(No Model.) 2 Sheets—Sheet 1.

E. G. OST.

DIE FOR STRAIGHTENING KNIVES AND FORKS.

No. 379,597. Patented Mar. 20, 1888.

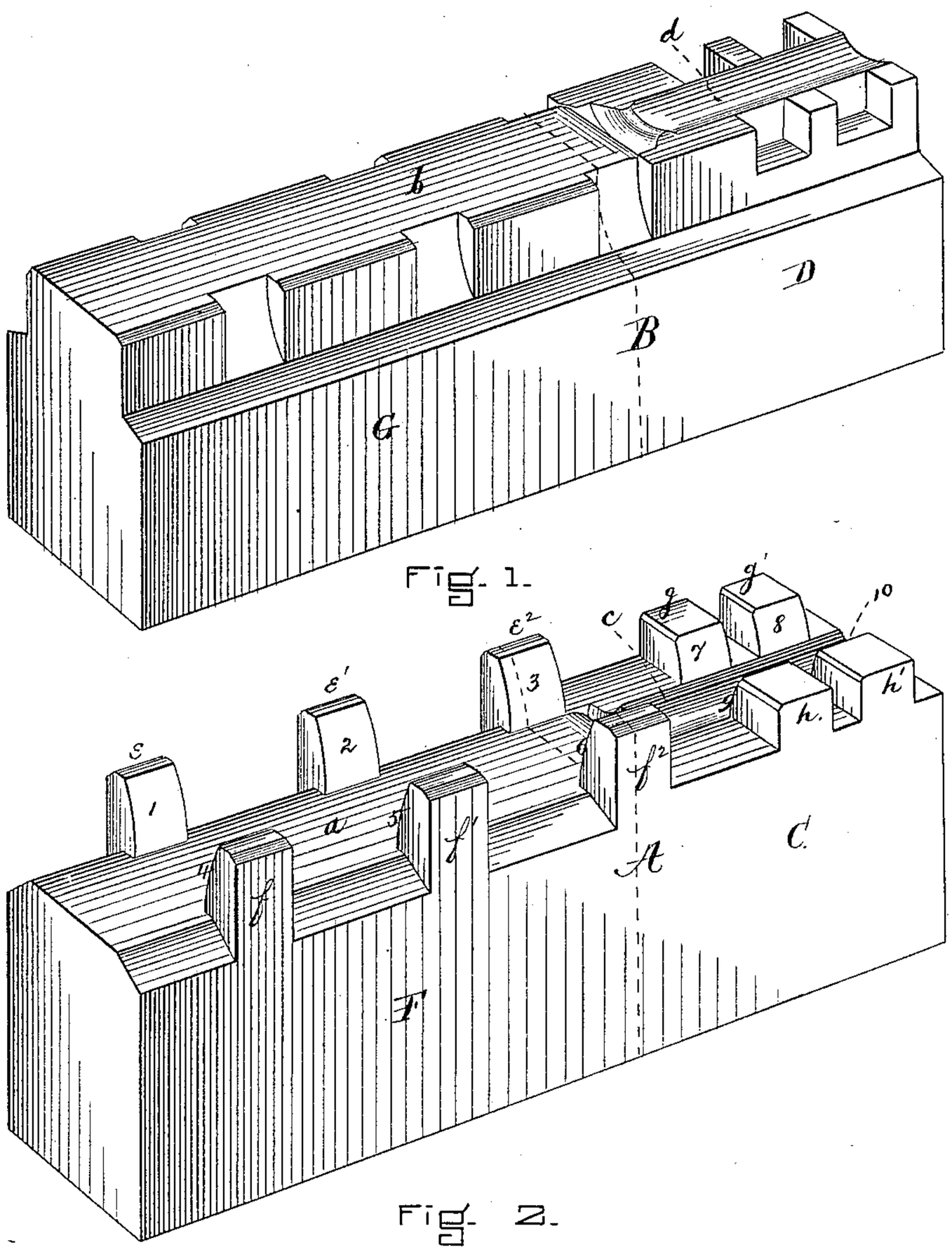

Fig. 1.

