T. F. MORSE.

SEPARATING MACHINE.

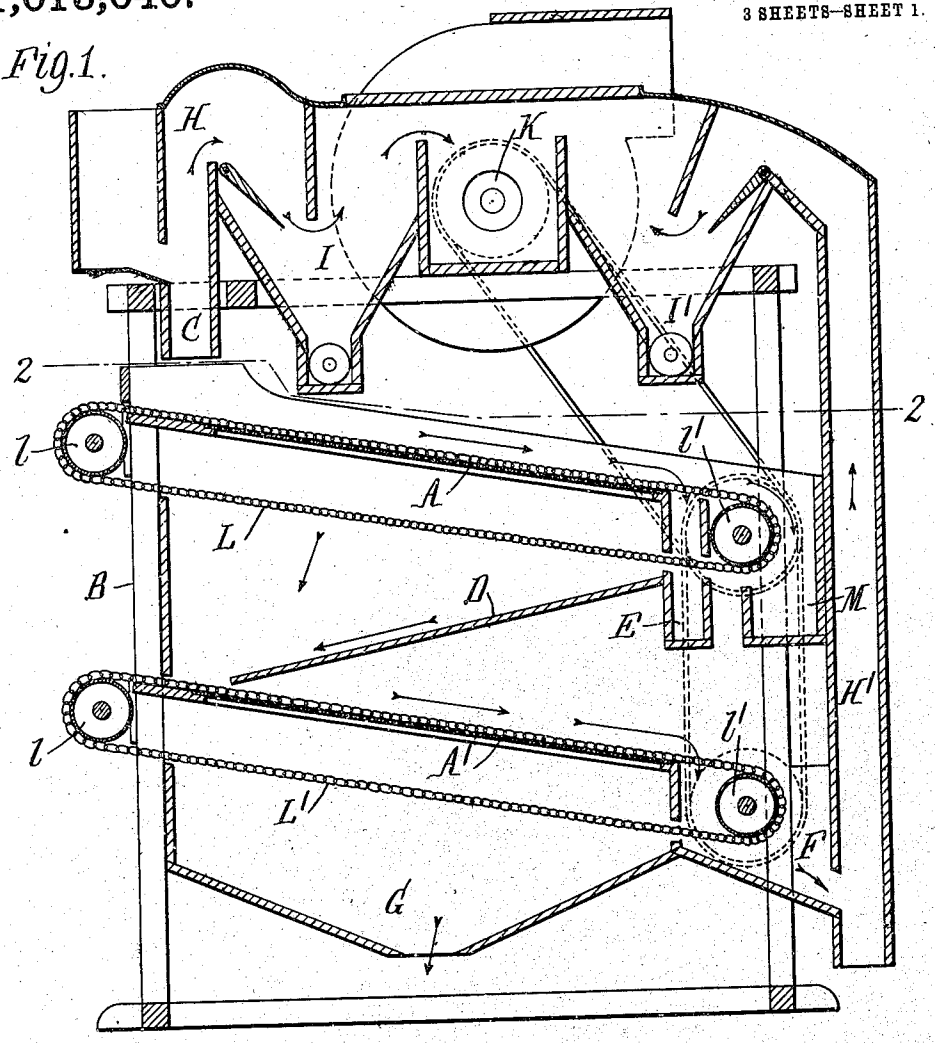
APPLICATION FILED MAY 12, 1910.

1,013,040.

Patented Dec. 26, 1911.

3 SHEETS—SHEET 1.

Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 2.

