(No Model.) 2 Sheets—Sheet 1.

M. A. SUTHERLAND.

WIRE APRON.

No. 389,261. Patented Sept. 11, 1888.

Fig. 1.

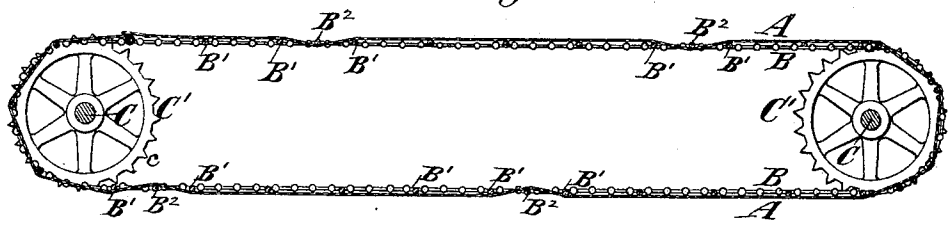


Fig. 2.

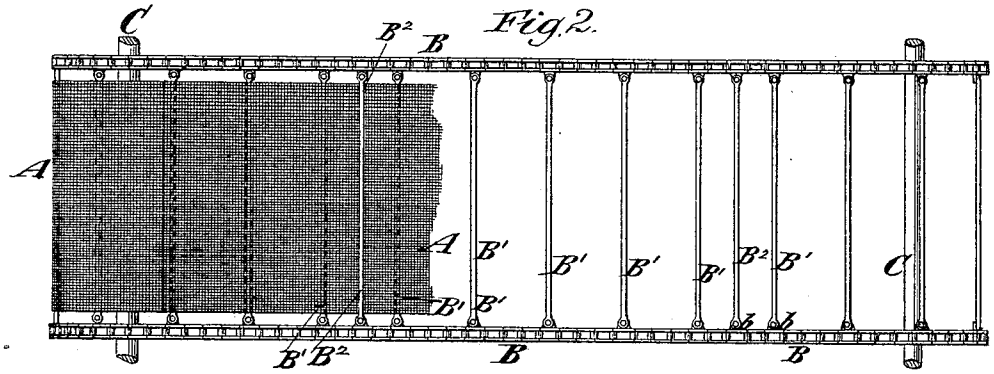


Fig. 3.

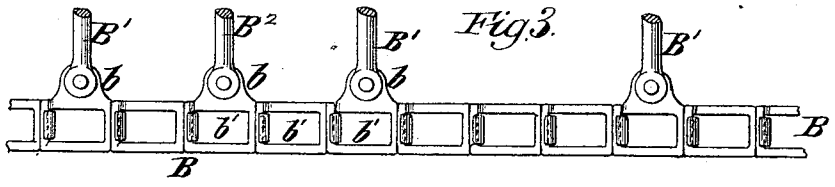


Fig. 4.



Fig. 5.



Fig. 6.

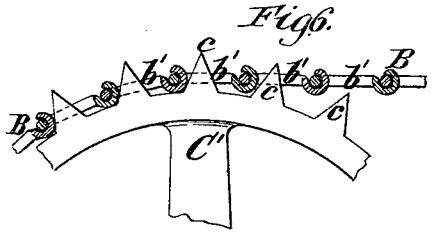
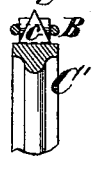


Fig. 7.



Witnesses:
C. L. Sundgren.
Chas. Haynes.

Inventor:
Mosher A. Sutherland,
by his attys
Brown & Hall.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

M. A. SUTHERLAND.

WIRE APRON.

No. 389,261. Patented Sept. 11, 1888.

Fig. 8.

