(No Model.)

E. SMITH.

SURFACE GAGE.

No. 391,488. Patented Oct. 23, 1888.

FIG. 1.

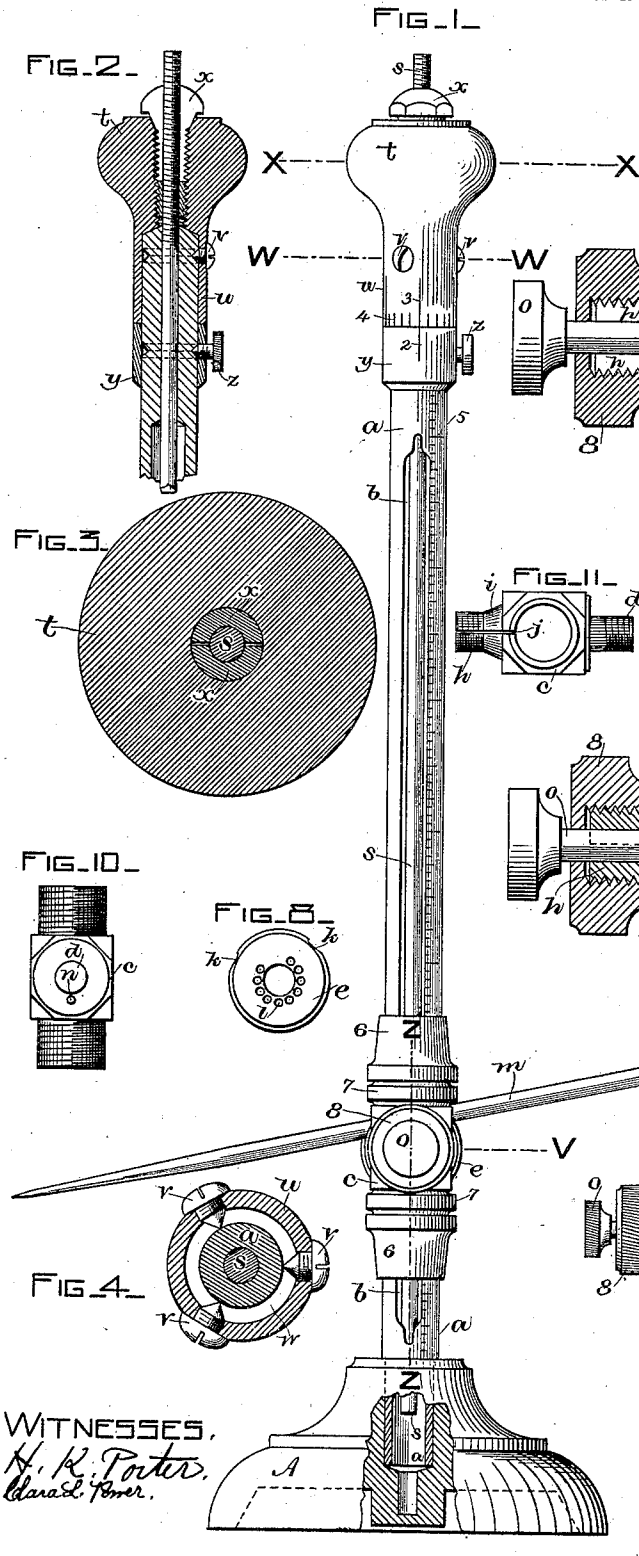


FIG. 2.

FIG. 6.