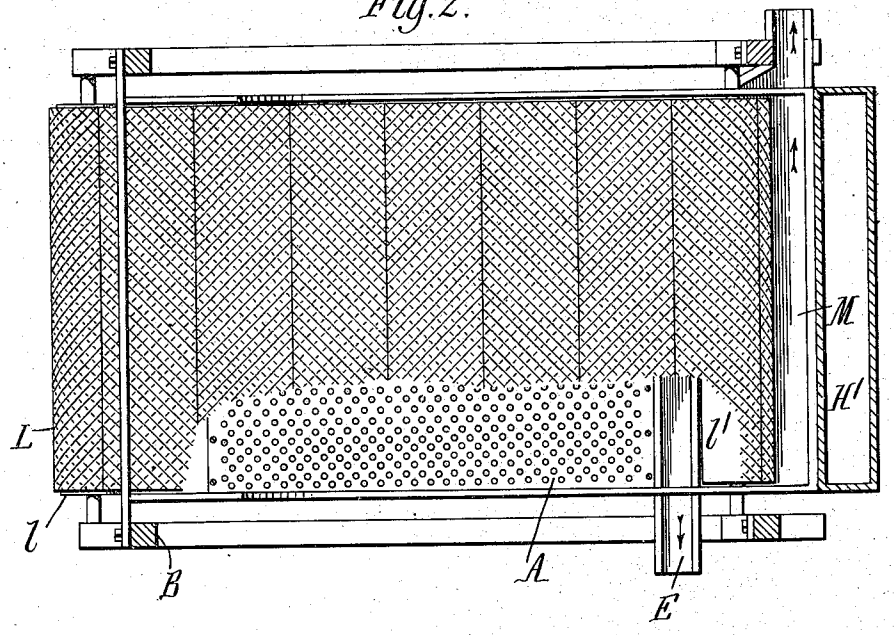



Fig. 3.

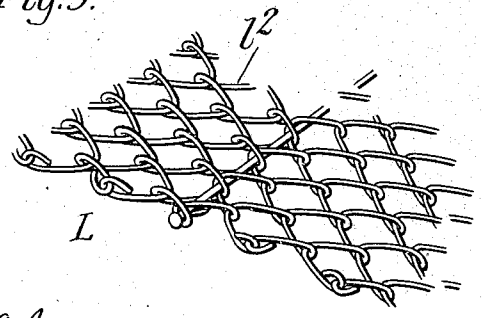
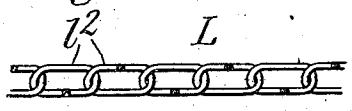



Fig. 4.

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3 SHEETS—SHEET 3.

Fig. 5.

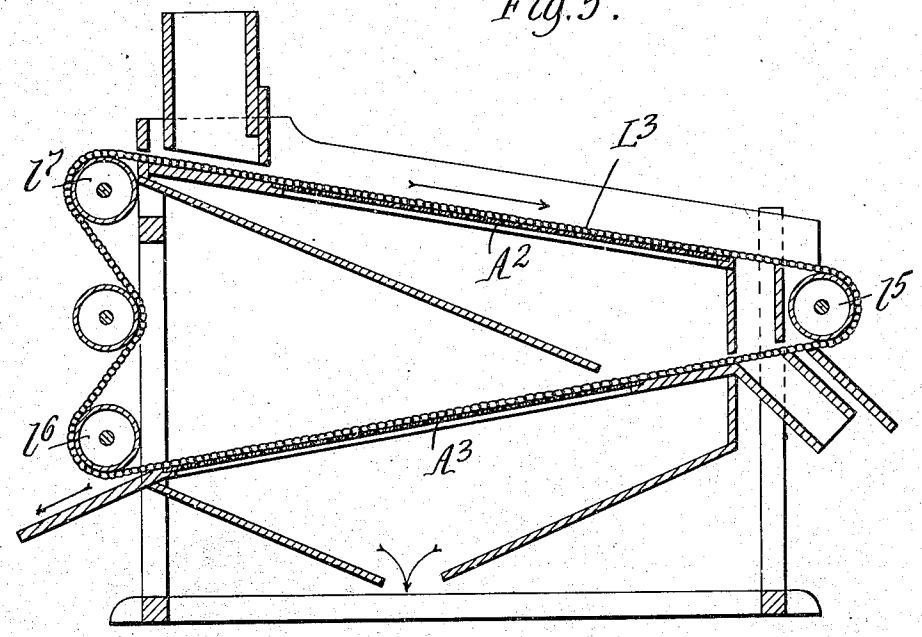
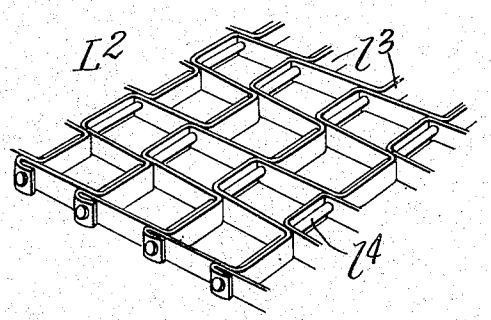



Fig. 6.

