

F. SEARLE.
COMPOSITE STOCK FOR MACHINE KNIVES AND METHOD OF MAKING THE SAME.
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925,661.

Patented June 22, 1909.

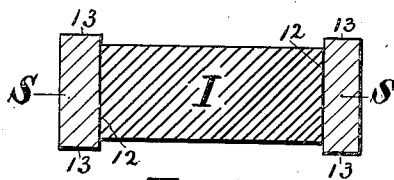


FIG. 1.

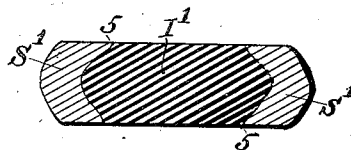


FIG. 2.

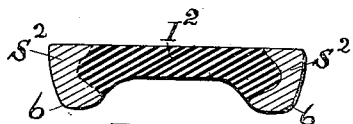


FIG. 3.

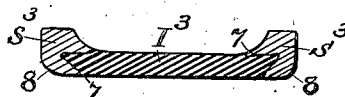


FIG. 4.

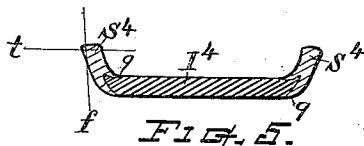


FIG. 5.

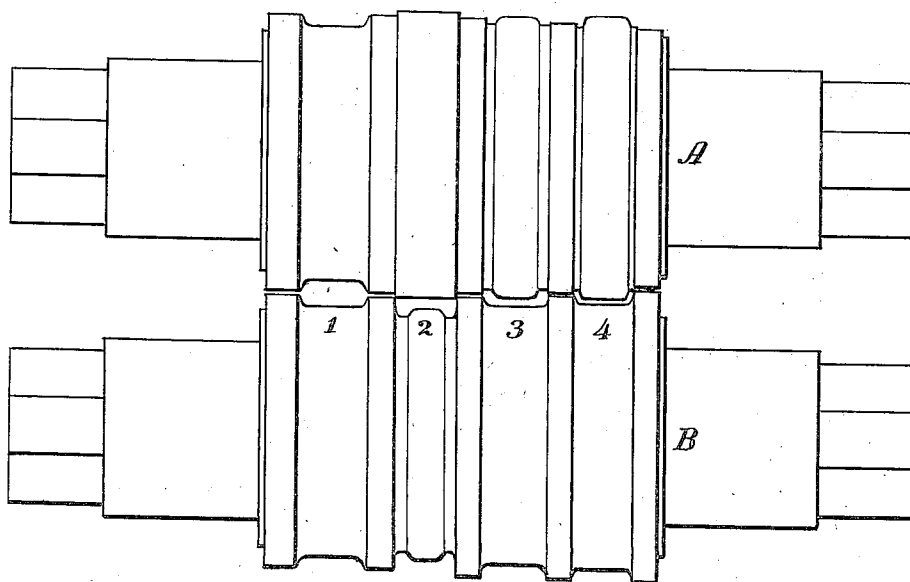


FIG. 6.

Witnesses.

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UNITED STATES PATENT OFFICE.

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COMPOSITE STOCK FOR MACHINE-KNIVES AND METHOD OF MAKING THE SAME.

No. 925,661.

Specification of Letters Patent.

Patented June 22, 1909.

Application filed May 7, 1908. Serial No. 431,331.

To all whom it may concern:

Be it known that I, FREDERICK SEARLE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Composite Stock for Machine-Knives and Method of Making the Same, of which the following is a specification, reference being made therein to the accompanying drawings.