Fig. 2.

WITNESSES.

Eva J. Winn.

Hale L. Warren.

INVENTOR.

Elias G. Ost.

By Henry Winn, Atty.

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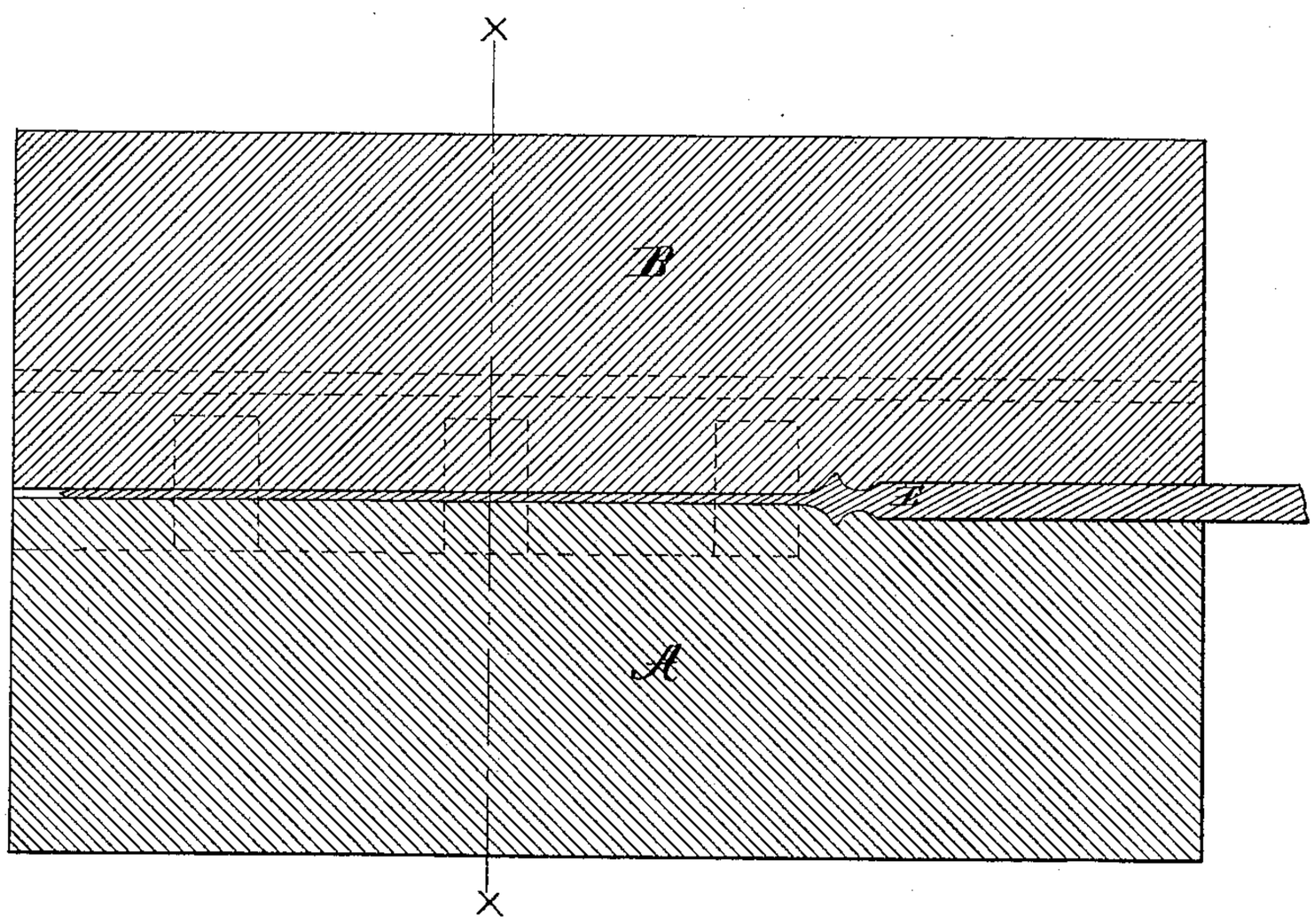

Fig. 3.