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# UNITED STATES PATENT OFFICE.

THEODORE F. MORSE, OF SILVER CREEK, NEW YORK, ASSIGNOR TO HUNTLEY MANUFACTURING COMPANY, OF SILVER CREEK, NEW YORK.

## SEPARATING-MACHINE.

1,013,040. Specification of Letters Patent. Patented Dec. 26, 1911.

Application filed May 12, 1910. Serial No. 560,964.

*To all whom it may concern:*

Be it known that I, THEODORE F. MORSE, a citizen of the United States, residing at Silver Creek, in the county of Chautauqua and State of New York, have invented a new and useful Improvement in Separating-Machines, of which the following is a specification.

This invention relates to grain separating or cleaning machines in which a perforated screen is employed for separating impurities or foreign matter from the grain or for separating grain of one kind from another.

The object of the invention is to provide machines of this sort with an open meshed belt which travels along on the surface of the screen and performs the double function of scraping the screen so as thereby to move or agitate the material thereon and cause the finer grains or particles to fall through the perforations of the screen and the coarser grains or particles to tail off at one end of the screen, and also of holding straws, stones, sticks and other large foreign particles off of the layer of material on the screen and conveying these particles to a separate point of discharge, thereby effecting a preliminary separation of such particles from the other material and preventing the large particles from coming into contact with the screen and from mingling with the material thereon and thereby impeding or interfering with the separating action of the screen. To this end, an open meshed belt is arranged to travel lengthwise on the separating screen and the material to be separated is fed onto this belt at one end of the screen. The meshes or interstices of the belt are of such size and shape that the large particles of foreign matter, such, for instance, as straws, stones, twigs, nails, &c., will be intercepted by this belt and ride thereon and be discharged therefrom at the tail end of the screen without coming into contact with the screen, while the grain and finer impurities will pass through the meshes of the belt onto the screen and will be scraped, moved or dragged and distributed over the screen by the traveling belt, the finer grains or particles passing through the perforations of the screen while the larger grains or particles tail off at the end of the screen. The depth or thickness of the belt is such as to hold the large particles riding thereon out of contact with the layer or body of material on the screen so as not to interfere with the free agitation or movement of the grains and smaller impurities on the screen in the interstices of the belt.

In the accompanying drawings, consisting of three sheets: Figure 1 is a sectional elevation of a grain separating machine, embodying the invention. Fig. 2 is a sectional plan thereof in line 2—2, Fig. 1. Fig. 3 is a perspective view, on an enlarged scale, of a portion of one of the screen belts. Fig. 4 is a longitudinal section of a portion of the belt. Fig. 5 is a sectional elevation of a separating machine of modified construction. Fig. 6 is a fragmentary perspective view of a screen belt of modified construction.

Like reference characters refer to like parts in the several figures.

In Figs. 1 and 2 the invention is shown as applied to a dustless separator of well known type in which upper and lower screens are employed for effecting the separation, and suction means are provided for removing the dust from the material as it is fed onto the upper screen and from the cleaned grain as it tails off from the end of the lower screen. In these figures, A represents a coarse screen for effecting a preliminary separation of the coarse impurities or particles from the grain and A′ represents a fine screen for separating the fine impurities from the grain which passes through the openings of the coarse screen. These screens, which may be of any suitable type, are mounted one above the other in a frame B of any suitable construction. They may be stationary or vibrating screens, the former being shown.