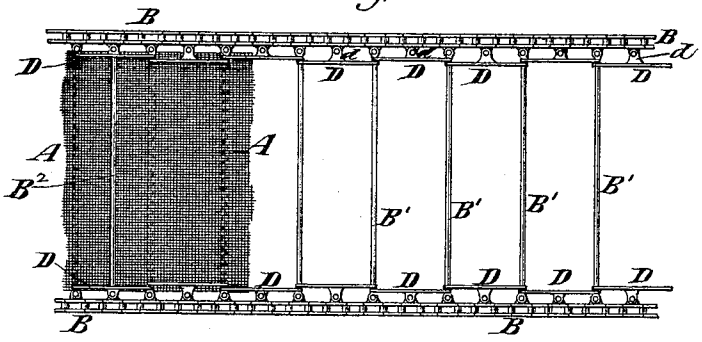


Fig. 9.

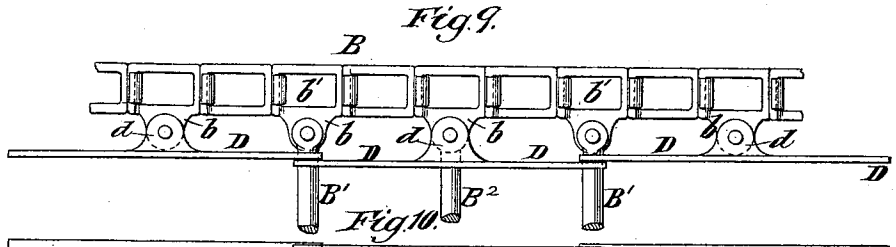
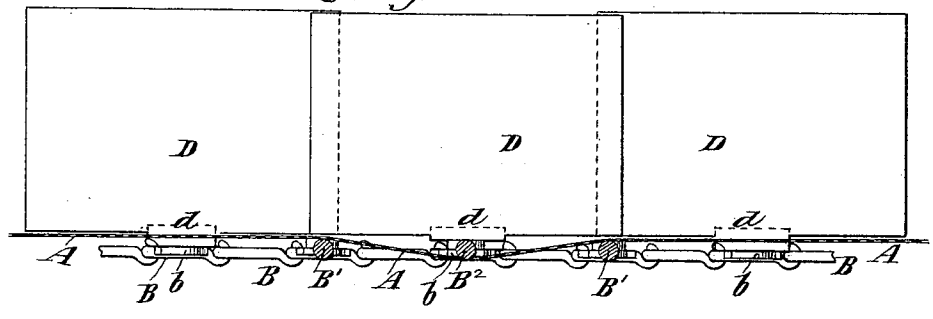


Fig. 10.



Witnesses:
C. L. Sundgren,
Joseph W. Roe.

Inventor:
Mosher A. Sutherland,
by his attys
Brown & Hall.

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

MOSHER A. SUTHERLAND, OF NEW YORK, N. Y.

WIRE APRON.

SPECIFICATION forming part of Letters Patent No. 389,261, dated September 11, 1888.

Application filed November 23, 1887. Serial No. 255,996. (No model.)

To all whom it may concern:

Be it known that I, MOSHER A. SUTHERLAND, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Machinery for Operating Wire Aprons, of which the following is a specification.

My invention relates more particularly to apparatus for carrying and imparting to an apron of wire-cloth a progressive motion for use in drying apparatus, but may be embodied in machinery for moving wire aprons for other purposes. Such machinery usually consists of an endless carrier operated by toothed wheels and composed of parallel endless chains connected by rods or bars extending between them. In some cases the wire-cloth apron has been attached at its opposite edges at intervals to the chains themselves, and in some cases the apron has been tied to the rods or bars; but with either method of securing the apron to the carrier it has been liable to tear loose therefrom at its point of attachment or else to tear between the points of attachment.

In carrying out my invention the apron is placed between the chains upon the outside of the rods or bars which connect them, and is secured in place by other rods or bars, which connect the chains and which lie upon the outside of the apron, and the apron at its two ends may be secured by tying with soft wire to a single rod or bar extending between the chains or to two rods or bars placed very near together. The rods or bars which are placed outside the apron support the latter during its return movement on the under side and prevent it from dropping away from the rods or bars outside which the apron is placed. The chains are constructed upon their inner edges with projecting lugs or ears on certain of their links, and to these lugs or ears are bolted the ends of the cross bars or rods, and the lugs or ears also, by the edges of the apron striking against them, prevent the lateral shifting of the apron.

