

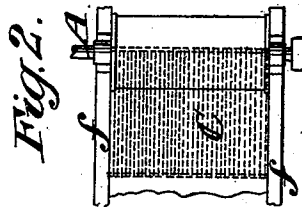
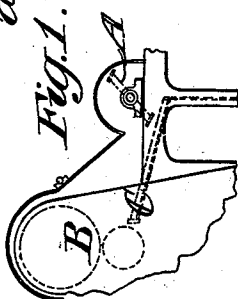
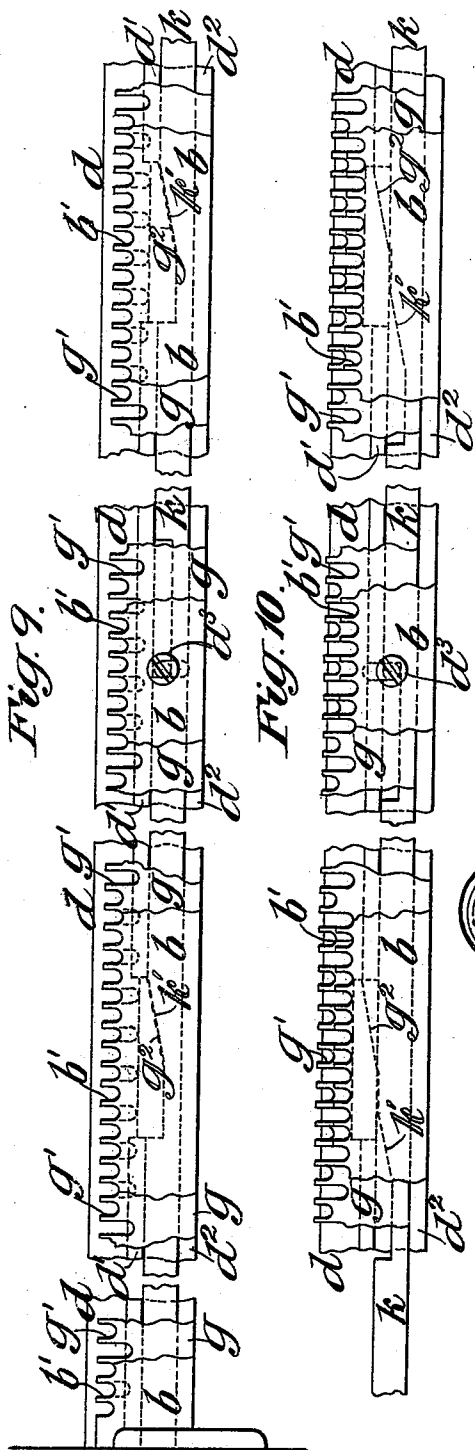
(No Model.)

4 Sheets—Sheet 1.

W. HURST.
MACHINE FOR OPENING COTTON.

No. 510,642.

Patented Dec. 12, 1893.