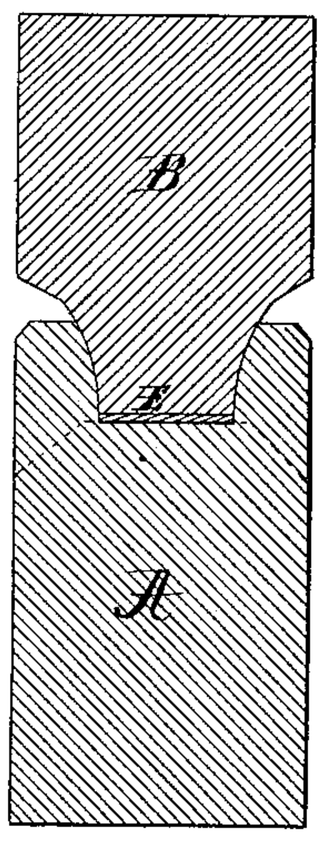

Fig. 4.

WITNESSES.

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UNITED STATES PATENT OFFICE.

ELIAS G. OST, OF SHELBURNE, MASSACHUSETTS.

DIE FOR STRAIGHTENING KNIVES AND FORKS.

SPECIFICATION forming part of Letters Patent No. 379,597, dated March 20, 1888.

Application filed June 3, 1886. Serial No. 203,976 (No model.)

To all whom it may concern:

Be it known that I, ELIAS G. OST, of Shelburne, in the county of Franklin and Commonwealth of Massachusetts, have made certain new and useful Improvements in Dies for Making Knives having Solid Steel Handles or Scale-Tangs and in the Process of Manufacture of such Knives, whereof the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 shows in elevation an upper die. Fig. 2 shows in elevation a lower die having my guides. Fig. 3 shows a central vertical longitudinal section of the two dies in the position of impact and of a knife in its impression-cavities in said dies. Fig. 4 shows a vertical cross-section of said dies and knife, taken through the line *x x* of Fig. 3.

My invention consists of an improvement in dies for making table-knives and other cutlery in which a tang or handle is required to be made integral with and in a prearranged line with or position relative to the blade according to the design of the knife; and it is especially valuable in making the blanks, which, when plated, are known as "steel-handled" knives, the principal part of the process performed with my dies being the straightening of the blade with the handle or tang or bringing of the blade and tang or handle into the exact line or position relative to each other which they are designed to have.

My invention is illustrated by a set of dies suitable for making a steel blank, E, for a medium or table knife. By the term "set" I refer to the upper and lower dies necessary to make an impression upon the blank by impact together, and of the dies shown A is the lower and B the upper die, each having cut in its face corresponding opposite impression-cavities constituting, when the dies are in place, with a blank of proper form between them in the cavities of each, a socket fitting upon the blank in a sufficient number of points to impress upon a blank heated and in suitable condition to be shaped or corrected in this process, when it is forced into this socket by the impact or pressure of the upper die, the desired configuration. No impression-cavities are necessary for the flat portion of the blade; but in the dies A and B the faces impressing this part have flat surfaces inclined suitably toward each other to bear upon the beveled sides of the blade between them when in its proper place, other bearing-surfaces holding the dies apart sufficiently to leave a proper thickness in the blade, the inclinations being toward the blade-edge, *a* being the face of the die A, impressing this part, and *b* the face of the die B, while *c* represents the impression-cavity of the die A, fitting the handle and bolster, and *d* represents the corresponding impression-cavity in the die B.

The dies are fitted to leave a small part of the handle outside to be taken hold of for manipulation, enough being introduced between the dies to secure the effects of the process for which they are used. The die A has attached to or integral with it the guides *e e'* e^2 *f f' f²*, for guiding the blade into its proper place between the dies, and the guides *g g' h h'*, for guiding the handle into its impression-cavity, all which guides have corresponding depressions in the die B; or the die B may be cut away to obviate the necessity of depressions. All these guides have inclined faces 1 2 3 4 5 6 7 8 9 10 inclining toward the proper locations in the dies of the several parts of the blank they are to guide into place, whereby when the blank to be operated on is put between them, (the dies being suitably placed in a drop or other press,) and the upper die is allowed to drop upon or press it, the blank is forced into its socket, and if it varies at all from the true configuration desired it is forced into shape by the dies, the edge being toward the guides *f f' f²*.