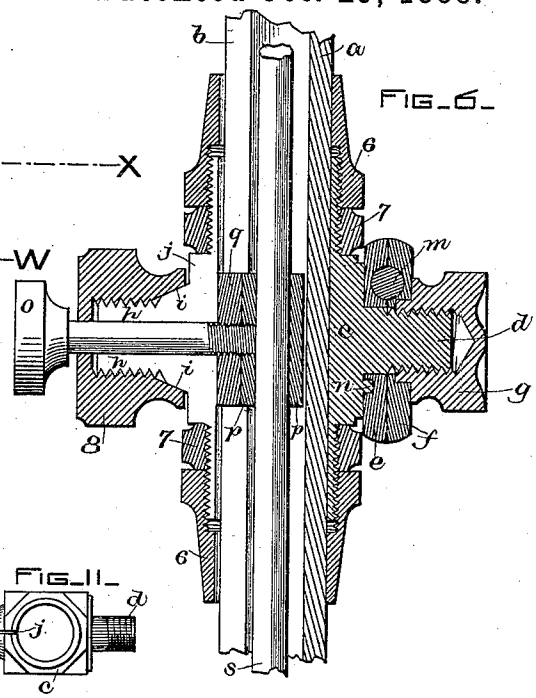


FIG. 3.

FIG. 11.

FIG. 7.

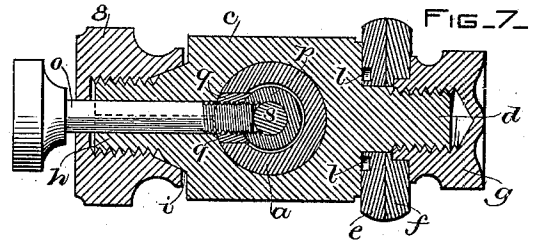


FIG. 10.

FIG. 8.

FIG. 4.

FIG. 5.

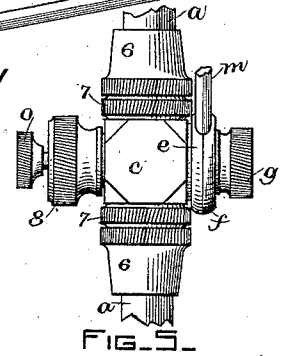
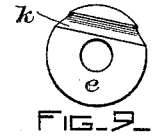


FIG. 9.



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UNITED STATES PATENT OFFICE.

EDGAR SMITH, OF BOSTON, MASSACHUSETTS.

SURFACE-GAGE.

SPECIFICATION forming part of Letters Patent No. 391,488, dated October 23, 1888.

Application filed November 7, 1887. Serial No. 254,492. (No model.)

To all whom it may concern:

Be it known that I, EDGAR SMITH, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Surface-Gages, which will, in connection with the accompanying drawings, be hereinafter fully described, and specifically defined in the appended claims.

In said drawings, Figure 1 is a front elevation of a surface-gage embodying my invention. Fig. 2 is a detached longitudinal vertical section of the upper portion of said gage, it being taken as at ninety degrees to the prolongation of line Z Z, Fig. 1, or as parallel to the plane of the sheet on which the drawing is executed. Fig. 3 is an enlarged horizontal or transverse section taken on line X X, Fig. 1. Fig. 4 is an enlarged transverse section taken on line W W, Fig. 1. Fig. 5 is a detached elevation showing the rod-holding device as viewed from the right in Fig. 1. Fig. 6 is an enlarged detached vertical section taken as on line Z Z, Fig. 1, and as viewed from the right in that figure. Fig. 7 is an enlarged horizontal section taken on line V, Fig. 1. Fig. 8 is a detached elevation showing the inner face of the inside disk by which the gaging-rod is clamped in place. Fig. 9 is an elevation showing the meeting face of the rod-clamping disks. Fig. 10 is a rear side elevation of the adjustable slide, showing the locking-pin by which the rod-clamping disks are secured from rotation and consequent displacement of the rod. Fig. 11 is a plan view of the adjustable slide, showing the subdivided binding-trunnion.

My invention relates to that class of gages which are more particularly intended for and used by machinists in gaging and determining the thickness of metal when arranged upon a platen or bed; and it consists in features of novelty hereinafter fully described, and pointed out in the claims.