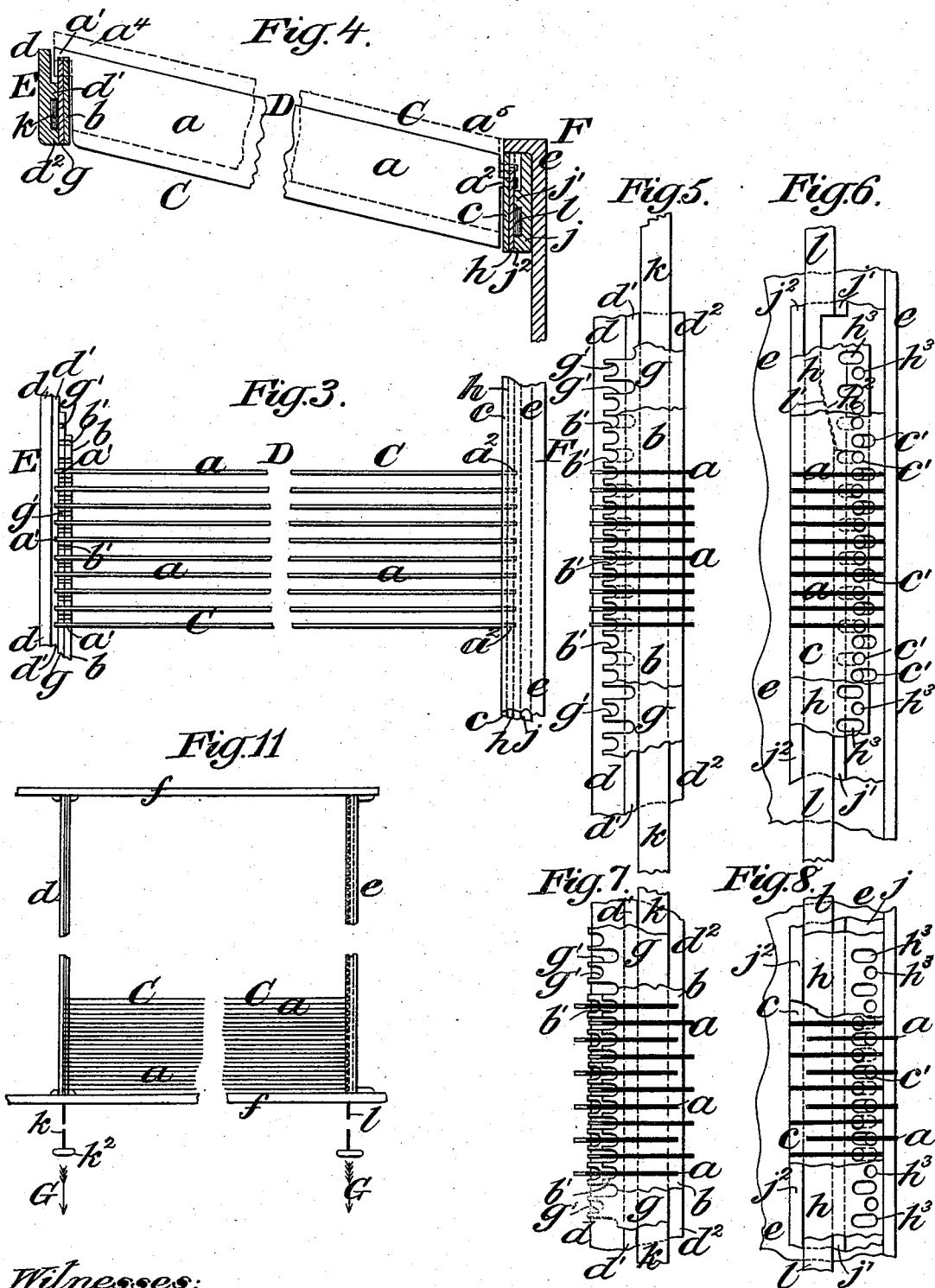
Witnesses:
O. Sundgren
George Barry.