The operation of the dies to straighten or correct the blank, which is properly heated therefor, is sufficiently obvious from the foregoing description. The guides greatly facilitate speed in work by guiding into place for impression the blanks placed between them. There are four principal directions in which a blank is usually out of line shown in the blank-fitting dies A and B, as follows: The first two are those in which the defect occurs when the edge or back of the blade inclines forward or back, making an angle with the handle. The second two directions are those in which the defect occurs when one side or the other inclines toward and makes an angle with the side of the handle. Of course, however, the blade or handle or blade and handle

may be out of line in either of the intermediate directions, the blade may be twisted on the handle, or the configuration of the bolster and the portion of the blade immediately connected therewith may be wrong. Any of these defects existing in the blank will be remedied by dropping or pressing it into its socket, in its proper heated state, between my improved dies.

The usual processes of forging a piece of steel cut from the bar into a blank are as follows:

First, the heated steel is dropped, forming in the drop-press a handle and bolster upon it.

Second, with another heating the other end of the steel is drawn under a trip-hammer lengthwise enough to form a blade.

Third, with another heating the blade portion is plated out sidewise into suitable thickness in that direction to form a blade.

Fourth, the blade is cut into shape with cutting-dies.

Fifth, the flash or flake of metal escaping into the dies from the handle in the impression-cavities is cut off with cutting-dies.

Sixth, the sixth and seventh processes are performed with two sets of dies, the first set similar to the dies which would be formed by the parts C and D of my dies A and B if each of my dies were cut in two parts at the vertical cross-section indicated by the dotted lines thereupon in Figs. 1 and 2, excepting that the die corresponding to the part C has no guides upon it, and the other no depressions to receive the same, and they are both constructed somewhat longer than the parts C and D, and contain impression-cavities for the full length of the handle. The second set of dies, in which the seventh process is usually performed, are like the dies formed by the parts F and G, left of my dies A and B, after cutting therefrom the parts C and D, as described, excepting that they have no guides or corresponding depressions. The sixth process has the principal purpose of correcting deflections of the blade and handle from a correct line in either of the first two principal directions named, in which a blank is usually out of line. This process is performed by the first two of the dies described, similar to the parts C and D, the lower die having fastened to its front, far enough forward to escape the upper die as it falls in the drop or other press, two fingers, usually called a "gage," which act as guides, and have a similar position relative to the impression-cavity of the handle in the lower die that my guides e^2 f^2 have to the same in my die. Between these fingers the blade of the heated blank is placed, and, the handle having usually a slightly-inclined surface on each side which bears upon the edge of the impression-cavity, if the blank is not much out of line, the impact or pressure of the upper die bearing upon it is thereby guided and forced into the cavity, and, the blade being held by the gage, the error is corrected. Any error in the configuration of the bolster or the part connecting it with the flat part of the blade is also corrected in the dies; but the amount of error in the deflection of the edge or back of the blade from line, to be remedied by pressure of the die on the incline of the handle forcing it into place, is slight, since, if the deflection is too great, the upper die will not force the handle into place, but the hot blank must be struck by other means to correct the deflection enough to allow the die to force it into its cavity.

Seventh. The next process is to straighten or correct any deflection of the blade in either of the second two principal directions named—that is, sidewise. This is done by heating again the blade and subjecting it to pressure between the dies described therefor, the flat beveled faces forcing the blade into line.