In drying material—such as malt—upon the apron it is necessary to confine it to prevent its lateral escape from the apron, and to this end I provide upon each chain, and beyond the edges of the apron, side plates or guards, which are made in sections lapping upon each other, so as to form a continuous wall without any gap. The guard-sections may have each a lug or ear, whereby they are secured to the lugs or ears on the chain-links.

The invention consists in novel combinations, which are above referred to and hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal section through an apron and its carrier embodying my invention. Fig. 2 is a plan of the apron and carrier, a portion of the apron being removed to show more clearly the construction of the carrier. Fig. 3 is a plan of a portion of one of the chains and the rods which connect the chains, upon a larger scale. Figs. 4 and 5 are sectional views illustrating two ways of securing the ends of a wire apron to the rods or bars which connect the chains. Figs. 6 and 7 are sectional views of a portion of one of the chain-wheels and a portion of the chain, taken, respectively, in the plane of rotation of the wheel and in a plane transversely through the rim of the wheel. Fig. 8 is a plan of a portion of the apron and the carrier with its side walls or guards; and Figs. 9 and 10 are respectively a plan and longitudinal section of a portion of the carrier, showing more clearly the plates or sectional guard upon a larger scale.

Similar letters of reference designate corresponding parts in all the figures.

A designates the wire-cloth apron which it is desired to operate and which is upon an endless carrier. This carrier is composed of chains B, which are endless and extend parallel with each other, and at short intervals apart are connected by rods or bars B', as best shown in Fig. 2.

C C designate two shafts, which are parallel with each other, and upon each of which are secured toothed or sprocket wheels C', engaging one with each chain, and which maintain the carrier and apron A extended between them. When rotary motion is communicated by suitable mechanism to one of the shafts C, both shafts will be rotated and a progressive motion in one or the other direction will be imparted to the endless carrier B B' and to the apron A, stretched thereon.

Certain of the links of the chains B are provided with inwardly-extending lugs or ears *b*,

to which the cross bars or rods B′ are riveted or bolted, and the apron A, which is as long as the carrier, is laid outside the rods or bars B′, and has its opposite ends secured to two rods or bars which are placed near together, as shown in Fig. 4, or to a single rod or bar, B′, as shown in Fig. 5. In either case the end of the apron is secured by lapping it upon the rod or bar B′ and then winding a soft wire—as of copper—around the rod or bar and through the meshes of the apron.

To secure the apron to the carrier and cause it to move regularly therewith, I place upon the outside of the apron at proper distances apart other rods or bars, B^2, which extend between the chains and are secured at the ends to the lugs or ears *b*, and thereby the apron is deflected slightly between the two rods or bars B′, where the bar B^2 is placed, and by the edges of the apron striking against the lugs or ears *b*, to which the rod or bar B^2 is secured, the lateral shifting of the apron between the chains is avoided. When the apron A is secured, as above described, to the endless carrier, the apron will be very durable, and may be operated for a very long time without tearing or other injury.

The chains B are of well-known character, and their links have rectangular openings *b*′, into which enter the teeth or sprockets *c* of the wheels C′. These teeth or sprockets *c* cannot accurately fit the openings *b*′, owing to slight differences in the links of the chain; but they should in all cases enter the openings, so that the chain will not override the teeth. To secure this result I make the teeth *c* pyramidal and pointed without any flat surface at their outer end, as best seen in Figs. 6 and 7, and when thus made their proper entrance into the openings of the links is insured and a smooth easy movement is imparted to the chain.

In an apparatus for drying many materials—such as malt—it is necessary to provide the carrier with side walls or guards at the longitudinal edges of the apron A to confine the material laterally. I have in Figs. 8, 9, and 10 shown attached to the carrier a wall or guard in such position as to slightly overlap the longitudinal edge of the apron A. As shown, the wall or guard is composed of plates or sections D, which are of about the same length as the distance between the cross-bars B′, and which overlap at their ends, as clearly shown. A convenient means of securing the plates or guard-sections is to provide each with an outwardly-projecting lug or ear, *d*, through which a bolt or rivet may be inserted for securing it to the lug or ear *b* on the adjacent chain—for example, to the same lug or ear to which is secured the bar or rod B^2, lying upon the outside of and holding the apron.