Inventor:
William Hurst
By attorneys
Brown & Seward

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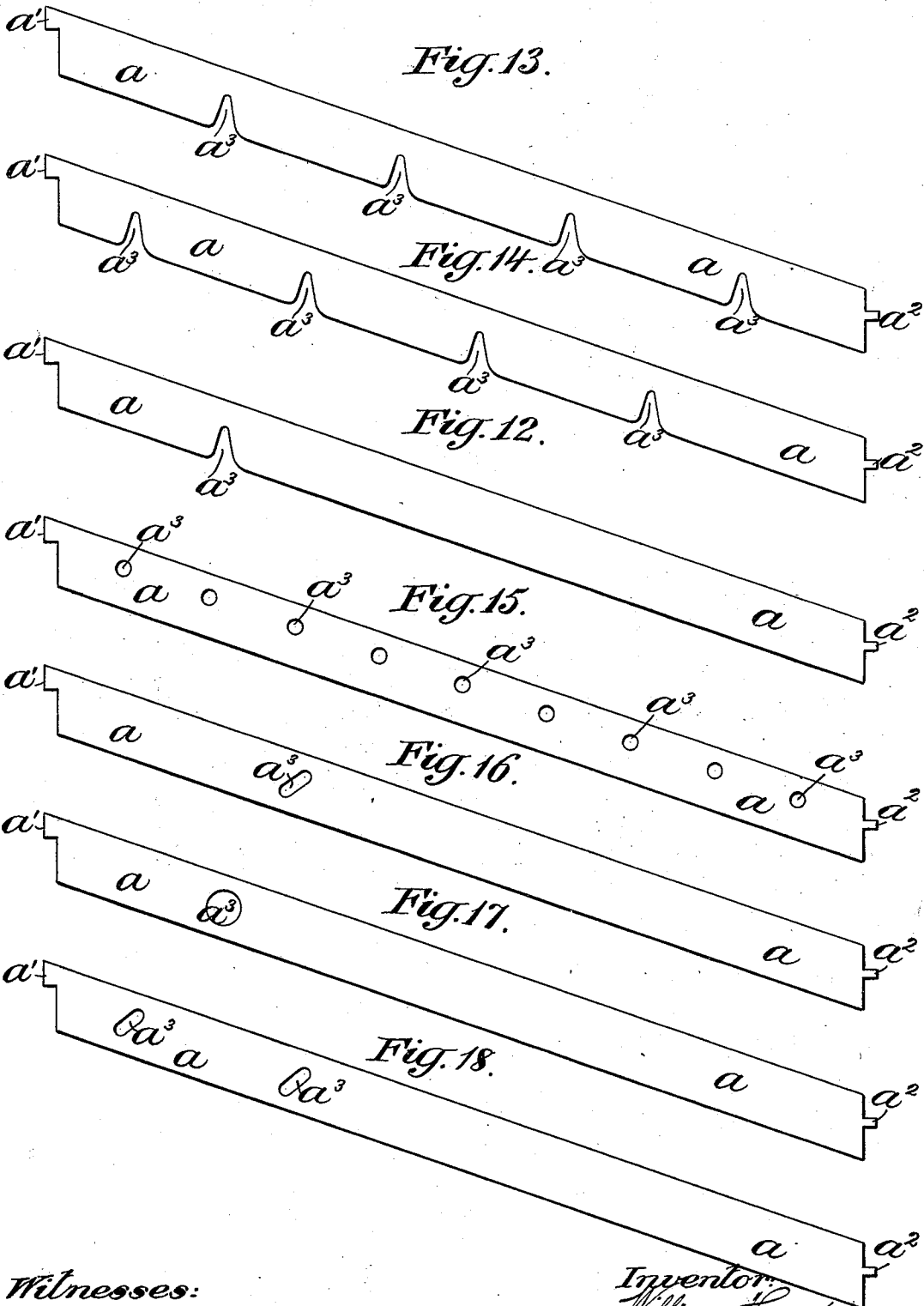
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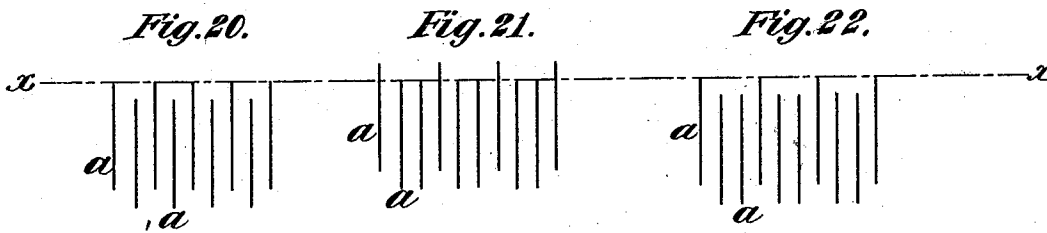
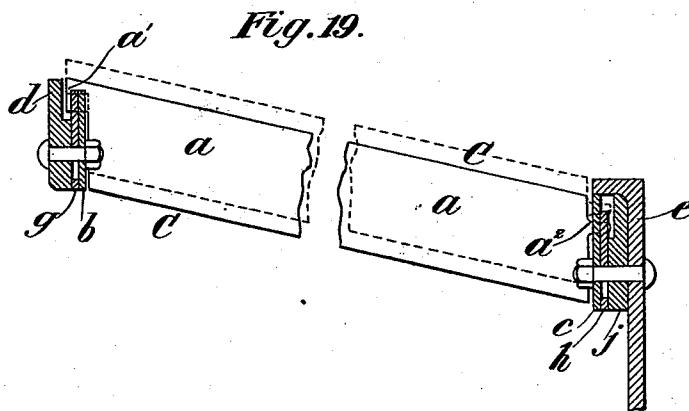
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UNITED STATES PATENT OFFICE.

WILLIAM HURST, OF ROCHDALE, ENGLAND.

MACHINE FOR OPENING COTTON.

SPECIFICATION forming part of Letters Patent No. 510,642, dated December 12, 1893.

Application filed February 29, 1892. Serial No. 423,292. (No model.) Patented in England April 13, 1889, No. 6,327.