Referring again to the drawings, A represents the base, which is preferably circular in outline and of such diameter and weight as may be requisite. A tubular standard, *a*, is rigidly secured in base A, said standard having a longitudinal slot, *b*, cut through its wall to an extent equal to or greater than the vertical movement of the rod-carrying slide. A slide, *c*, is fitted closely, but to slide up and down on standard *a*, said slide having formed on opposite sides the trunnion-like studs *d* and *h*, said studs *d* having arranged thereon the disks *e f* and their securing-nut *g*, threaded on said stud. Each of said disks *e f* is formed with a groove, *k*, to receive the gage-rod *m*, said grooves being of such depth that nut *g* will firmly clamp said rod between the disks. In the inner face of disk *e* are a series of cavities, *l*, arranged around the center, and in the slide *c*, at the proper distance from stud *d*, is a pin, *n*, which, by engaging in one of holes *l*, serves to lock said disks, so that force exerted upon either of the arms of rod *m* cannot, by the friction between disk *f* and nut *g*, turn said nut backward, and thereby loosen said rod. Said stud *h* is cone-formed at its base, as shown at *i*, Fig. 11, and a narrow slot, *j*, extends through said stud and the wall of the slide, so that when the nut 8 is turned inward its concentric cavity, fitting upon cone *i* and compressing the stud and sleeve, firmly clamps the latter upon standards *a*. A screw, *o*, having a knurled head, passes through the center of nut 8 and stud *h*, and is threaded in sleeve *p*, arranged on axial rod *s* in standard *a*. Said screw *o* is also threaded in gib *q*, arranged in slot *b* in standard *a*, said gib filling closely the space between sleeve *p* and the interior wall of slide *c*, so that when said screw is fully turned inward, so as to lock rod *s* from rotation and clamp it and slide *c* firmly together, said rod will not be deflected out of a vertical line.

For the purpose of vertically adjusting slide *c* and the attached parts when it is locked to rod *s*, as just described, a head, *t*, is mounted on standard *a* by its sleeve *u*, it being held from vertical displacement thereon by the screws *v*, which engage in concentric groove *w* in the standard. In the axis of head *t* is threaded the tapering and conical split nut *x*, in which is threaded rod *s*, and by rotating said head the nut is thereby rotated, and so raises or lowers the rod and slide *c*, according to the direction in which the nut is rotated. Below the sleeve-like portion *u* of head *t* is a collar, *y*, which may be locked by its set-screw *z*, which engages in a groove in standard *a* in

the same manner as do set-screws *v* of sleeve *u*. Upon sleeve *y* is a longitudinal adjusting-line, 2, while the lower end of sleeve *u* has its circumference graduated or spaced, as at 4, one of said spaces (marked 3) being the longer zero mark or line, shown to be coincident with line 2 on collar *y*, the spacing on sleeve *u* being preferably marked by indicating-numerals both to the right and left from the zero-line 3, for convenience of users.

If (as would be convenient) the circumference of sleeve *u* were subdivided into twenty-five spaces and the thread of nut *x* and rod *s* were forty to the inch, then each space that head *t* was rotated would linearly move rod *s* and slide *c* the one-thousandth of an inch, (the slide being clamped to the rod, as described;) and hence if the point of rod *m* were adjusted to any surface of any object or to any point or line and it were desired to differentiate its position for any purpose, it could be done by thousandths of an inch by first adjusting collar *y* so that its adjusting-mark 2 and zero-line 3 of sleeve *u* were in coincidence, when the rotation of the head *t* the required spaces of its graduation would produce the desired change in the gage-rod *m*.

Upon standard *a*, at one side of its slot *b*, are scale-graduations, as at 5, which may be in inches and fractions thereof, or any other scale that may be desired; and upon the sleeve-like upper and lower parts of slide *c* are threaded the sleeves 6 and rings 7, both of which have knurled ridges for convenience of rotating them, said rings serving as set or jam nuts to lock sleeves 6 and prevent their accidental rotation when properly adjusted.

