

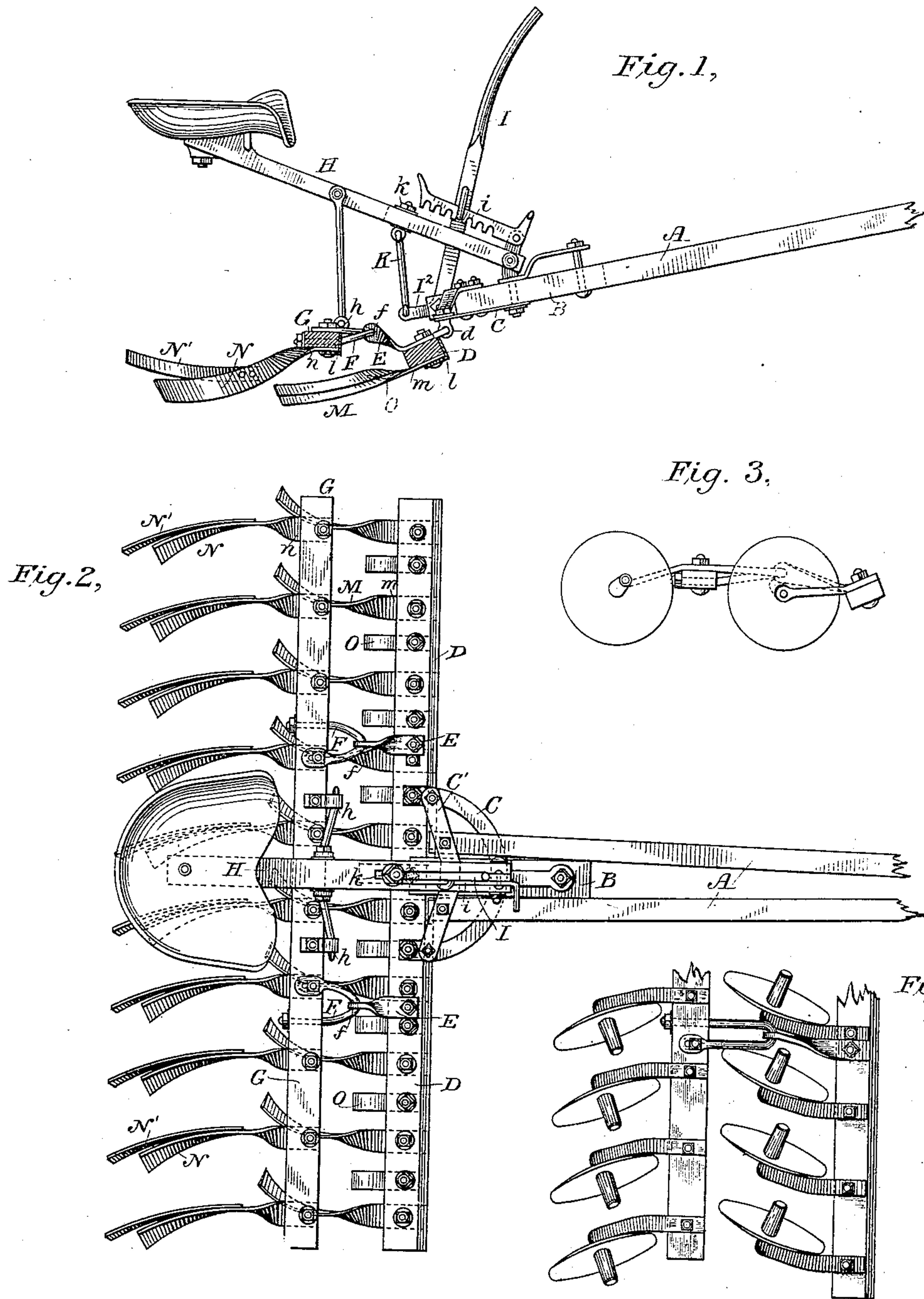
(No Model.)

F. NISHWITZ.

HARROW.

No. 262,820.

Patented Aug. 15, 1882.



WITNESSES

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# UNITED STATES PATENT OFFICE.

FREDERICK NISHWITZ, OF MILLINGTON, NEW JERSEY.

## HARROW.

SPECIFICATION forming part of Letters Patent No. 262,820, dated August 15, 1882.

Application filed February 3, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK NISHWITZ, of Millington, in the county of Morris and State of New Jersey, have invented certain Improvements in Harrows, of which the following is a specification.