To all whom it may concern:

Be it known that I, WILLIAM HURST, of Rochdale, in the county of Lancaster, England, have invented certain new and useful
5 Improvements in Machines for Opening Cotton and Used in the Preparation of Cotton and other Fibrous Materials, (for which I have obtained Letters Patent of the United Kingdom of Great Britain and Ireland, No. 6,327,
10 dated April 13, 1889,) of which the following is a specification.

My invention relates to the machines known as "scutchers" or "lap machines" and used in preparing cotton and other fibrous materials and relates more particularly to the
15 gratings or grids placed longitudinally, diagonally, cross-wise or in any other position between the beaters and the cages, and intended to allow of the escape from the cotton or other fibrous material of short fiber, motes and other refuse such as sand and "fly" mixed with such cotton and other fibrous materials while at the same time preventing the escape
20 of cotton or other fibrous material.

The object of my invention is to render "scutchers" or "lap machines" more efficient in cleaning and freeing from the short fiber, motes and other refuse such as sand and "fly" present therein the cotton or other
30 fibrous material being operated upon by the "scutchers" or "lap machines."

My invention consists partly in means for insuring that the bars of the grids or gratings employed in "scutchers" or "lap machines" for the purpose above named shall
35 vibrate or oscillate freely and cause the "motes," short fiber and other refuse present in the cotton being operated upon which fall upon or between the said bars to pass or work
40 downward between the said bars or grids very readily and be prevented from again rising from between such bars or grids into the stream of cotton or other fibrous material passing over such bars or grids and also by
45 so vibrating or oscillating greatly facilitate the falling away of the short fiber, "motes" and other refuse from the said bars on the opening or lowering of the doors beneath such bars, and partly in arrangements by which I
50 am enabled to alter the positions of the bars or grids of the said gratings or grids so that

such bars or grids may be in such position as may be most effective in producing a cleaning effect upon the cotton or other fibrous material being operated upon.

My invention also enables me to prevent the formation of balls or rolls of short fiber which in "scutchers" or "lap machines" with gratings or grids constructed in the manner hitherto customary are formed above the
60 gratings or grids near to the cages of such machines and pass from time to time into or upon the surface of the stream of cotton or other fibrous material passing to the cages and so cause irregularity and a dirty appearance in the "laps" produced by the machines.

In the accompanying drawings, Figure 1 is a vertical section of a portion of a "scutcher" or "lap machine" sufficient to indicate the part thereof to which my invention refers, and
70 Fig. 2 is a plan of part of that which is shown in Fig. 1, Figs. 1 and 2 showing at A the beater, at B the cage, and at C the gratings or grids to which my invention relates and over which the cotton or other fibrous material passes
75 from the beater A to the cage B. Fig. 3 is a plan and Fig. 4 a sectional view of the grating or grid. Fig. 5 is a view looking in the direction from D to E in Figs. 3 and 4. Fig. 6 is a view looking in the direction from D to F in
80 Figs. 3 and 4. Fig. 7 is similar to Fig. 5 but shows certain parts in a changed position. Fig. 8 is similar to Fig. 6 but shows certain parts in a changed position. Fig. 9 is an elevation showing arrangements by means of
85 which certain parts are raised and lowered. Fig. 10 shows certain parts in the positions which they occupy when raised. Fig. 11 shows arrangements for operating certain parts. Figs. 12, 13, 14, 15, 16, 17, and 18 show certain
90 parts detached. Fig. 19 is a section generally similar to Fig. 4 but serving to indicate an expedient which is necessary in some cases and Figs. 20, 21 and 22 are diagrammatic transverse sections serving to more fully indicate
95 the manner in which my invention may be applied.

The same letters of reference are applied to corresponding parts throughout the whole series of figures.

The grating or grid C I form of bars or plates *a* of metal, wood or other suitable ma-

terial but preferably of steel and it is to these bars or plates a to which my invention first relates.

Hitherto the bars or plates employed in the gratings or grids employed in "scutchers" or "lap machines" have been formed of cast metal or other thick materials and consequently such bars or plates have been too rigid to vibrate or oscillate in such manner as to aid the passage of the "motes," seeds or dirt or other matter down between the plates or bars of the grids or gratings.

