R. Dutton.

Harvester Finger Guards.

No. 54,702. Patented May 15, 1866.

Fig. 1

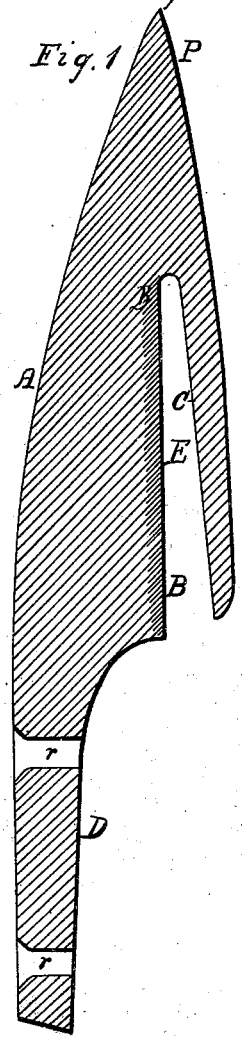


Fig. 2

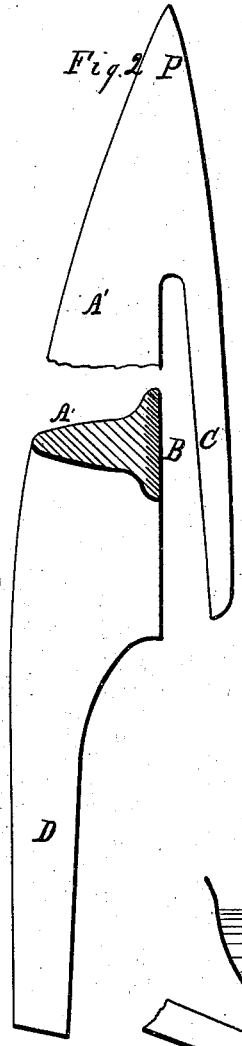
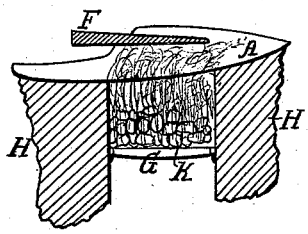


Fig. 5.



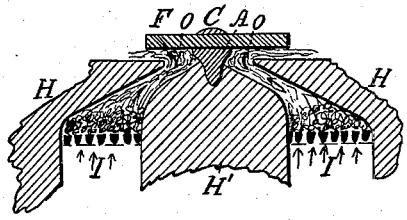


Fig. 6.

Fig. 3.

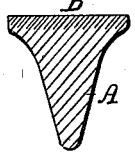


Fig. 4.

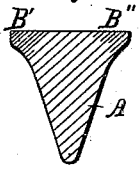


Fig. 8.

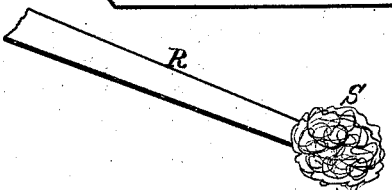
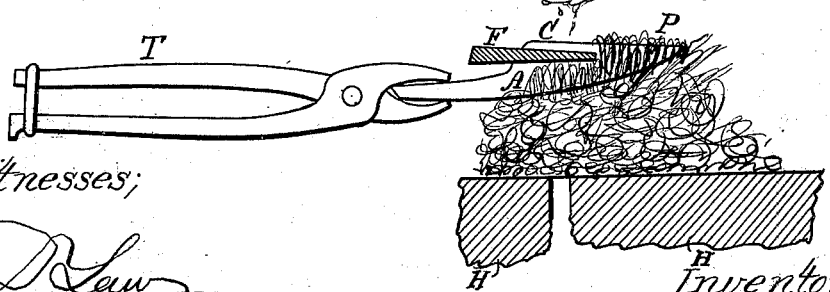


Fig. 7.



Witnesses;

L. D. Law

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UNITED STATES PATENT OFFICE.

RUFUS DUTTON, OF NEW YORK, N. Y.

IMPROVEMENT IN THE MANUFACTURE OF GUARD-FINGERS FOR HARVESTERS.

Specification forming part of Letters Patent No. **54,702**, dated May 15, 1866.

To all whom it may concern:

Be it known that I, RUFUS DUTTON, of the city of New York, in the county of New York and State of New York, have invented a new and useful Improvement in Guard-Fingers for Harvesting-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon, and making a part of this specification.

There are several features or characteristics which are essential in a good guard-finger, and particularly when such finger is to be used upon machines for cutting grass. The finger should be light and at the same time of sufficient strength to resist any strain to which it may be subjected and which may have a tendency to bend or fracture it, and it should also be tempered or hardened on the corners or face of the under side of the slot, so that by the operation of the knife against it while cutting the grass the corners of the under surface of the slot will not become worn or rounded and the cutting action of the machine thus rendered imperfect. Guard-fingers were formerly made of cast-iron; but in order to secure sufficient strength they were required to be made so large and heavy that they seriously interfered with the working of the machine; for when the fingers are heavy they increase the weight of the finger-bar, which, resting on the ground, causes the machine to draw harder, and greatly increases what is termed in mowing-machines the "side draft." Again, when the guard-finger is large it will not easily penetrate the fine and thick bottom grass, and thus increasing the side draft, and also rendering the machine very liable to clog by pulling up the fine grass, which is likely to adhere to the points of the fingers. Malleable-iron fingers having a tempered-steel plate, which formed the under side of the slot, have also been used, malleable iron being much stronger than cast-iron and the hardened steel-plate furnishing a good surface to cut against. A finger so made was lighter and much superior to the ordinary cast-iron fingers. Wrought-iron fingers have also been made having a steel plate welded to them to form the under side of the slot, the steel being tempered to secure a hard surface for the knives to cut against, while the iron, which will not receive the temper, retains its strength.

