March 18, 1941. J. F. W. KRUSE 2,235,026

TRACK CHISEL AND METHOD OF TREATING SAME

Filed Feb. 5, 1940

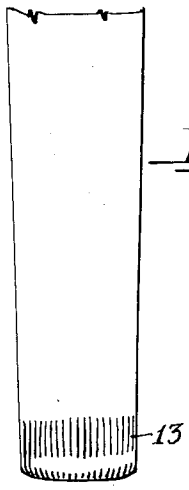


Fig. 3.

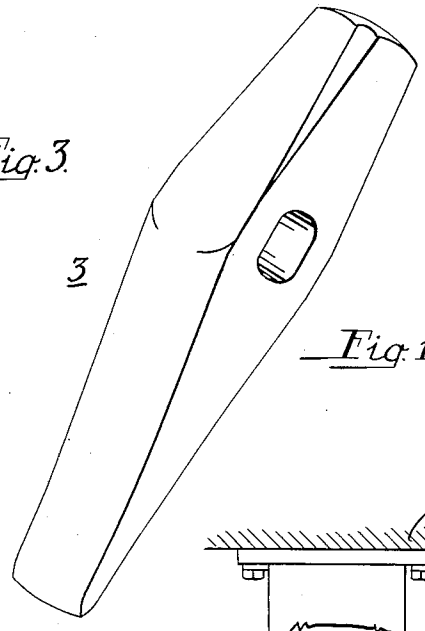


Fig. 1.

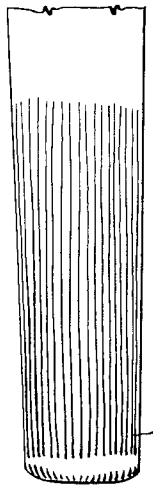


Fig. 4.

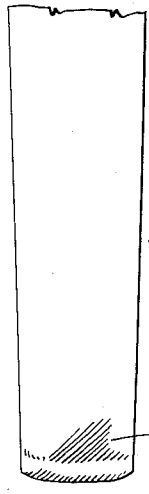


Fig. 5.

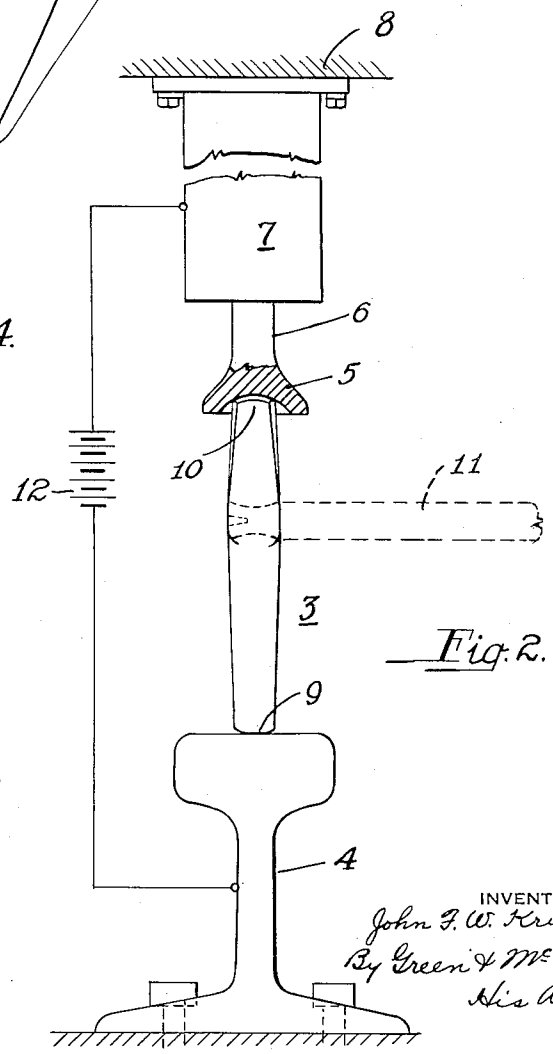


Fig. 2.

INVENTOR
John F. W. Kruse
By Green & McCallister
His Attorneys

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2,235,026

TRACK CHISEL AND METHOD OF TREATING SAME

John F. W. Kruse, Oakmont, Pa., assignor to Hubbard and Company, a corporation of Pennsylvania

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5 Claims. (Cl. 148—12)

This invention relates to chisels and particularly to what are known as track chisels, and to a method of improving such chisels.

A track chisel is a tool used by tracklayers and has a wedge shaped peen or cutting edge at one end and a hammer head at the other end, and is slotted to receive a wooden handle.