According to my invention I form the bars or plates a of thin sheet metal so that they may be sufficiently flexible to readily vibrate and I have found plates or bars a of a thickness of about one seventeenth of an inch to be very suitable for the purpose of my invention but plates or bars a little thinner or a little thicker may be employed according as the gratings or grids C are made of less or greater length. The bars or plates a are each provided at one end with a projecting part a' which resting in a bearing consisting of a notch b' formed in a bar b extending across the machine supports the said end of the said bar or plate a and the other end of each of the said bars or plates a is provided with a projecting part a^2 which projects into a bearing consisting of a hole c' formed in a bar c extending across the machine and supporting by means of the said part a^2 the said end of the bar or plate a . The part a^2 being free to turn in the hole c' into which it projects and the part a' resting by a comparatively thin edge upon a comparatively small surface of the bar upon which it rests each plate or bar a is very free to oscillate upon the parts by which it is supported and being made of thin metal is very free to vibrate within itself and the vibration of such bars or plates a due to the working of the machine will very greatly facilitate the passage of "motes" or seeds or dirt or other refuse down between the plates or bars a and thus the efficiency of the machine in cleaning the cotton or other fibrous material is greatly increased. Instead of being supported by projecting parts a' passing into notches b' and projecting parts a^2 passing into notches or holes c' the plates or bars a may be supported at either or both ends by their ends being simply placed in bearings consisting of notches in which the said bars or plates a may oscillate.

It is found in practice that with grids or gratings as hitherto employed in "scutchers" or "lap machines" the "motes," "fly" or short fiber and other refuse separated from the cotton or other fibrous material and deposited between the plates or bars of the said grids or gratings have a tendency to sometimes be disturbed and carried forward with the cotton or other fibrous material passing over the grids or gratings and thus to cause streaks or blemishes in the lap produced by the "scutcher" or "lap machine" and thus to some extent

nullify the effect of the machine upon the cotton or other fibrous material being operated upon. To obviate this defect I form or provide in each of said bars or plates an opening or openings consisting of a notch, perforation, or slot, or notches, perforations or slots a^3 of any size and shape and placed in any position as indicated in Figs. 12, 13, 14, 15, 16, 17 and 18, Fig. 12 illustrating a bar or plate formed with a notch a^3 , Figs. 13 and 14 a bar or plate formed with notches a^3 , Fig. 15 a bar or plate formed with perforations a^3 , Fig. 16 a bar or plate formed with a slot a^3 , Fig. 17 a bar or plate formed with an opening a^3 , and Fig. 18 a bar or plate formed with inclined slots a^3 .

When the "scutcher" or "lap machine" is at work the "motes," sand and "fly," short fiber or other refuse removed or escaping from the cotton or other fibrous material being operated upon and passing down between the bars or plates a of which the grating or grid employed in the "scutcher" or "lap machine" consists will become engaged with the notches, perforations, or slots a^3 formed in the said bars or plates and so be secured against again passing into or into contact with the cotton or other fibrous material while at the same time the said "motes," sand, fly, short fiber or other refuse are or is free to pass down between the said bars or plates a and to fall away from such bars or plates when the door beneath them is opened or lowered for the purpose of emptying the grids or gratings.

It is obvious that bars or plates a of any of the forms indicated in Figs. 4, 12, 13, 14, 15, 16, 17 and 18 may be combined in any manner and in any desired number in one grid or grating but a very advantageous combination is obtained by placing bars or plates such as are shown in Fig. 13 alternately side by side with bars or plates such as are shown in Fig. 14 as in such combination the notches a^3 in one bar or plate will not be opposite to the notches a^3 in the adjacent bar or plate or bars or plates but will be intermediate such notches a^3 . Thus notches a^3 are very uniformly distributed over the entire grating or grid formed by the bars or plates.

My invention also consists in arrangements by which I am enabled to raise or lower certain of the bars or plates of the gratings or grids of "scutchers" or "lap machines" in relation to the other bars or plates of such gratings or grids so that the said bars or plates may be in such position as may be most effective for operating upon the cotton or other fibrous material. For this purpose besides the cross bars d e , which are secured by means of bolts to the side frames f of the machine I provide bars b g c h j which I will now proceed to more fully describe. The cross bar j is placed against the cross plate e which is ordinarily employed in "scutchers" or "lap machines." Secured to the cross bar d by screws d^3 one only of which is shown in Figs. 9 and 10 is a bar b and between the bar b and

cross bar *d* I place a bar *g*. In the upper edge of the bar *b* I form notches *b'* in which at times rest the projecting ends *a'* of the plates or bars *a* which are adjacent to the cross-bar *d*.