It will be obvious that by turning back screw *o* from contact with rod *s* and slacking nut 8 then slide *c* and its appendant parts may be quickly moved up or down the standard as nearly as may be to the desired point and there locked by said screw and nut, when if but slight further adjustment is required it is effected by means of head *t*, as already explained; but if at any time slide *c* were locked to the standard and it were desired to change the position of gage-rod *m* a considerable but certain distance, then, instead of measuring such movement by the scale on head *t*, either of sleeves 6 could be adjusted on some proper line of scale 5, and then locked by its ring 7, when, by actuating rod *s* through head *t*, the slide would be moved till the sleeve so adjusted indicated on said scale 5 that the required movement had been effected.

By forming nut *x* tapering and subdivided in part of its length the contact of its screw-threads with the threaded portion of rod *s* may be regulated by turning said nut inward as the threads become worn by use.

It will from the foregoing description be clear that rod *m* may at the end thereof which is being utilized for gaging, scribing, or other purpose be vertically adjusted in four different ways: first, by tilting it through the agency of washers *e f* and the described means of locking and clamping the same; second, by a free movement of slide *c* by hand when not confined by screw *o* or nut 8; third, by slacking nut 8 and locking slide *c* to rod *s* through screw *o*, and vertically actuating rod *s* through the means described and in accordance with the graduation on head *t;* and, fourth, when slide *c*, nut 8, and rod *s* are arranged as just described, by vertically actuating said rod by means of head *t*, but in accordance with the graduation on standard *a*, as already specified.

Head *t* may itself be formed with the thread that engages rod *s*, but with inferior results, and it would be an obvious equivalent to graduate collar *y* and place the adjusting-line 2 on the sleeve of the head. Instead of forming sleeve *p* and gib *q* separate, as shown, they may be formed integral, if preferred, or be secured together by screws or other means.

I claim as my invention—

1. In a surface-gage, the combination of a hollow standard provided with a suitable base, a rod arranged in said standard with a nut or head threaded upon it for moving it up and down, a slide arranged upon said standard and provided with a clamping device by which to clamp it rigidly to the standard, and a separate clamping device arranged upon said slide, whereby the gage-rod may be rigidly and adjustably clamped to the slide, substantially as specified.

2. In a surface-gage, the combination of a hollow standard, a rod arranged to be vertically adjusted therein independent of said standard, a slide arranged upon the standard and adapted to be clamped to said rod, a head or nut seated upon the standard and threaded upon the rod to raise or lower the same, said head having circumferential graduation thereon, and a collar arranged on said standard and adapted to be rotated freely thereon and clamped thereto, and having an adjusting-mark arranged to coact with the graduated head, substantially as specified.

3. In a surface-gage, the combination, with a hollow standard, a vertically-adjustable rod arranged in said standard, and a slide arranged upon and provided with means whereby it may be rigidly clamped to said standard, of a friction clamping device whereby said slide and rod may be rigidly secured together at any and all points in the length of said rod, substantially as specified.

4. In a surface-gage, the combination of the gage-rod-supporting slide, the grooved disks mounted on and interlocked with said slide, and a clamping-nut threaded upon said slide and adapted to secure said slide, disks, and rod rigidly in position relatively to each other, substantially as specified.

5. In a surface-gage, the combination of slotted tubular standard *a*, rod *s*, head *t*, threaded to said rod, interlocked with said standard by screws *v*, and provided with circumferential graduation, and collar *y*, adjust-

able on and arranged to be interlocked with said standard, and having a linear line, 2, whereby it may be adjusted relatively to the graduation on head *t*, all substantially as specified.

6. In a surface-gage having hollow slotted standard *a*, with rod *s* arranged therein and vertically adjustable, the gage-rod-supporting slide *c*, having conical split stud *h*, clamping-nut 8, screw *o*, and sleeve *p*, arranged on rod *s*, all substantially as specified.

7. In a surface-gage, the combination, with standard *a*, having vertical graduation thereon, of slide *c* and adjustable sleeves 6, to coact with said graduation, substantially as specified.

8. In a surface-gage, the combination of hollow standard *a*, the rod *s*, arranged axially therein, head *t*, arranged to be rotated on said standard, and the conical and partly-divided nut *x*, externally threaded in said head and internally threaded upon said nut, substantially as specified.

EDGAR SMITH.

Witnesses:
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