When using such a chisel as a cutting tool or wedge, one man, by means of the handle, holds it in position, while another, by means of a sledge usually of about 10 pounds in weight, strikes the necessary blows on its head end.

Prior to this invention, the general instructions in regard to the use of new chisels of this type have always been to strike them lightly for approximately 25 to 50 blows before delivering a full blow; it having been found that by carrying out this procedure, the effective life of such chisel has been increased.

An object of this invention is to provide a method of producing track chisels having a materially greater effective life than those heretofore made.

Another object is to provide a method of treating track chisels to materially increase their effective life.

A further object is to provide a method of so treating track chisels that the shock flow lines, when the chisels are in use, are caused to substantially parallel the longitudinal axis of the chisel as they progress from the chisel's cutting edge toward the head end thereof.

A still further object is to produce a track chisel in which the shock flow lines have been so established that there is no necessity for the ordinary preliminary light blows above referred to.

These and other objects which will be apparent to those skilled in this particular art, I attain by means of the chisel and the procedure described in the specification and illustrated in the drawing accompanying and forming part of this application.

In the drawing:

Figure 1 is a track chisel embodying this invention;

Fig. 2 is a more or less schematic illustration of apparatus such as may be used in carrying out the method by which track chisels may be given the improved qualities above referred to; and

Figs. 3, 4 and 5 are fragmentary views of track chisels and illustrate the shock flow lines referred to.

Broadly, the method of imparting to track chisels the improved qualities or characteristics, of the chisels treated in accordance with this invention, consists in holding the cutting or wedge end of such a chisel in contact with a solid metal abutment such as the top of a short section of a rail, so that the longitudinal axis of the chisel is perpendicular to the top of the rail, and then to apply, axially to the head end of the chisel, a succession of rapid hammer-like blows. Each such blow is preferably of the order of about 70 pounds and the blows are rapidly applied for about 15 seconds and preferably at the rate of about 1500 per minute.

This practice, in effect, amounts to axially vibrating the chisel by means of 70 pound blows delivered on the head of the chisel at the rate of substantially 1500 per minute, and in carrying on the vibrating procedure for about fifteen seconds.

I find that somewhat better results can be obtained if, while carrying on the vibrating procedure, the chisels are included in an electric circuit and I have found satisfactory results are obtained when the voltage is from 4 to 6 and the amperage from about 50 to 80.

I am of the belief that such vibrations have an entirely different effect upon the chisels than can be secured by 25 to 50 light blows struck by a sledge.

I do not know that any structural adjustment is occasioned by the vibrating treatment alone or when carried on while the electric current is passing lengthwise through the chisels, but I do know that the vibrating treatment by itself and also when supplemented by the electric current, produces a material improvement in the chisels; their effective life is materially increased and my belief is, that this is so because the direction of the shock flow lines are set, so to speak, so that during use of the chisels in service, such lines, as they progress from the cutting edge toward the head end always parallel the longitudinal axis of the chisel instead of veering toward one edge or the other or toward both edges.

The chisels after being completed except for polishing and painting are subjected to the shock flow line setting method of this invention.

In carrying out this method, a track chisel such as chisel **3** shown in Fig. 1 is held in position between a solid metallic abutment such as a relatively short rail section **4**, and the cupped end of a member **5** carried by the plunger rod **6** of a vibrating device **7**. This vibrating device preferably takes the form of a relatively short stroke air hammer which is rigidly secured to a support **8**.

The center of the cupped end of member 5 is in line with the center line of the head of rail 4, and the chisel is held in vertical position with its cutting edge 9 in contact with the rail and with its head end 10 in line with the center of the cupped end of member 5.

The chisel may be held in position by the operator of the vibrator 7 by means of a handle 11 or, if not too large, the operator of the vibrator may hold the chisel in position by hand. The rapid hammer-like blows delivered by the vibrator 7 are delivered axially of the chisel.

Each blow delivered by the air hammer is preferably approximately a 70 pound blow and these blows are delivered preferably at the rate of about 1500 per minute; the vibrating treatment being carried on for approximately 15 seconds.

As I have said, I obtain some added improvement by including the chisels in an electric circuit during the vibrating procedure. In order to do this, I connect rail 4 and vibrator 7 to a suitable source of supply 12 of electric current. While source 12 in the drawing is depicted as a battery, this is merely for the sake of illustration, since any suitable source of current of the desired voltage may be used.

The vibrating treatment when carried on by itself as well as when carried on while the chisel is included in an electric circuit, apparently sets the shock flow lines or, in other words, determines the direction in which such lines will proceed during use of the chisel in service.