5 In the upper edge of the bar *g* I form notches *g'* into which pass projecting parts *a'* formed on the ends *a⁴* of the plates or bars *a* before mentioned. Certain of the notches *g'* are of one depth but every alternate notch is formed
10 deeper than the notches alternate therewith. I form on the cross bar *d* ribs *d'* *d²* situate between which is a bar *k* capable of being slid longitudinally between the ribs *d'* *d²*. I form in the bar *k* inclines *k'* shown in Figs. 9 and
15 10 which inclines *k'* are at times situate below inclines *g²* secured to and projecting from the plate *g*. If the bar *k* be moved in the direction indicated by the arrow *G* by means of the handle *k²* with which it is provided, until
20 the inclines *k'* are in the position in which they are indicated in Fig. 10 the inclines *k'* will have acted upon the inclines *g²* and raised the bar *g* so that its upper edge will be raised above the upper edge of the bar *b*. To the
25 cross-bar *j* by means of screws is secured a bar *c*. Between the bar *c* and the cross bar *j* is a bar *h* capable of being moved upward and downward between the bar *c* and cross-bar *j* by means of inclines *l'* formed upon a
30 bar *l* capable of being slid longitudinally between ribs *j'*, *j²* formed on the cross bar *j* which inclines act against inclines *h²* formed upon the bar *h*. The inclines *l'* upon the bar *l* and the inclines *h²* upon the bar *h* are similar in
35 construction and operation to the inclines *k'* and *g²* previously described. I form in the bar *c* a number of holes *c'* each alternate hole *c'* being elongated in an upward direction.

In the bar *h* I form a number of holes *h³*
40 the alternate holes *h³* being elongated in a downward direction. The elongated holes *h³* in the bar *h* are situate behind the round holes *c'* in the bar *c*. Projecting parts *a²* formed on alternate bars or plates *a* pass
45 through the elongated holes *c'* in the bar *c* and into the round holes *h³* formed in the bar *h* and the projecting parts *a²* formed on the bars or plates *a* alternate with those aforesaid and pass through the round holes *c'* in the
50 bar *c* and into the elongated holes *h³* in the bar *h*. The round holes *c'* in the bar *c* are the bearings for the projecting parts *a²* of those plates or bars *a* which are not to be lifted and the round holes *h³* of the bar *h* are the bearings for the projecting parts *a²*
55 of those plates or bars *a* which are to be lifted; the elongation of the intervening holes *c'* and *h³* being only to permit the lifting of the plates or bars *a*. The notches *b'* in the bar *b* constitute the bearings for the projections
60 *a'* of as many of the bars *a* as are not to be raised and the shallower notches *g'* of the plate *g* constitute the bearings for the projections of those bars *a* which are not to be
65 raised.

During the working of the "scutcher" or "lap machine" the cotton or other fibrous

material passing from the beater *A* to the cage *B* will travel over the grating or grid *C*. Any "motes," seed, dirt or other matter separated from the cotton or other fibrous material will be readily able to pass between the plates or bars *a* of which the grating or grid *C* is formed, the vibration and oscillation of the plates or bars *a* assisting the passage of
70 "motes," seeds or dirt or other matter down between the plates or bars *a*.

When the "scutcher" or "lap machine" is operating upon cotton or other fibrous material of short "staple" or comparatively clean
80 the plates or bars *a* of the grid or grating may be in the position in which they are shown in Figs. 5 and 6 but when the "scutcher" or "lap machine" is intended to operate upon cotton or other fibrous material which is more
85 leafy or dirtier the bars *k* and *l* are drawn in the directions indicated by the arrows *G*. The movement of the bar *k* in the direction indicated by the arrow *G* will cause the inclines *k'* to act upon the inclines *g²* and move
90 the bar *g* into the raised position in which it is shown in Figs. 7 and 10. The rising of the bar *g* will cause the ends *a⁴* of the alternate bars or plates *a* to be raised by means of the
95 shallow notches *g'* the ends of the deeper notches *g'* not being raised sufficiently to act upon the projecting parts *a'* upon the bars or plates *a*. By the bar *l* being moved in the direction indicated by the arrow *G* the ends
100 *a⁵* of the said bars or plates *a* will be raised in a manner similar to that in which the ends *a⁴* were raised. When the alternate bars or plates *a* are in the raised position as shown in Figs. 7 and 8 the fibers of cotton or other
105 fibrous material pass over the upper edges of the raised bars or plates so that greater opportunity is given for short fiber, "motes" and other refuse to fall from such cotton or other fibrous material by reason of the increased space between the bars or plates into
110 contact with or upon which the cotton or other fibrous material comes or rests in its passage over the grid or grating of the "scutcher" or "lap machine." When the alternate bars *a* or plates are in the raised position in which they are shown in Figs. 7 and
115 8 the short fibers, "motes" and other refuse separated from the cotton or other fibrous material passing over the said bars or plates *a* are able to fall more freely into and through the spaces between the raised bars or plates
120 *a* and the bars or plates *a* not raised and are consequently less liable to again come into contact with the cotton or other fibrous material passing over the bars or plates *a*. The vibration of the raised bars or plates *a* and the bars
125 or plates not raised assists the passage of short fiber, "motes" and other refuse down between such bars or plates and also assists in preventing the cotton or other fibrous material passing over the said bars or plates *a*
130 from adhering to such bars or plates.