The object of my present invention is the production of a securely welded composite stock for machine knives of the double edged channel-bar pattern, more especially for the ledger knives for lawn mowers, or similar knives having two turned up edges. Also, to provide a conveniently workable process whereby a double edged channel-bar knife-stock can be successfully and economically manufactured, and the steel edging material efficiently affixed to the body or backing by a V-welded integration; and to practically produce a composite stock of such character that the dual cutting-edges of knives made therefrom can be properly hardened and tempered without destroying the capacity of the product for being straightened or fitted after the knife is formed, or while being formed therefrom; thereby affording more perfect and stronger knives of the pattern specified than heretofore produced. These objects I attain by the means hereinafter explained, and illustrated in the drawings, wherein—

Figure 1 represents a cross section of the iron and steel members as primarily assembled in the fagot. Fig. 2 represents a cross section of the billet after going through the first reduction pass. Figs. 3 and 4 represent successive cross section shapes of the composite bar after going through the second and third reduction passes respectively. Fig. 5 represents a cross section of the completed stock as it is issued from the final pass of the reduction rolls; and Fig. 6 is a front view of a pair of reducing rolls having passes formed for producing composite knife-stock in accordance with my invention.

In a machine knife of the channel-bar shape it is desirable that the upturned lips, whereon the cutting edges are formed, should be hardened and tempered, while the bar as a whole should be strong and rigid, but at the

same time sufficiently tough and bendable to permit of the knife made therefrom being straightened or fitted, to eliminate the warpings and distortions incident to the hardening operations, or to properly adjust the alinement of the opposite edges. It is also essential that the lips or upturned edges be of such quality and texture that they can be ground away, by successive sharpenings, quite or nearly to the bottom plate or backing. A stock made entirely of steel would of course give good cutting edges, but an all-steel stock, when hardened to the required degree, cannot be successfully straightened and adjusted by bending; and furthermore an all-steel stock is comparatively expensive and may not be produced with the requisite economy.

To produce composite stock of the shape specified and having the requisite qualities, and that can be manufactured with practical economy and success, my improved process is as follows: I prepare a fagot (Fig. 1) of the desired length, composed of a rectangular sectioned bar I of refined wrought iron, or soft steel (of ten per cent. carbon or less) of a dimension say three-fourths inch by one and three fourths inches, more or less, and two rectangular sectioned bars S of crucible cast-steel or tool-steel, of a dimension say one inch by five sixteenths inch, more or less, which latter are placed flatwise against the opposite edges 12 of the body-bar I, with their respective edges 13 projecting in either direction beyond the flat faces of said body-bar, as illustrated in Fig. 1; in which form the members, previously heated and fluxed, are hammer-welded to primarily unite their adjacent surfaces sufficiently to keep the members together in place. This fagot, when properly heated, is run through a pair of reducing rolls A, B, in a pass 1 having an approximately straight top and bottom, and rounded or inclined ends that compress the exterior angles of the billet and firmly weld the steel members to the opposite edges of the body-bar, reduced as at I¹, with a somewhat crescentic shaped cross-section, as at S¹, forming an overthrust of the upper and lower edges of the steel at the weld joint 5, as indicated in Fig. 2. The composite billet is then further reduced in a pass 2, the form of

which presents a flat at one side and a double
channeled contour at the opposite side;
whereby the billet is given the shape approxi-
mately as shown in Fig. 3, the intermedial
portion I^2 being reduced to about one half the
thickness of the side portions S^2 , which latter
are crowded inward at the corners 6. The
bar is next inverted and put through a reduc-
ing pass 3 that flattens the body or backing
portion nearly to its final thickness, as at I^3 ,
and transforms the edge portions into embryo
upturned lips, as at S^3 , forcing the lines of the
welding into oppositely directed bird-mouth
or V-shaped contour, as at 7, but leaving a
proportional excess of thickness at the shoul-
der 8; the stock then having the shape ap-
proximately as indicated in Fig. 4. The bar
when thus shaped is put through a final pass
4 of the rolls, whereby it is slightly reduced
in its full width, the body portion flattened
or further reduced to finished dimension for
the backing, as at I^4 , and the excess at the
shoulders 8 reduced in thickness and forced
upward making the upturned lips S^4 , at each
edge, complete and of approximately uni-
form thickness therewith; and disposing the
V-shaped welding along the angle or base of
the lips in such manner that the upstanding
lips are substantially all hard steel, while the
backing or body web is of iron or non-harden-
ing material, as shown in Fig. 5. Thus pro-
ducing a firmly united composite stock of
channel-bar section, with edges that can be
hardened and tempered, and with a body
that will permit of the straightening, twist-
ing, or readjustment of the alinement of the
knife after it has been tempered, and with
the V-welds of the steel-edge overlapping
onto the softer material approximately along
the angles, as at 9, in a manner that will
avoid liability of rupture in the weld in the
process of manufacture; the stock presenting
hard and efficient upstanding lips along both
edges.