The invention consists in certain novel features and organizations, the details and operation of which will be fully set forth and claimed hereinafter.

In the accompanying drawings, Figure 1 is a vertical section; Fig. 2, a plan view; Fig. 3, a detail view, showing cutting-disks mounted on the gang-bars; and Fig. 4 is a detail plan view, also showing cutting-disks.

The draft-frame or tongue-frame is shown as composed of the pole or tongue A, the draft-bar or whiffle attachment B, which is placed between the branches or hounds of the tongue, a curved or semicircular strap or bar, C, on the bottom of the tongue and draft-bar, and a strap or brace, C', which extends from the ends of the curved bar across the top of the tongue and draft-bar, the parts all being securely and rigidly bolted together. This is mere detail and may be varied.

The forward gang-bar, D, which also constitutes a crusher and leveler, is hinged at *d* to the draft-frame, preferably somewhat in front of its forward face, as shown. Rearwardly-projecting straps or arms E E are attached to this gang-bar at suitable points, and have eyes in which loops F F from the rear cutter-bar, G, engage so as to form the hinge-joints *f f*. Of course the gangs may be hinged in other ways.

The seat-standard H is pivoted on the tongue or draft frame, and is supported at *h h* upon the rear gang-bar, G, by pivoted supporting-rods at a point in rear of the hinge-joints *f f*.

A lever, I, pivoted on the tongue or frame works preferably in a longitudinal slot in the seat-standard, and is held in any desired position by a notched dog or detent, *i*, pivoted on the seat-standard and engaging with a loop or eye on the lever. The rearwardly-projecting bent end I<sup>2</sup> of the lever is connected by a link, K, with the seat-standard. This link may be adjusted in the slot in the seat-standard by means of the set-nut *k*, if desired, to modify the relation of the gangs to the frame and change the range of their adjustment.

The purpose and operation of the above organization will be fully set forth when the details of the machine have been described.

The front lower corner or edge of the gang-bar D and of the cutter-bar G are covered with iron angle-strips L (shown in Fig. 1.) The flat ends *m n* of the harrow-teeth M N, which form the surfaces of attachment to the bars, are inserted under the edges of the angle-strips to form a snug and neat connection. The angle-strips and teeth are secured by suitable bolts. The teeth M on the front gang-bar are uniformly curved to one side relatively to the line of draft, while those on the rear bar are uniformly curved in the opposite direction; and it will be observed that they are so arranged that the teeth in the rear gang will cut out the spaces left by those in the forward gang, as is clearly shown in Fig. 2. No claim is, however, made herein to this special organization.

Between the teeth on the front gang-bar are placed flat spurs, disintegrators, or crushers O, which are secured under the angle-strip, as the teeth are, and project rearwardly from the bar at or about in line with its lower face, and are slightly turned up at their ends.

It will be observed that the flat portions *m* of the teeth M also extend a short distance in rear of the gang-bar. The spurs or crushers O and the flat parts *m* of the teeth constitute a substantially metal-faced, ribbed, open-slotted, or comb-like clod crusher and leveler.

The teeth M are, as above mentioned, straight and flat for a short distance in rear of the gang-bar, and are then twisted around to present a curved cutting-edge to the soil. The teeth N on the rear cutter-bar are similarly shaped, though the flat portions do not extend much, if any, to the rear of the bar, there being no occasion for such an extension in this gang. These teeth are provided with wings or earth-turning portions N', which are somewhat longer than the teeth proper. No claim is, however, made herein to a tooth of this construction, such claim being made in another application for patent filed by me.

The weight of the driver and of the frame is supported on the rear gang or cutter bar through the pivoted supporting-rods, and is in part transferred through the hinge-joints *f f* to the forward gang bar or crusher, as will



be seen upon reference to Fig. 1. To make this more clear, assume that the teeth in the rear gang constitute the fulcrum of that bar. Now, the weight being applied to the front of the fulcrum will press down the hinge-joints  $ff$  and transfer part of the weight to the forward gang-bar, which is fulcrumed at its connection with the frame.