Instead of being placed in the direction of the length of the scutcher or "lap machine"

the plates or bars *a* may be placed across the "scutcher" or "lap machine" or in a diagonal direction. The plates or bars *a* may also be placed in a horizontal position or in any suitable inclined or sloping position as may be desired.

As my invention is intended to be applied to old machines as well as to new it is necessary to provide for variations in the manner of applying my invention, as in some machines in consequence of the dimensions and arrangement of some of the parts already existing it is not possible to employ in its entirety the arrangement illustrated in the accompanying drawings; for instance in some cases I have been compelled in order to avoid extensive alteration of the existing machine to which I have been applying my invention to dispense with the sliding bar *l* and plate *j* and employ simple bolts and slots to secure the plates *c* and *h* in position as indicated in Fig. 19 of the accompanying drawings and vary the positions of the bars or plates *a* by making adjustments by hand from time to time as has been necessary. In other machines it might be necessary to in like manner dispense with the cross-bar *d* and bar *k* or dispense with the plates *j* and cross-bar *d* as well as both of the bars *l* and *k* as is also indicated in Fig. 19 of the accompanying drawings. Thus it is obvious that in order to meet the various circumstances which may occur in practice the alternate bars or plates *a* of the grid or grating *C* may be raised by means other than those above described and that instead of the alternate bars or plates *a* being raised a similar result may be brought about by the alternate bars or plates being lowered and that instead of the alternate bars or plates *a* being raised or lowered, every third or fourth bar or plate *a* may be raised or lowered or the bars or plates *a* raised or lowered may bear any other suitable relation in number and position to the bars or plates *a* which are not raised or lowered. These slight variations in the use of my invention are clearly indicated in Figs. 20, 21 and 22 of the accompanying drawings in which the line *X X* indicates the position of the upper edge of the part of each bar or plate *a* cut by the plane on which the sections are made when all the bars or plates *a* shown in each of such figures are put at one level. Fig. 20 thus serves to indicate how the alternate bars or plates *a* may be lowered instead of being raised in relation to the other bars or plates *a*. Fig. 21 indicates how every third bar or plate *a* instead of every alternate bar or plate *a* may be raised in relation to the other bars or plates *a* and Fig. 22 indicates how every third bar or plate *a* may be lowered in relation to the other bars or plates *a*. It is also obvious that the plates or bars may be either of the form shown in Fig. 4 or of any of the forms shown in or described in reference to Figs. 12, 13, 14, 15, 16, 17 and 18 and that the bars or plates *a* formed of

thin metal and whether provided or not provided with notches, perforations or slots *a*³ as indicated in Figs. 12, 13, 14, 15, 16, 17 and 18 may be employed in "scutchers" or "lap-machines" in which no means for raising or lowering the alternate or other bars or plates are provided and that the arrangements of apparatus hereinbefore described for effecting the raising and lowering of the alternate or other bars or plates may be applied to raise or lower bars or plates of the kind ordinarily in use in "scutchers" or "lap machines."

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

1. In the grid or grating of a "scutcher" or lap machine thin flexible metal bars or plates *a* capable of freely vibrating within themselves without being mechanically moved for the purpose and substantially as hereinbefore described.

2. The combination with a scutcher or lap machine of grids or gratings *C* formed of bars or plates *a*, and provision for setting said bars at the same or at different levels relatively to each other, as and for the purpose herein set forth.

3. In the grid or grating *C* of a scutcher or lap machine the combination of bars or plates *a* formed of thin metal, and bearings for the ends of said bars or plates in which said plates or bars are capable of oscillating and vibrating freely and without being mechanically moved, for the purposes and substantially in the manner hereinbefore described.