The class of machine knives for which this
improved composite stock is produced, and
for which it is peculiarly adapted, are the
ledger-knives for lawn mowers and similar
mechanisms, wherein a spirally bladed re-
volver is arranged to shear against a straight
ledger knife. The finished knife made from
this cutter-stock is of approximately the
same cross-section as that of the complete
stock, as shown in Fig. 5; the knife being a
piece of the stock of the required length,
suitably hardened and tempered, and having
the top edges and outer faces of the upstand-
ing lips simply ground, on the lines f and t ,
for giving the desired cutting edges, and
which can be re-ground and used until the
entire upstanding lips are worn away, with-
out exhausting the quality of the stock.

I am aware that a channel-bar shaped cut-
ter stock of a non-composite nature has here-

before been employed, and I do not, there-
fore, herein broadly claim that shape, *per se*,
as applied to cutters; but so far as I am
aware a composite soft-bodied, dual steel-
edged knife-stock of the shape and inherent
structure herein described, has never been
heretofore successfully produced, nor a
method disclosed for the practical manufac-
turing of such formed composite knife-stock,
prior to my invention hereinbefore set forth.

What I claim and desire to secure by Let-
ters Patent, is—

1. The method of making double-lipped
composite knife-stock, which consists in ap-
plying to each of the two edges of a rectangu-
lar bar of wrought iron a bar of cast or tool-
steel of greater width than the thickness of
the iron, condensing this composite *fagot* to
weld and form the steel in approximately
crescent shape upon the respective edges of
the body-bar, reducing said bar with an ex-
cess of reduction centrally along one side;
further reducing the same in channel-bar
shape to form embryo lips of the steel having
an excess of thickness at the shoulders where
the welds embrace the edges of the iron, then
rolling said reduced bar into its final double-
lipped shape with the mass of steel chiefly
disposed in the lips, and the welding line
along the base of the lip, substantially as set
forth.

2. The improvement in the method of
making composite stock for dual-edged ma-
chine knives of the character specified, which
consists in combining in a *fagot*, a rectangu-
lar sectional body-bar of iron or soft steel and
two bars of crucible cast or tool steel respec-
tively arranged with projecting edges upon
the opposite edges of said body-bar, pri-
marily uniting the same by hammer-welding,
and at an initial rolling compressing the ex-
terior projecting edges of the billet inward so
as to overthrust the steel edgings in opposite
crescentic form upon the body portion, then
reducing the body thickness, and by succes-
sive stages subsequently forcing the steel
edgings into the form of upstanding lips at the
respective edges, and closing the welding
lines into inwardly over-lapping bird-mouth
or V-shaped integrations along the opposite
edges of the backing body, substantially as
set forth.

3. A composite stock for machine-knives
of channel-bar cross-section, said stock com-
prising an approximately flat body-portion
consisting of soft non-hardenable steel or
wrought-iron, and offset upstanding longi-
tudinal lips consisting of hardenable steel or
tool-steel along each edge of said body, the
body and lip portions being integrally united
by oppositely disposed V-shaped weldings
longitudinally along the junction line of the
lip and body, as set forth.

4. The within described double-edged

composite stock for machine-knives, said
stock comprising a flat non-hardenable cen-
tral body-strip, in combination with an up-
standing outwardly inclined lip of harden-
5 able steel uniformly applied thereto along
each of the edges, said lips being of approxi-
mately the same thickness as the body-strip,
and integrally united longitudinally there-
with by oppositely disposed weldings located

at the angle or up-turn-offset of the respec- 10
tive lips, substantially as set forth.

Witness my hand this fourth day of May
1908.

FREDERICK SEARLE.

Witnesses:

CHAS. H. BURLEIGH,
ELLA P. BLENUS.