The relation of the gangs to the soil may be varied by operating the lever. Thus, if the lever be drawn toward the driver it will tend to draw the tongue and seat-standard toward each other and to press the rear gang down, and the power being applied in rear of its hinge-joints  $ff$  will cause the teeth thereon to assume a more upright position relatively to the ground. At the same time the front or pivot of the crusher-bar is raised, and as a pressure will be exerted by the depression of the rear bar at the hinge-joints  $ff$  in the rear of the hinge-connections  $dd$  of the front gang-bar the teeth on that bar will also be caused to assume a more upright position. To describe this operation in another way, the joint between the link K and lever may be said to form a fulcrum, from which the frame and forward gang bar or crusher are raised. In this view the teeth of the front gang form the fulcrum on which the bar rocks, and consequently the raising of the bar turns the teeth down and causes them to assume a more upright position. The raising of the front bar lifts the hinge-joints  $ff$ , and, turning the cutter-bar upon the fulcrum  $h$ , formed by the joint of the supporting-rods and cutter-bar G, depresses the teeth in the rear gang and causes them to assume a more upright position.

It will thus be seen that by operating the lever the relation of the teeth to the ground and to the frame or tongue may be varied as occasion may require.

My improved machine is free to flex to conform to undulations and inequalities of the ground, and will thoroughly operate upon the surface traversed. In passing over the field any obstruction, undulation, or rise in the ground will cause the cutters in the forward gang to rise to pass over it. This movement depresses the cutters in the rear gang. When the first gang has passed the obstruction they will resume their normal position, and as the rear gang is raised in passing the obstruction the forward gang will be depressed.

A machine thus organized, it will be obvious, will thoroughly cultivate every portion of the field close up to any obstruction on each side of it. This operation of the machine is as follows: When the cutters on the front gang bar or crusher meet an obstruction they will be thrown up to ride over it, the connection  $d$ , with the frame, forming the fulcrum or pivot on which the gang vibrates. In thus rising they will force up the hinge-joints  $ff$  and depress the teeth in the rear gang, the fulcrum of the latter gang being at the joint  $h$  between the seat-supporting rods and cutter-bar. When the front gang has passed the obstruction it

will fall, and as the teeth in the rear gang meet it they will be forced up. As the teeth in the rear gang rise they rock upon the pivot or fulcrum  $h$ , and, forcing down the hinge-joints  $ff$ , will press down the teeth in the front gang. Thus there is always a reciprocal compensating action or vibration between the gangs and a complete flexibility, which enables the machine to freely conform to the entire surface of the ground and act upon it in the most complete and perfect manner.

In the operation above described it has been assumed that the lever was held by the notched dog in some adjusted position. The machine works to great advantage, however, when the dog is held out of engagement with the lever, so that it is free to vibrate in unison with the vibrations of the gangs. The flat portions of the teeth on the forward gang bar or crusher and the intermediate spurs or disintegrators form a bearing for the machine and prevent the teeth from sinking unduly into the ground. When the machine is thus working the frame, gang-bars, seat-support, and lever all vibrate, and the machine flexes freely and conforms to all irregularities of the ground.

Should the machine at any time become clogged or encumbered with weeds or debris of any kind, it can be freed therefrom by operating the lever and vibrating or rocking the gangs.

The seat-standard and its pivoted supporting-bars serve as a pivoted coupling between the cutter-bar G and frame in addition to and independent of their function as a seat-support, and I do not wish to limit myself to such a function.

So far as part of this invention is concerned, harrow-teeth may or may not be used on the front gang bar or crusher; nor do I limit myself in the general organization of the machine as claimed to any special form of crusher-bar. Where harrow-teeth are used on the rear gang or cutter bar only they should be arranged in two reversely-curved series on opposite sides of the line of draft; or teeth so formed as to insure the rectilinear motion of the machine may be used.

In Figs. 3 and 4 disk-cutters are shown as mounted on the gang-bars. Such cutters may be used with advantage; but no claim is made herein to such organization. The disks are preferably placed at an angle both to the horizon and the line of draft, as is well understood. The operation of a machine thus organized is similar to that above described.

Instead of having the seat-standard connected with the adjusting-lever, the link-connection may extend directly from the lever to the rear gang-bar and the connection be so made as to give the results above set forth. In that case the pivot of the connecting-link on the gang-bar would become the fulcrum on which that bar would vibrate.

I am aware that a harrow in which inclined crushing-surfaces are provided with rearwardly-projecting teeth is old; but the teeth were ar-



ranged on the upper sides of the bars and were placed thereon at wide intervals. I therefore make no claim to such subject-matter, but limit myself to the special open-slotted or comb-like crusher herein described.