4. In the grid or grating of a scutcher or lap machine the combination of bars or plates *a* formed of thin metal, and bearings for the ends of said plates in which they are capable of oscillating and vibrating freely and without being mechanically moved, said bars or plates *a* being formed with openings *a*³ for preventing short fiber, motes or other refuse separated from the cotton or other fibrous material being operated upon from becoming again affixed to or entangled with the said cotton or other fibrous material, substantially as hereinbefore described.

5. In the grid or grating of a scutcher or lap machine the combination with a supporting bar *b* having notches in its upper edge and a supporting bar *c* having holes, of bars or plates *a* each formed of thin metal and having at one end a projecting part *a*¹ resting in a notch of the bar *b* and at the other end with a projecting part *a*² resting in a hole formed in the bar *c* so that such bars or plates may be able to freely vibrate and oscillate without being mechanically moved, substantially as hereinbefore described.

6. In the grating or grid employed in a scutcher or lap machine the combination with a supporting bar *b* having notches in its upper edge and a supporting bar *c* having holes, of bars or plates *a* each formed of thin metal and having at one end a projecting part *a*¹ resting in a notch of the bar *b* and at the other end a projecting part *a*² resting in a

hole of the bar c so that such bars or plates a may be able to freely vibrate and oscillate, each of said bars a being formed with openings a^3 adapted to prevent short fiber, motes or other refuse once separated from the cotton or other fibrous material being operated upon from becoming again affixed to or entangled with the said cotton or other fibrous material substantially in the manner hereinbefore described.

7. In the grid or grating of a scutcher or lap machine bars or plates formed with openings a^3 to prevent short fiber, motes and other refuse once separated from the cotton or other fibrous material being operated upon from becoming again affixed to or entangled with the said cotton or other fibrous material.

8. In the grid or grating of a scutcher or lap machine the combination with bars or plates a having openings a^3 to prevent short fiber, motes and other refuse once separated from the cotton or other fibrous material being operated upon from becoming again affixed to or entangled with the said cotton or other fibrous material, of provision for setting such bars or plates a at the same level or at different levels relatively to each other as may be required substantially as and for the purposes hereinbefore described.

9. In the grid or grating of a scutcher or lap machine the combination of supporting bars $b c$, thin metal bars or plates a having projecting parts $a' a^2$ resting and free to oscillate in bearings in said supporting bars, and provision for setting said bars or plates a at the same or at different levels relatively to each other, all substantially as set forth.

10. In the grid or grating of a scutcher or lap machine the combination with supporting bars $b c$, of thin metal bars or plates a having projecting parts $a' a^2$ resting and free to oscillate in bearings formed in the said supporting bars and having openings a^3 to prevent short fiber motes and other refuse once separated from the cotton or other fibrous material being operated upon from becoming again affixed to or entangled with the said cotton or other fibrous material, and provision

for setting the said plates a at the same level or at different levels relatively to each other, all substantially as set forth.

11. The combination of the metal bars a having projections $a' a^2$ at their ends, two sets of supporting bars $b c$ and $g h$ one set containing bearings for the said projections on certain of said plates or bars a , and the other set containing bearings for the said projections on others of said plates or bars and means of changing the level of one set of supporting bars, substantially as and for the purpose herein set forth.

12. The combination of the metal bars or plates a having projections $a' a^2$ at their ends, two sets of supporting bars $b c$ and $g h$ one set containing bearings for the said projections on certain of said plates or bars a and the other set containing bearings for the said projections on others of the said plates or bars and one set having inclines g^2 and h^2 , and sliding bars k and l having inclines $k' l'$ corresponding with those $g^2 h^2$ on the supporting bars, all substantially as and for the purpose herein set forth.

13. The combination of the metal bars or plates a having projections $a' a^2$ at their ends, two supporting bars $b g$ one having notches b' for the reception of the projections a' at one end of said bars or plates a and the other having notches g' of different depths for the reception of said projections a' , two supporting bars $c h$ having respectively holes c' and h' some of which are round and others elongated for the reception of the projections a^2 at the opposite end of said plates or bars a and the said bars g and h being provided with inclines $g^2 h^2$, and sliding bars k and l having inclines $k' l'$ corresponding with those $g^2 h^2$ on the bars $g h$, all substantially as and for the purpose herein set forth.

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