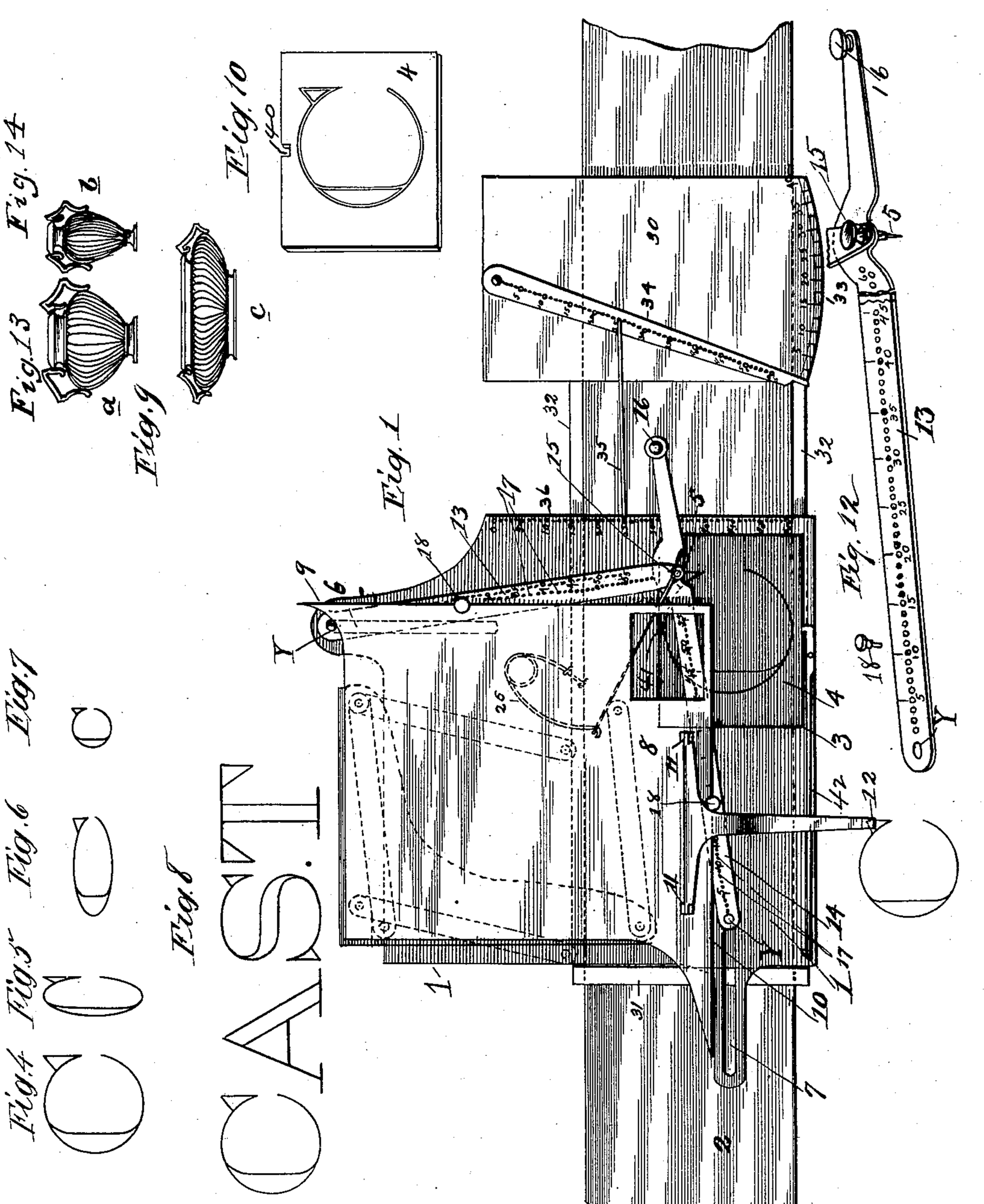
No. 637,262. Patented Nov. 21, 1899.

A. E. JACOBS.

REPRODUCING DEVICE.