I claim as my invention—

1. The combination, substantially as set forth, of the tongue or draft frame, the vibrating crusher or gang bar, the vibrating cutter or gang bar in rear of the crusher, and the vibrating seat support or coupling, whereby the gangs may flex to conform to undulations of the ground.

2. The combination, substantially as set forth, of the vibrating tongue or draft frame, the vibrating crusher or gang bar, the vibrating cutter or gang bar in rear of the crusher, the vibrating seat support or coupling, and the vibrating lever, for the purpose set forth.

3. The combination, substantially as set forth, of the vibrating tongue or draft frame, the vibrating crusher or gang bar, the vibrating cutter or gang bar in rear of the crusher, the vibrating seat support or coupling, the vibrating lever, and a detent, for the purpose described.

4. The combination, substantially as set forth, of the tongue or frame, the crusher or gang bar, its hinge connection with the frame, the vibrating cutter-bar, the fulcrum or pivot on which it vibrates, and the hinge connection between the bars.

5. The combination, substantially as set forth, of the tongue or frame, the crusher or gang bar, its hinge connection with the frame, the cutter-bar, the pivot or hinge connection between the bars, and the fulcrum or pivot of the cutter-bar in rear of the hinge-connection.

6. The combination, substantially as set forth, of the tongue or frame, the crusher or gang bar, its hinge connection with the frame, the cutter-bar, the hinge connection between the bars, and a seat standard or coupling pivoted on the frame and supported on the cutter-bar by pivoted rods in rear of its hinge-connection.

7. The combination, substantially as set forth, of the tongue or frame, the crusher or gang bar, its hinge connection with the frame, the cutter-bar, the hinge connection between the bars, a seat standard or coupling pivoted on the frame and supported on the cutter-bar by pivoted rods in rear of its hinge-connection, and a lever for vibrating the gangs.

8. The combination, substantially as set forth, of the tongue or frame, the crusher or gang bar, its hinge connection with the frame, the cutter-bar, the hinge connection between the bars, a seat standard or coupling pivoted on the frame and supported on the cutter-bar by pivoted rods in rear of its hinge-connection, a lever for vibrating the bars, and a detent for locking the lever.

9. The combination, substantially as set forth, of the frame, the gang or crusher bar, its hinge connection with the frame, the cutter-bar in rear of the crusher, the hinge connection between the bars, harrow-teeth carried by the bars, a seat-standard pivoted on the frame and supported on the rear bar by pivoted rods in rear of its hinge connection with the front bar, a lever on the frame, a link connection between the seat-standard and lever, and a detent.

10. The combination, substantially as set forth, of a tongue or frame, a gang or crusher bar, a cutter-bar in rear of the crusher, harrowing teeth or devices, and hinge or pivot connections or joints between the bars and tongue or frame, which permit a vertical rocking vibration or flexure of the parts relatively to the ground and to each other.

11. The trailing or dragging harrow-tooth herein described, which is formed with a flat end for attachment to the gang-bar, and is then twisted and curved relatively to the draft-line to present a curved dragging cutting-edge to the soil, the cutting-blade of the tooth extending rearwardly in substantially the same general plane with the flat surface of attachment.

12. The combination of a crusher-bar with a series or gang of curved trailing harrow-teeth having flat surfaces for attachment and secured on the under face of the bar, the flat surfaces extending rearwardly beyond the bar, substantially as set forth.

13. The combination, substantially as set forth, of a pole or tongue, a crusher-bar secured thereto and having an upwardly-inclined crushing-face for operating upon the soil, and a series of disintegrating faces or spurs secured on the inclined crushing-face of the bar, so as to give it a ribbed surface, and projecting rearwardly beyond the face of the bar, the spurs being arranged with small open spaces between them to constitute an open-slotted comb-like crusher.

14. The combination of the crusher-bar, the harrow-teeth having the flat surfaces of attachment, and the rearwardly-projecting flat spurs, substantially as set forth.

15. The combination, substantially as set forth, of the tongue or draft frame, the vibrating gang bar or crusher hinged thereto, the vibrating cutter or gang bar in rear of the crusher and hinged thereto, an adjusting-lever on the frame, and a connection between the cutter-bar and lever.

In testimony whereof I have hereunto subscribed my name this 2d day of February, 1882.

FREDERICK NISHWITZ.

Witnesses:

GEO. T. PINCKNEY,  
DUAM N. NASH.