The material is fed onto the head end of the upper screen through a feed spout C and the grain, small seeds and sand or other material which pass through the openings of this screen are directed onto the head end of the lower screen A′ by an inclined board D arranged between the screens. The fine tailings from the upper screen A, consisting of pebbles and other foreign particles or grains which are too large to pass through the openings of this screen pass off of the tail end thereof into a fine tailings chute E leading to one side of the machine. The clean grain passes off of the tail end of the lower screen A′ onto a chute F which dis-

charges it from the machine at a suitable point, and the sand or other fine impurities and small seeds passing through the openings of this screen A′ fall into a hopper G which discharges them at a suitable point.

H represents a suction leg which connects the feed spout C with a dust settling chamber I, and H′ represents a suction leg which connects the discharge chute F for the good grain with a dust settling chamber I′. Air is exhausted from the settling chambers by a fan K and the suction thus created draws the dust from the material through the suction legs into the settling chambers I I′, where it settles and is removed by conveyers in the bottoms of the settling chambers.

The construction thus far described is common to machines of this type and the operation of such machines is well understood.

L represents an endless belt which is arranged so as to travel lengthwise over the screen A in contact therewith, and L′ represents a belt similarly arranged with respect to the lower screen A′. As shown, the belt for each screen passes around pulleys or drums $l$ $l'$ suitably journaled adjacent to the opposite ends of the screens and the belts are driven by any suitable means, for instance, the shaft of the pulley $l'$ for each belt may be belted to the shaft of the fan K. The chute E for the fine tailings from the upper screen is located between the tail end of this screen and the adjacent drum $l'$ for the belt L, the lower run of the belt passing through suitable openings in the walls of the chute, and sufficient space is likewise left between the tail end of the lower screen and the adjacent belt drum $l'$ for the discharge of the clean grain tailing off of this screen.

Each of the belts L L′ is composed of articulated or flexibly connected wires or metal strips having portions extending both lengthwise and crosswise of the belt so as to form meshes or interstices throughout the extent of the belt.

Figs. 3 and 4 show a belt of practical construction which is composed of oval or flattened wire coils $l^2$ which extend transversely of the belt and are interlocked with each other. The flat lower portions of the coils rest and travel on the upper surface of the screen and act to scrape, move or agitate the material on the screen, while the flat upper portions of the coils lie in a plane some distance above the surface of the screen so that as the material discharges from the feed spout C the grain and other particles which are small enough pass through the meshes of the belt onto the head end of the upper screen, but the belt intercepts the coarse impurities which lodge on the raised upper surface of the belt and are supported thereby above or out of contact with the layer of material on the screen. The coarse impurities or tailings ride on the upper surface of the belt and fall therefrom into a suitable discharge chute M as the belt passes around the drum $l'$ at the tail end of the screen. Thus the belt, in addition to scraping the screen, also effects a preliminary separation of the straws, twigs, and nails or other coarse foreign particles from the grain and finer impurities which pass through the belt to the screen, and therefore materially lessens the work to be done by the screen and increases the capacity of the machine.

The belt can be of other construction adapted to operate in a similar manner. For instance, the belt $L^2$ can, as shown in Fig. 6, be composed of zig-zag metal strips $l^3$ flexibly connected by rods or wires $l^4$. These strips also form meshes or interstices throughout the extent of the belt, and their lower edges act to scrape the screen, while their upper edges serve to support the coarse foreign particles above the layer of material on the screen.

In the case of the lower screen, the belt L′ does not perform the separating function above described and serves merely to scrape or move the material over this screen.

The invention is also applicable to other types of separating machines. Fig. 5 shows a machine of different construction in which a single endless traveling belt, such as described, is arranged to coöperate with two screens. In this construction the screens $A^2$ $A^3$ are oppositely inclined. The belt $L^3$ passes around a pulley or drum $l^5$ adjacent to the tail end of the screen and the head end of the lower screen and around two pulleys or drums $l^6$ and $l^7$ adjacent to the opposite ends of the screens. The upper run of the belt travels in one direction over the upper screen $A^2$ and the lower run of the belt travels in the opposite direction over the lower screen $A^3$. The belt thus coöperates with the upper screen $A^2$ to separate the coarse foreign particles from the material delivered to this screen and discharge them at a different point from the finer impurities tailing off of the screen and to scrape the screen, and coöperates with the lower screen to scrape and distribute the material over the same, thus operating in the same manner as the belts in the machine first described.