It has been determined by a suitable photographic procedure, to which treated chisels have been subjected, after etching with Frey's reagent, that the shock flow lines are so set that as such lines progress or lengthen during use, they remain parallel to the longitudinal axis of the chisel.

In Fig. 3, the shock flow lines 13 have been permanently set by the treatment of this invention; in Fig. 4, lines 14 are the shock flow lines of a treated chisel after such chisel has been given about 15,000 blows with a 10 pound sledge.

In Fig. 5, lines 15 which veer toward one side of the chisel are shock flow lines of an actual chisel after having been given the usual 25 to 50 light blows, and then used in service.

The chisels are forged from square bars preferably of silico-manganese steel, although other high carbon steels may be used.

It is important that the bars be rolled in but one direction, that is, without cross rolling, so that the grain lines of such bars parallel their longitudinal axes.

When forging the chisels from silico-manganese steel, I make use of a forging temperature of from 1850–1960° F. and after forging, the chisels are normalized at about 1050° F. and are then ground to size. They are next hardened by being heated to about 1600° F. and water quenched. Next, they are tempered and this is carried out at a temperature of about 760° F. for about 3 hours after which they are air cooled. After tempering, the head portions of the chisels are heated in a lead pot to a temperature of about 1050° F. for approximately 3 hours. After this, they are air cooled.

Before the chisels are finished by polishing and painting, they are subjected to my vibrating treatment.

After the chisels have been subjected to the vibrating treatment, they are polarized and covered with finely divided iron, preferably in the form of iron filings. In the procedure of polarizing, I find that satisfactory results are obtained when the voltage is from 4 to 8 and the amperage from 250 to 300.

This procedure of polarizing the chisels and then covering them with finely divided iron resembles the Magnafluxing procedure and discloses defects such as cracks or non-metallic inclusions.

I have found that many chisels which will pass the polarizing test before being subjected to my vibrating treatment, after receiving such treatment, fail to pass this test.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A method of permanently setting shock flow lines in a track chisel during its manufacture so that said lines as they lengthen during use of the chisel will substantially parallel its longitudinal axis, which includes holding a track chisel with its cutting edge in contact with a metal abutment and in subjecting the chisel to at least 350 blows of at least 50 pounds each delivered at a rate in excess of 1000 per minute to its head end and in line with its longitudinal axis.

2. A method of permanently setting shock flow lines in a track chisel during its manufacture so that said lines as they lengthen during use of the chisel will substantially parallel its longitudinal axis, which includes holding a track chisel with its cutting edge in contact with a metal abutment and in subjecting the chisel to a succession of substantially uniform blows delivered to its head and in line with its longitudinal axis; said blows being delivered at a rate of not less than about 1000 per minute throughout a period of at least 10 seconds, with each such blow being of the order of not less than about 50 pounds.

3. A method of permanently setting shock flow lines in a track chisel during its manufacture so that said lines as they lengthen during use of the chisel will substantially parallel its longitudinal axis, which includes holding a track chisel with its cutting edge in contact with a metal abutment and in subjecting the chisel to a succession of substantially uniform blows delivered to its head end in line with its longitudinal axis; said blows being delivered at a rate of approximately 1500 per minute throughout a period of about 15 seconds with each such blow being of the order of approximately 70 pounds.

4. A method of permanently setting shock flow lines in a track chisel during its manufacture so that said lines as they lengthen during use of the chisel will substantially parallel its longitudinal axis, which includes holding a track chisel with its cutting edge in contact with a metal abutment, in subjecting the chisel to a succession of substantially uniform blows delivered to its head end and in line with its longitudinal axis; said blows being delivered at a rate of not less than 1000 per minute throughout a period of at least 10 seconds, with each such blow being of the order of not less than 50 pounds, and during the delivery of such blows in flowing lengthwise through said chisel from about 50 to 80 amperes of from about 4 to 6 volt current.

5. A method of permanently setting shock flow lines in a track chisel during its manufacture so that said lines as they lengthen during use of the chisel will substantially parallel its longitudinal axis, which includes holding a track chisel with its cutting edge in contact with a metal abutment, in subjecting the chisel to a succession of

substantially uniform blows delivered to its head end in line with its longitudinal axis; said blows being delivered at a rate of approximately 1500 per minute throughout a period of at least 15 seconds with each such blow being of the order of approximately 70 pounds, and in passing lengthwise through said chisel during the delivery of such blows from about 50 to about 80 amperes of electric current having a voltage of from about 4 to about 6.

JOHN F. W. KRUSE.