My invention consists in forging the guard-finger from a solid piece of steel or metal, then cutting therein the slot for the knife by means of a saw or chisel, or by milling, and then tempering or hardening the finger on the under side of or on the edges of the slot, while the body of the finger is left untempered.

Figure 1 is a side view of a finger made and tempered according to my invention. Fig. 2 is a side view of such a finger broken, and showing the tempered or hardened part on the under side of the slot. Fig. 3 is a section of a finger, showing the slot tempered across the surface. Fig. 4 is a section of a finger, showing the edges only of the slot tempered or hardened.

The parts of the fingers tempered or hardened are represented by the letters B B, Figs. 1, 2, 3, and B′ B″, Fig. 4.

By the use of steel a much lighter and smaller and also stronger finger is obtained than is possible when the finger is made either from cast-iron or of malleable iron, or wrought-iron with a steel-plate facing on the under surface of the slot. A steel finger, however, to possess required strength and tenacity, must be, as a whole, free from temper or hardness, as when hardened it becomes brittle and very liable to fracture, while at the same time the under surface of the slot should be hardened to furnish a suitable surface against which the knives may cut.

The difficulty of tempering or hardening the under surface of the slot or its edges while the rest of the finger remains untempered, together with the expense of material and of forging steel above that of wrought-iron, have thus far induced those desiring forged fingers to make them of wrought-iron with a plate of steel welded on the under face of the slot. As iron does not temper, or but very little, when suddenly cooled after being heated, all that is necessary as to such fingers is to heat the whole finger and then plunge it in water, when the steel will be hardened, while the iron remains unchanged. A finger forged from steel requires, however, a different and more difficult process for tempering the under surface or edges of the slot. As the edges only are cut against by the knives, it is apparent that they

only require to be tempered or hardened. A finger forged from a single piece of metal is also much freer from flaws, and consequently less liable to become broken than when formed of several pieces welded together.

Figs. 5, 6, and 7 show several different methods which I have employed or devised to heat such a solid-steel guard-finger so as to enable me to harden or temper only the under surface or edges of the slot and leave the rest of the finger untempered.

In Fig. 5, A represents a finger placed over a fire, K, built or confined between two walls, H H, which are separated from each other about the length of the slot in the guard-finger. A wedge-shaped piece of iron, F, considerably wider than the finger, is placed in the slot, as shown more plainly in section in Fig. 6. The ends of the finger lying over the walls H H are thus protected from the blaze, and the lip of the finger, or that portion above the slot, is also protected from the heat by the interposition of the metallic piece F. Only that portion of the finger below or under the slot is thus heated. When the finger is sufficiently heated the plate F is removed and the finger is dipped in water in the manner shown in Fig. 8, and only the under surface of the slot will be hardened.

Fig. 6 represents another mode of heating the finger preparatory to hardening it. A is an end or sectional view of the finger below the slot, and C a like view of the lip, the metallic plate F being placed in the slot, as before mentioned. H H are the outer walls of a furnace, which project inward toward each other, as shown in the drawing. H′ is a center wall or portion of the same furnace, in the upper side or top of which is a recess adapted to receive the under side of the finger and protect it from the blaze or heat of the fire. By causing a draft of air to be applied under the grates I I the heat or blaze will take the direction O O, causing it to come in contact with the edges of the under surface of the slot, heating them, but not heating the other parts of the finger. As the edges only of the slot are heated when the finger is plunged in water, they only will be hardened. I prefer this plan of heating the finger as being simple and in many respects most practicable. The furnaces are small and inexpensive, and by increasing them in number several fingers may be heated at the same time. A number of such furnaces can also be attended by one man, and the tempering can thus be facilitated.

Fig. 7 represents another mode of heating the finger in an ordinary fire preparatory to being hardened. That part of the finger in front of the slot is wound with waste cloth or any suitable material, and is kept wet by a swab or sponge, S, so that only that portion of the finger below the slot will be heated, the plate F, placed in the slot, preventing the heat from coming in direct contact with the lip above the slot. When sufficiently heated the finger is cooled, as represented in Fig. 8.

I do not claim making the under side of the slot of a guard-finger harder than the other portions of the same finger, as this has been done in the methods above mentioned; nor do I claim making a finger of one uniform metal, having the surface of the slot harder than the body of the finger, as this has been done by casting iron fingers and chilling the under surface of the slot.

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

1. Forging a guard-finger of one uniform metal, as steel, cutting, sawing, or milling a slot therein, and tempering such slot on its under surface or edges, while the body of the finger remains untempered or not hardened, substantially as and for the purposes set forth.

2. Forging a solid guard-finger, cutting the slot therein, and tempering such slot on its under surface or edges, substantially as and for the purposes set forth.

3. Forging the guard-finger from a single piece of metal without a weld and cutting a slot for the knife to work through, substantially as and for the purposes set forth.

R. DUTTON.

Witnesses:
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W. R. RONALDS.