While in both of the machines described the separation is effected in two stages by two screens, with both of which the belt or belts coöperate, the invention is not restricted to such arrangements and a single screen and a belt coöperating therewith, as in the case of the upper screens in the machines described, can be employed.

I claim as my invention:

1. In a separating machine, the combination with a separating screen, of a belt which

travels over said screen and is provided with open meshes which are of a size to permit the finer material to pass through them onto the screen and to intercept the coarser material, said belt having portions which engage the face of said screen and move the finer material thereon and portions which are spaced therefrom and support and carry the coarser material, substantially as set forth.

2. In a separating machine, the combination with a separating screen, of a belt which travels on the upper surface of said screen and is provided with open meshes which are of a size to permit the finer material to pass through them onto the screen and to intercept the coarse material, said belt having portions located above the surface of the screen and spaced therefrom which support and carry the coarser material, substantially as set forth.

3. In a separating machine, the combination with a separating screen, of a belt which travels over said screen and is provided with open meshes which are of a size to permit the finer material to pass through them onto the screen and to intercept the coarser material, said belt having portions which move the finer material on the screen and portions which support and carry the coarser material, and separate means at the tail end of said screen for receiving the coarser material from said belt and the material which tails off from said screen, substantially as set forth.

4. In a separating machine, the combination with a separating screen, of a belt which travels over said screen and extends beyond the tail end thereof, said belt having open meshes which are of a size to permit the finer material to pass through them onto the screen and to intercept the coarser material, and having portions which move the finer material on the screen and portions which support and carry the coarser material, means for feeding the material onto said belt, means at the tail end of said screen below said belt for receiving the material tailing off from said screen, and means arranged beyond the tail end of said screen at the end of said belt for receiving the coarser material from said belt, substantially as set forth.

5. In a separating machine, the combination with a separating screen, of a belt which travels over said screen and has open meshes which are of a size to permit the finer material to pass through them onto the screen and to intercept the coarser material, said belt having portions which move the finer material on the screen and portions which support and carry the coarser material, means for feeding the material onto said belt, a discharge chute for receiving the material tailing off from said screen, and a second discharge chute arranged at the tail end of said screen beyond said first mentioned discharge chute for receiving the coarser material from said belt, substantially as set forth.

6. In a separating machine, the combination with a separating screen, of an endless belt which travels over said screen upon drums arranged adjacent to the opposite ends of said screen, said belt having open meshes which are of a size to permit the finer material to pass through them onto the screen and to intercept the coarser material and having portions which move the finer material on the screen and portions which support and carry the coarser material, means for feeding the material onto said belt, a discharge chute for the material tailing off from said screen arranged between the tail end of said screen and the adjacent drum and a discharge chute for receiving the coarser material from said belt arranged beneath said drum, substantially as set forth.

7. In a separating machine, the combination with a separating screen, of a belt which travels on said screen and is composed of portions which extend at an angle to each other and form open meshes in the belt through which the finer material is adapted to pass onto the screen, the thickness of said belt relative to the open meshes therein being sufficient to prevent the coarser material which falls upon the upper surface thereof from coming into contact with the screen, substantially as set forth.

8. In a separating machine, the combination with a separating screen of a belt which travels over said screen and is provided with open meshes which are of a size to permit the finer material to pass through them onto the screen and to intercept the coarser material, said belt having portions on its under face which engage the face of the screen and move the finer material thereon, and portions on its upper face which support and carry the coarser material, the thickness of said belt relative to the said meshes therein being sufficient to prevent the coarser material carried by its upper surface from coming into contact with the screen, substantially as set forth.

Witness my hand in the presence of two subscribing witnesses.

THEODORE F. MORSE.

Witnesses:
T. H. COWDIN,
C. G. HAMMOND.