My improved method, for which I reserve the right to apply for Letters Patent, combines the sixth and seventh processes, saving in the manufacture of these blanks one dropping or pressing process, and consequently the use of a drop or other press and one fire. This is accomplished by my improvement in the dies, and is rendered possible by the use of the guides e e' e^2 f f' f^2 g g' h h', the inclined faces 1 2 3, &c., of which will guide the entire blank, which is placed between them, heated, and receives the impact or pressure of the upper die in a drop or other press into its proper impression-cavities, the blade falling into its exact place between the faces a and b, the reaction of the guides or of the guides e e' e^2 or f f' f^2 and the impression-cavity c doing the work of the sixth process, while the flat faces a and b, reacting on the blade while the handle is held and impressed in its true position relative to the blade by the surfaces of its impression-cavity, perform the work of the seventh process at the same time, all errors of configuration being corrected also. These guides direct or guide the blank into position when being placed in the dies by reacting against it if the operator deflects it from its true course, and if the blank be so much out of figure in either of the two principal directions first named that it will not pass to its position for receiving the impact of the dies, the reaction of the guides against it on opposite sides, when being pressed down by the upper die, guides it to place, and by this guiding process corrects the whole or some part of the deflection of the blank as it passes along.

My improvements remedy a difficulty heretofore experienced in the manufacture of these blanks, making them much more perfect than former processes. Inasmuch as the bevel of the blade is formed by an inclination of the faces of the upper and lower die toward each other, obviously the blades will not be uniform and perfect unless the blade is placed in the same spot on the face a and in a proper line longitudinally with the faces a and b, as well as in the location required to give the proper thickness at every operation. This cannot be done in practice by the old process, but is accomplished by the use of my guides. Each guide

adjacent to the blade in place acts as a stop to hold it in place on the flat face *a* while awaiting and while receiving the blow of the other die after it has been put or forced into position to be impressed. Since the blades cannot be placed accurately in ordinary dies used in the seventh process, the impact of the upper die falls unequally on the blade, and this very frequently has the effect to cause the same deflection in the blank from its true line, which the sixth process was intended to remedy; and so if either the sixth or seventh process precedes, the disfigurement sought to be remedied by the prior process is often created by the later, while my combination of both in one makes perfect work.

Some makers of blanks perform the fourth and fifth processes described at one operation by using cutting-dies that will cut off the flash, as described, from the handle and cut the blade at the same operation. Obviously this will remedy any error of the lines of the blank in either of the first two principal directions and save the necessity of the sixth process, so far as it is used for straightening the blade and handle to remedy deflections in those directions; but the seventh process is then necessary, since the cutting-dies will leave the blank out of line in one of the other two directions—that is, sidewise—and the seventh process in the same manner before described, unless the blade is placed on the die precisely where it should be; or if it has been placed so as to give more of the force of the pressure or impact of the upper die to one part of the blade than another, will create anew one of the deflections of the blade or handle in one of the first two directions, which deflections the sixth process is intended to remedy. The work is therefore no better than if made by the processes first described, unless my improved dies are used, which are intended to remedy these faults.

In the seventh process it is common to place a rest, on which to place the handle while the blade is being struck, near the die at the right height to support the handle even with the blade and prevent a sharp bend at the bolster. Obviously the part C of my die performs this function when the blade is shaped.

Plainly it is not essential to the use of my dies with some advantage that all the guides shown should be attached thereto, the extra number being attached to take out every possible deflection from the true lines of the blank, and the guides would operate substantially as well if attached to the upper die, or if part were attached to the upper and part to the lower, if correctly located to operate as described when the dies came together. the blank being caught by the inclines and forced into place; or, if so located and otherwise held, but admitted through depressions to their places, the guides might be disengaged from both dies.