(Application filed Oct. 29, 1898.)

(No Model.) 3 Sheets—Sheet 1.



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(Application filed Oct. 29, 1898.)

(No Model.)

3 Sheets—Sheet 2.

Fig 2

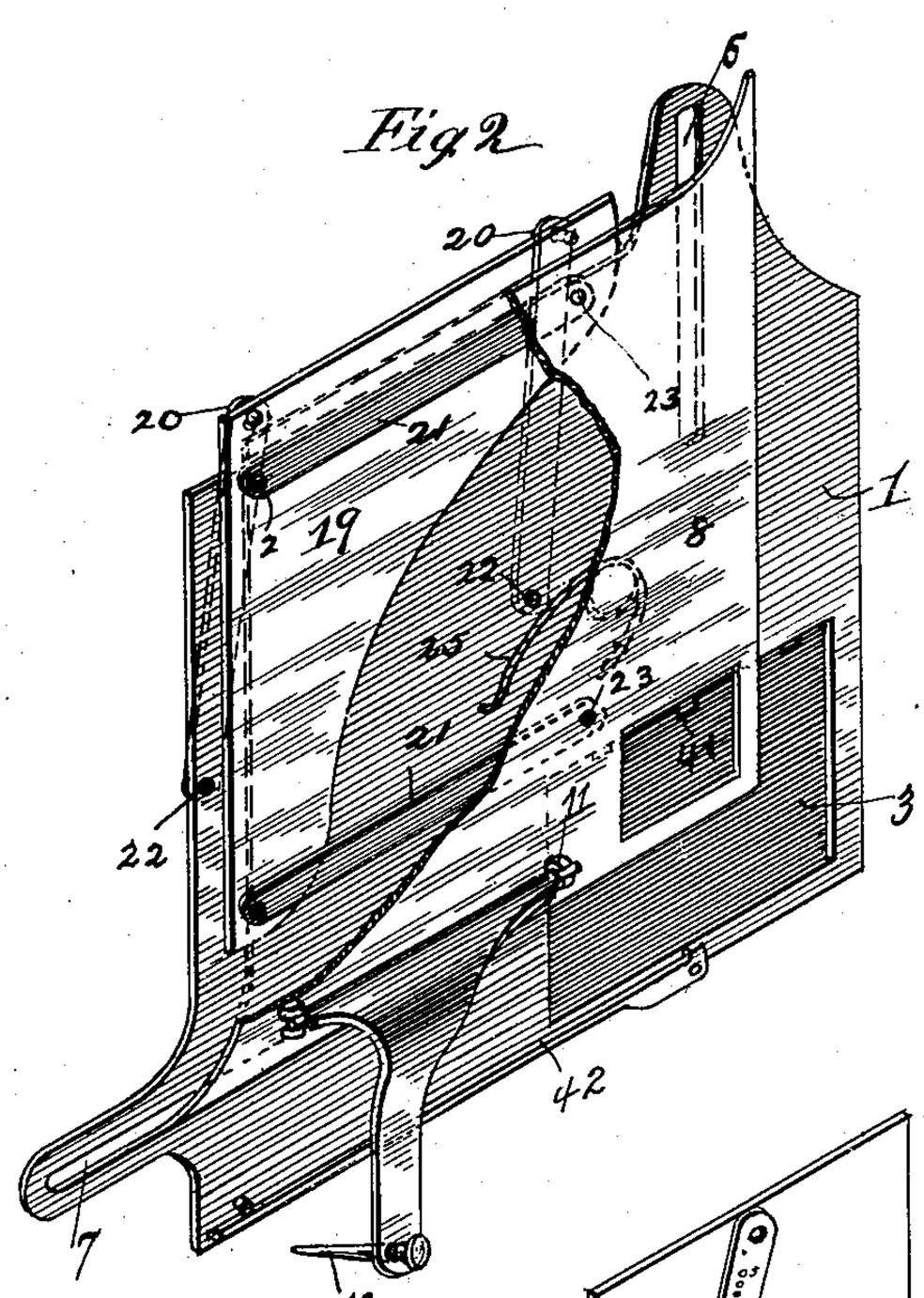
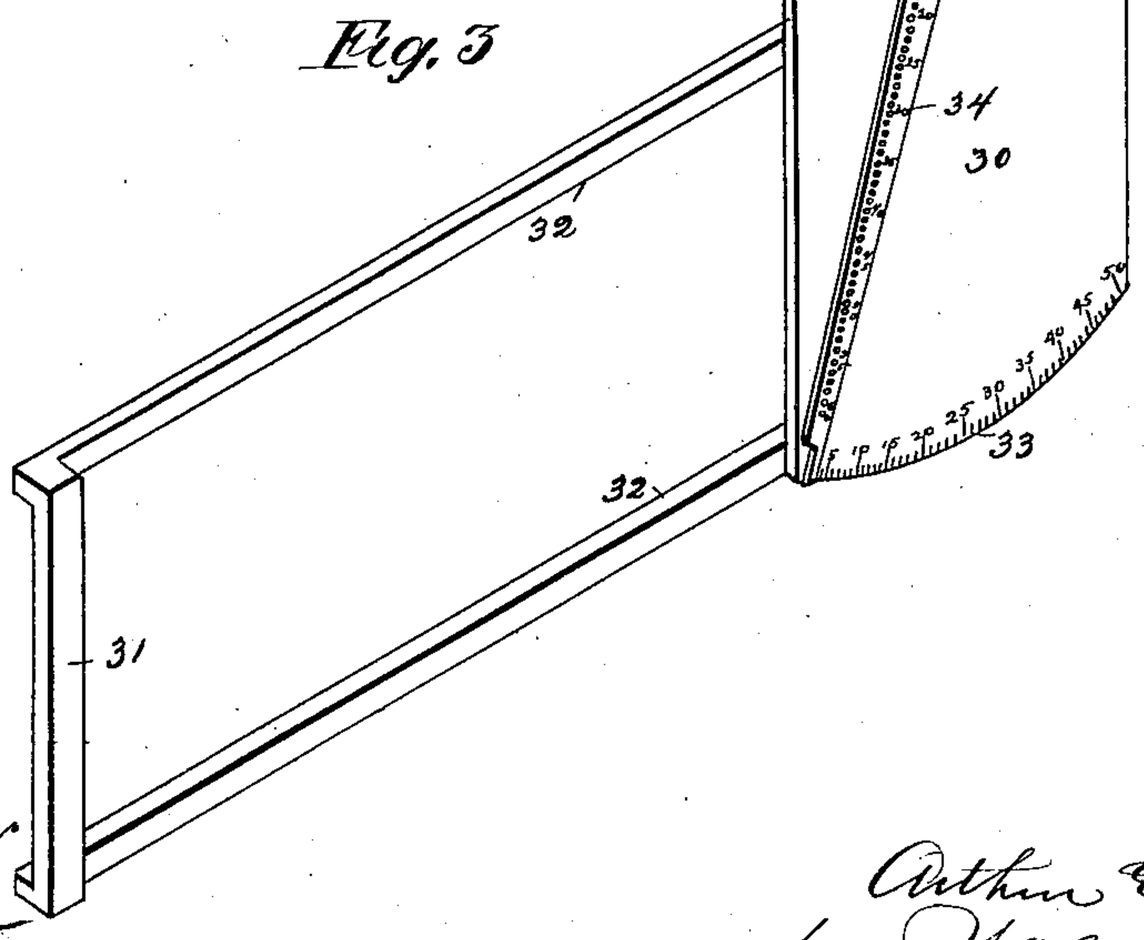