When constructed as above described, the plates or sections D will make a practically-continuous wall in the straight travel of the apron and carrier, and they will not interfere with the passage of the chains around the wheels C′.

I am aware, as stated in the commencement of this specification, that in machinery comprising endless chains connected by rods or bars and a wire apron the wire apron has been secured in place by tying it to such rods or bars, and I am also aware that a wire apron has been supported and moved by chains or wire ropes, to which the opposite edges of the apron are lashed or sewed. In the operation of machinery of this character, and where the wire apron is tied to the cross-bars, the strains and deflections to which the apron is subjected result, as I have found by practice, in the apron being soon torn out at the points where it is tied to the bars, and when the apron has its carriers sewed to its edges the deflection of the apron caused by the weight or load upon it and its movements soon cause the apron to tear loose from the chains or wire ropes which carry it. Wire aprons of the kind used in drying-machines, and which are attached to endless carriers, must be of light or fine wire, so that they will not receive a set curvature by passing around comparatively small drums, as, if made of heavier wire, the constant bending and unbending which they receive in passing around the drums or wheels which support their carriers soon results in the breaking of the apron. In machinery embodying my invention the apron is not connected at all with the chains or endless carriers, save by the cross-bars, and the apron is secured simply by lying between the cross-bars B′ B^2, and is not tied to the cross-bars, save at the two ends of the apron, which are shown in Figs. 4 and 5. When the apron is thus secured in place, so as to receive a progressive movement from the chains B, the apron is not constantly racked or twisted in its movement, but is left entirely free, save for the general progressive movement which it receives from the chains; and I have found that an endless-wire apron when secured and operated according to my invention is far more durable than when secured in any other way, so as to receive progressive motion from endless chains or carriers.

I am aware that in endless conveyers for various purposes a series of buckets, each having a bottom and sides and without ends, have been connected together after the manner of a chain or by pivots, so as to pass aroud wheels, and I am also aware that an endless chain of elevator-buckets have had overlapping plates or sections lying upon opposite sides of the buckets and connected by the same pins or pintles, so as to prevent material escaping from the buckets from dropping over the sides thereof. I do not desire to include these constructions, which are old, in my invention. In order to provide endless conveyers which may be successfully used in drying-machines for drying material, it is necessary to employ a perforated or reticulated surface or apron, on

which the material may be supported, so that the heated air will act effectively upon the under surface of the material as well as upon the top thereof. My use of the overlapping side sections or guard-sections D is confined to their employment in connection with two chains connected by cross bars or rods and the wire apron supported by the cross-bars or rods, the guard-sections being secured to the chains beyond the edges of the apron.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with two endless carriers and a series of rods or bars extending between and connecting them, of a wire-cloth apron placed upon the outer side of said rods or bars, and other rods or bars connecting the carriers at intervals in their length and lying upon the outer side of the apron, whereby the apron is held in place relatively to and moved by the carriers, although only connected with them by said rods or bars, substantially as herein described.

2. The combination, with parallel endless chains B, certain links of which are provided with inwardly-projecting lugs or ears *b*, of the rods or bars B′, extending between the chains and secured to said lugs, a wire-cloth apron placed outside said rods or bars, and other cross rods or bars, B^2, extending between the chains and intermediate between the rods or bars B′, and also secured to lugs or ears *b*, the rods or bars B^2 lying outside the apron, and the apron being retained in place laterally by its edges bearing against the lugs or ears *b*, to which the rods or bars B^2 are secured, substantially as herein described.

3. The combination, with two endless chains, B B, and bars or rods B′ B^2, connecting them, of the wire-cloth apron A, overlying the bars or rods B′ and underlying the bars or rods B^2 between the chains, and the sections or plates D, secured to the chains beyond the edges of the apron and lapping upon each other to form continuous side walls, substantially as herein described.

MOSHER A. SUTHERLAND.

Witnesses:
FREDK. HAYNES,
HENRY J. MCBRIDE.