A single guide, e^2, for example, with no more, which would rest against the back of the blade in its true location on the face *a*, would act as a stop to locate it thereon, and the reaction of said back against it and of the inclines of the handle against the sides of the impression-cavity would correct a moderate deflection of the back toward the handle; or a single guide, f^2, for example, with no more, would similarly act as a stop against the edge and in a similar manner correct a moderate deflection in the blank of the edge toward the handle, in either case the dies rectifying all sidewise deflections. As by striking the hot blank the deflection could be thrown on either side desired, my dies would be useful with one guide; but two guides, e^2 and f^2, for example, located on opposite sides of the location of the blade, would fulfill the part of the gage in the sixth process, and in cases of moderate deflection in either of the two first principal directions named the configuration of the blank would in one operation be corrected, as in the sixth and seventh processes, if only those guides were used, and with two guides thus used and another located on the side of the impression-cavity of the handle—the guide g', for example—a still greater deflection of the blade in one of said two principal directions would be rectified, while with a single guide located beside said impression-cavity, the other two not being used. a stop would be provided to assist in locating the blank in the dies—a purpose further aided by another guide on the opposite side thereof; but a much better result is secured by the use of four guides, two on opposite sides of the location of the blade and two on opposite sides of the location of the handle or tang, a large deflection in either direction being thereby corrected.

Of course the addition of other guides tends to make the work more perfect until, if the guides were extended, a continuous inclination might surround the location of the blank in the dies, leaving, perhaps, an opening out of which some part of the blade handle or bolster might project to take hold of in manipulation.

To further define the term "guide" as herein used, it may be said that it indicates generically a projection which may or may not be attached to one of the dies, extending from the die-face upward if attached to the lower die in place, or downward if attached to the upper die in place, located generally at the proper position in the die of the blank during impression, but located and adapted to and having the purpose of assisting to guide the blank while being adjusted to its impression position and impinging against the side of the guide presented to said position into said position, or to stop the blank in said position from motion therefrom, or by reaction against a force applied upon the side of the blank opposite to that in contact with it, to assist in rectifying the outline of the blank while being pressed to its place. The term does not include any portion of the impression-cavity impressing finally its form upon the blank, although the inclinations thereof may

to some extent have similar effects; but it does include, generically, projections with or without the inclinations 1 2 3 4, &c., which are on the specific improved guides shown. Thus if the guides shown were without such inclinations, but had vertical faces in place thereof, they would yet serve as guides to assist in guiding the blank to place or to hold it therein or even to correct some irregularities of its outline, especially if the blank be somewhat tilted edgewise while being placed between said guides.

My guides are also specially useful in making scale-tang knives, which have a tang drawn flat to receive scales of wood or other substance required for the handle. These tangs can have no inclination to guide them into an impression-cavity and need the guides to correct their lines with those of the blade. Obviously, also, my dies with suitable bearing-points may be made to correct the configuration of almost any blank, by which term I include the forging, which when ground and finished, and when the material, if any, required for the handle is added, becomes a knife.

What I claim as my invention, and for which I pray Letters Patent, is—

1. A set of dies having an impression-cavity into which the handle and bolster of a knife-blank are forced to correct their configuration, and one or more guides located in position to impinge against said handle when being placed into the die for impression and guide it into said impression-cavity, substantially as described.

2. In a set of dies for correcting the configuration of a knife-blank, a stop located adjacent to the position in the die in which the blade of the blank rests while receiving the impression and in place to prevent said blade from moving on the die-face from said position in the direction of said stop.

3. A set of dies having impression-faces to press upon both the blade and handle of a knife-blank for correcting the configuration thereof, combined with two pairs of guides, one pair thereof having inclined faces arranged on opposite sides of the position in the die in which the blade of the blank rests to receive the impression, and the other pair having inclined faces arranged on opposite sides of the position in the die in which the handle of the blank rests to receive said impression, all said inclined faces being located, as described, to guide said blank, when placed between the four opposite faces, into the position required to receive the impression of the dies, and all said parts being arranged and constructed substantially as described.

4. The die A, combined with one or more of the guides $e\ e'\ e^2\ g\ g'$, and one or more of the guides $f\ f'\ f^2\ h\ h'$, and with the die B, the combined parts being arranged and operating substantially as described.

5. A set of dies for correcting the configuration of a knife-blank combined with a system of guides constructed and adapted, as described, to act upon said blank when being placed or forced into its position in the dies for receiving their impression, and arranged on opposite sides of said position in place to react against the blank when being placed or forced into its said position and assist in guiding said blank into said position.

ELIAS G. OST.

In presence of—
EVA J. WINN,
GEORGE H. WARREN.