Fig. 3



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(No Model.) 3 Sheets—Sheet 3.

Fig. 11

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A	A 41	B 42	C 39	D 40	E 42	F 42	G 39	H 33	I 32	J 33	K 43	L 42	M 43	N 44	O 39	P 42	Q 39	R 42	S 40	T 37	U 41	V 37	W 41	X 42	Y 37	Z 36
B	A 34	B 42	C 41	D 41	E 41	F 41	G 41	H 44	I 33	J 43	K 41	L 43	M 38	N 41	O 41	P 41	Q 41	R 41	S 41	T 39	U 43	V 40	W 42	X 41	Y 38	Z 41
C	A 38	B 38	C 38	D 38	E 38	F 38	G 38	H 42	I 31	J 31	K 39	L 38	M 40	N 38	O 38	P 38	Q 38	R 38	S 38	T 42	U 40	V 39	W 40	X 36	Y 36	Z 38
D	A 33	B 40	C 41	D 40	E 40	F 40	G 41	H 42	I 32	J 32	K 41	L 40	M 40	N 38	O 41	P 40	Q 41	R 40	S 40	T 38	U 41	V 38	W 41	X 35	Y 36	Z 37
E	A 36	B 41	C 42	D 41	E 41	F 41	G 42	H 43	I 34	J 37	K 42	L 41	M 43	N 41	O 42	P 41	Q 42	R 41	S 40	T 39	U 44	V 39	W 42	X 39	Y 39	Z 42
F	A 29	B 35	C 35	D 35	E 35	F 35	G 35	H 38	I 27	J 24	K 37	L 36	M 39	N 36	O 35	P 36	Q 35	R 35	S 34	T 35	U 38	V 38	W 40	X 38	Y 36	Z 36
G	A 38	B 39	C 39	D 39	E 39	F 39	G 39	H 42	I 31	J 33	K 40	L 39	M 41	N 38	O 39	P 39	Q 39	R 39	S 38	T 38	U 41	V 39	W 41	X 38	Y 38	Z 40
H	A 39	B 43	C 42	D 43	E 43	F 43	G 42	H 44	I 35	J 32	K 44	L 43	M 45	N 42	O 42	P 43	Q 42	R 43	S 42	T 41	U 44	V 43	W 45	X 43	Y 42	Z 43
I	A 28	B 31	C 31	D 31	E 31	F 31	G 31	H 35	I 24	J 22	K 32	L 31	M 36	N 35	O 32	P 31	Q 31	R 31	S 30	T 29	U 32	V 31	W 33	X 30	Y 30	Z 31
J	A 31	B 37	C 38	D 37	E 37	F 37	G 38	H 40	I 30	J 29	K 38	L 37	M 39	N 37	O 38	P 37	Q 38	R 37	S 37	T 36	U 39	V 38	W 40	X 36	Y 37	Z 38
K	A 37	B 39	C 37	D 39	E 39	F 39	G 37	H 42	I 31	J 31	K 40	L 39	M 42	N 39	O 37	P 39	Q 37	R 39	S 38	T 38	U 41	V 40	W 40	X 40	Y 39	Z 39
L	A 33	B 36	C 37	D 36	E 36	F 36	G 37	H 38	I 28	J 30	K 37	L 36	M 38	N 35	O 37	P 36	Q 37	R 36	S 36	T 34	U 38	V 33	W 36	X 35	Y 30	Z 36
