage the rollers in its movement through said tank, and means for imparting movement to said rollers and bands.

In testimony whereof I hereunto subscribed my name.

HARRY A. CUMFER.