M	A 41	B 44	C 45	D 44	E 44	F 44	G 45	H 47	I 36	J 36	K 45	L 44	M 45	N 43	O 45	P 44	Q 45	R 44	S 44	T 44	U 46	V 45	W 46	X 43	Y 42	Z 45
N	A 33	B 39	C 38	D 39	E 39	F 39	G 38	H 40	I 29	J 28	K 40	L 39	M 40	N 38	O 38	P 39	Q 38	R 39	S 37	T 38	U 41	V 41	W 42	X 37	Y 38	Z 39
O	A 34	B 38	C 40	D 38	E 38	F 38	G 40	H 43	I 31	J 32	K 39	L 38	M 41	N 37	O 40	P 38	Q 40	R 38	S 39	T 39	U 40	V 38	W 41	X 36	Y 35	Z 38
P	A 30	B 38	C 40	D 38	E 38	F 38	G 40	H 41	I 31	J 39	K 39	L 38	M 43	N 39	O 40	P 38	Q 40	R 38	S 38	T 39	U 41	V 39	W 42	X 38	Y 37	Z 40
Q	A 34	B 38	C 40	D 38	E 38	F 38	G 40	H 41	I 31	J 32	K 39	L 38	M 41	N 37	O 40	P 38	Q 40	R 38	S 39	T 39	U 36	V 38	W 41	X 36	Y 35	Z 38
R	A 38	B 39	C 40	D 39	E 39	F 39	G 40	H 44	I 33	J 38	K 40	L 39	M 42	N 39	O 40	P 39	Q 40	R 39	S 41	T 40	U 43	V 40	W 42	X 39	Y 38	Z 42
S	A 32	B 37	C 39	D 37	E 37	F 37	G 39	H 40	I 30	J 31	K 38	L 37	M 40	N 37	O 39	P 39	Q 39	R 37	S 38	T 38	U 39	V 38	W 40	X 38	Y 36	Z 39
T	A 31	B 37	C 38	D 37	E 37	F 37	G 38	H 41	I 30	J 28	K 38	L 37	M 41	N 38	O 38	P 37	Q 38	R 37	S 39	T 39	U 42	V 39	W 41	X 39	Y 38	Z 39
U	A 32	B 38	C 37	D 38	E 38	F 38	G 37	H 40	I 30	J 29	K 39	L 38	M 42	N 39	O 37	P 38	Q 37	R 38	S 37	T 39	U 40	V 41	W 42	X 41	Y 39	Z 39
V	A 27	B 36	C 32	D 36	E 36	F 36	G 32	H 39	I 28	J 23	K 37	L 36	M 40	N 37	O 32	P 36	Q 32	R 36	S 33	T 36	U 38	V 39	W 41	X 37	Y 37	Z 35
W	A 32	B 42	C 39	D 42	E 42	F 42	G 39	H 44	I 34	J 31	K 43	L 42	M 46	N 43	O 39	P 42	Q 39	R 42	S 38	T 42	U 45	V 45	W 42	X 44	Y 45	Z 42
X	A 39	B 39	C 36	D 39	E 39	F 39	G 36	H 41	I 30	J 31	K 40	L 39	M 42	N 39	O 36	P 39	Q 36	R 39	S 35	T 39	U 41	V 41	W 44	X 40	Y 40	Z 39
Y	A 29	B 37	C 34	D 37	E 37	F 37	G 34	H 40	I 29	J 35	K 35	L 37	M 42	N 39	O 34	P 37	Q 34	R 37	S 33	T 35	U 40	V 40	W 42	X 39	Y 38	Z 36
Z	A 35	B 41	C 41	D 41	E 41	F 41	G 41	H 42	I 32	J 32	K 42	L 41	M 42	N 39	O 41	P 41	Q 41	R 41	S 39	T 40	U 43	V 39	W 41	X 39	Y 38	Z 38

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UNITED STATES PATENT OFFICE.

ARTHUR E. JACOBS, OF CLEVELAND, OHIO.

REPRODUCING DEVICE.

SPECIFICATION forming part of Letters Patent No. 637,262, dated November 21, 1899.

Application filed October 29, 1898. Serial No. 694,939. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR E. JACOBS, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Reproducing Devices, of which I hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in mechanism for accurately copying letters or other designs in facsimile or modifying the size or general proportions to any predetermined degree.

I exemplify my invention by means of the accompanying drawings, as hereinafter described, and I specifically distinguish the same in the claims.

In the accompanying drawings, Figure 1 is a plan view of the device embodying my invention. Fig. 2 is a perspective view of a portion of the device, showing the manner of attaching the links through which the various changes of movement are effected. Fig. 3 is a detail of the frame supporting the spacing-dial. Figs. 4, 5, 6, and 7 are views of letters formed by the device. Fig. 8 shows a word printed by the machine. Figs. 9, 13, and 14 show a design modified in shape and proportions by the device. Fig. 10 is a detail of the copy-plate. Fig. 11 is a table of figures employed in using the spacing instrument. Fig. 12 is a detail of one of the graduated arms.

In the figures, 1 represents a bottom plate upon which all the working parts of the device are mounted.

2 is a draftsman's straight-edge, such as the tongue of a T-square, upon which the plate rests and upon which it is adapted to move longitudinally. This plate is provided with a recess 3, in which is placed the model or copy-plate 4, containing the design, which is followed by the tracing-point 5 of the machine in reproducing the design. The bottom plate is provided also with the slots 6 and 7, placed at an angle to each other, the purpose of which will be described farther on.

8 is an upper plate adapted to move freely over the bottom plate and provided with adjacent rectilinear edges 9 and 10, parallel to the slots 6 and 7 in the bottom plate. Upon this upper plate is securely pivoted at 11 the copying pen or pencil 12, which moves freely with the plate.

Movably pivoted in the slots 6 and 7, at their inner extremities Y, are the graduated arms 13 and 14, which are pivotally united at their intersecting point at 15, one of them being extended to form a handle 16, by which the arms are operated. At this point of union 15 the tracing-point 5 is placed, which follows the outline of the design. The graduations of the arms are marked by pin-holes 17, in which are placed pins 18, which bear against the rectilinear sides of the upper plate and force it to move with the arms in whatever direction they may move, and hence trace a corresponding figure with the reproducing-point 12.

In order to obtain the universal or floating movement desired for the upper plate and attached tracing-point and at the same time to support them securely, I have adopted the peculiar construction shown in the drawings, where 19 is an intermediate plate or bar placed between the fixed bottom and upper floating plates by means of sets of links 20 and 21. One set of these links is pivotally attached at one end to the under side of the intermediate plate and at the other end to the lower fixed plate, and the other set of links is pivoted at one end to the upper side of the intermediate plate and to the lower side of the floating plate. The sets of links are placed transversely to one another, and it will be seen that by their use in connection with the intermediate plate parallel movements are obtained transversely and longitudinally of the instrument, thus affording a universal movement in all directions to the floating plate and tracing-point.

It will be seen by reference to Fig. 2 that the links 20 pass under the lower plate, to which they are pivoted at 22, and the links 21 are pivoted to the under side of the upper plate at 23, thus preventing one pair from interfering with the other or with the movement of the auxiliary plate.

A spring 25 serves to normally throw out the upper plate toward the point of union of the arms, and hence forces the rectilinear edges always into engagement with the pins 18 when the plate is pressed back by hand in

following the copy, thus permitting the plate to follow with the greatest precision every movement of the pins.

In operating this device it will readily be seen that the forms and all proportions of the letters can be changed at will by altering the position of the pins 18 in the graduated arms 13 and 14. For instance, if the pin in one of the arms is placed near the pivotal point Y the movement communicated to the plate 8 by that arm will be less than when placed far from the pivotal point, and vice versa, and if one pin is placed farther from the point than the other it will move the plate proportionally farther in that direction than in the other. To make a letter similar in proportion to the copy, both pins are placed equally distant from the pivotal points in the arms. To make a tall and thin letter, as in Fig. 5, the pin 18 in the arm 13 is placed near the pivot, so as to communicate but little movement to the plate and copying-pen, while the pin in the arm 14 is placed at a distance from the pivot, so as to make the height of the letter greater than the width. As many points in the graduation may be made as will afford all the variations in size and proportions that may be desired.

In Figs. 4 to 7, inclusive, are seen four variations of one letter.

In Figs. 9, 13, and 14 is seen a design for a dish or jug, as for a dinner-service, varied to adapt it to the different uses of table or other ware, one design, as *a*, being taken for a model and the others taken from it, as *b* and *c*.

In Figs. 1 and 3 is shown a movable dial-plate 30, which slides freely upon the tongue 2 and by means of the cross-bar 31 and side strips 32 is maintained in the close vicinity of the plate 1. This dial-plate is graduated upon one edge at 33 and provided with a pivoted pointer-arm 34, the pointer being graduated similarly to the arm 13, before mentioned, which determines the width of the letter. A link-rod 35 connects this pointer-arm with a graduated scale 36 upon the neighboring edge of plate 1. The graduation in these parts is indicated by pin-holes, into which the extremities of a link 35 are placed. The object of this device is to provide means for spacing the letters accurately when composing a word or line of words, since the letters may vary greatly in width and proportions, and hence the distance from center to center of the letters in a printed word varies also. To facilitate the use of this portion of the instrument, a table (shown in Fig. 11) is employed in the following manner: The letters of the alphabet are printed at the side and across the table. Under each letter is a figure representing the space between it and the letter of the column at the left, as indicated on the dial. For instance, if the last letter printed is "C" and the next letter is to be an "A" the figure under "A" in the "C" column is "33." The pointer, normally placed at "0," is then moved to "33," when the instrument is in position to print the letter "A." Before moving the pointer from "0" the link 35 should be placed in the index-finger at the same number as the one in which the pin 18 is inserted in the arm 13, since the movements of this arm decide the width of the letters, and the space between letters should be determined by the movement of this arm.

To assist in accurately placing the removable copy-plate 4, it is provided with a notch 40, adapted to register with the projection 41 on the plate 1, and is removably secured in place by means of the spring 42.

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

1. In a reproducing device, in combination, a fixed plate adapted to be adjusted longitudinally upon a ruler or straight-edge and provided with slots arranged at an angle to each other, graduated arms pivoted each at one extremity in one of said slots, the said pivots being freely movable therein, a copy-plate attached to said fixed plate, a tracing-point moving in unison with the intersecting point of said arms, adapted to follow an outline upon said copy-plate, holes in the points of graduation of the arms, and pins movably placed in said holes, a floating plate provided with a reproducing pen or pencil, and with rectilinear edges adapted to engage the pins in said graduated arms, whereby the longitudinal and transverse movements of the floating plate are controlled, the said rectilinear edges of the floating plate being maintained parallel at all times to the said slots in the fixed plate, and means for supporting the floating plate and for pressing it into engagement with the pins, substantially as described.

2. In a reproducing device, a fixed plate and a floating plate, one of said plates being provided with slots at a right angle to each other and the other with rectilinear edges corresponding in direction with said slots, intersecting graduated arms having their outer extremities pivoted movably in said slots, a tracing-point at the intersection of said arms, holes in the points of graduation in said arms, pins movably placed therein and means for supporting said floating plate with its edges constantly in engagement with said pins, consisting of two sets of links placed transversely to each other, and an intermediate plate; one set of links being pivoted to the fixed plate at one of their extremities, and to the intermediate plate at their other extremities, and the other set being pivoted to the floating plate at one of their extremities and to the intermediate plate at their other extremities, and a return-spring for the floating plate, substantially as described.

3. In an instrument for the purpose described, the combination with a fixed plate provided with slots; of intersecting graduated arms provided with movable pins therein, and pin-holes corresponding to the graduations,

the said arms being pivotally and movably secured in said slots, and further provided with a tracing-point at their point of intersection; a movable plate provided with rectilinear edges adapted to engage said pins wherever placed in said arms, and with a reproducing-point and intermediate link mechanism between the said plates, whereby a universal movement is afforded the floating plate, substantially as described.

4. In an instrument for the purpose described the combination with a tracing and reproducing device for letters, adjustable longitudinally upon a ruler or draftsman's straight-edge and provided with a graduated arm which determines the width of the letters, of a graduated dial-plate adjacent thereto and also adapted to travel upon the said straight-edge in front of the reproducing device in the line of the letters, a pivoted index-finger upon said plate graduated similarly to the graduations upon the said graduated arm of the reproducing device and a movable link connecting said index-finger and a fixed edge of said reproducing device, substantially as described.

5. In a machine for the purpose described, a fixed plate provided with slots arranged at a right angle to one another, a floating plate located above the fixed plate and provided with rectilinear edges, also at a right angle to one another, graduated arms intersecting and pivoted together at the point of intersection, the said arms being pivoted at their outer extremities in said slots in the fixed plate, pin-holes in said graduated arms at the points of graduation, movable pins in said holes which the rectilinear edges of the movable plate constantly engage, a tracing-point at the intersection of the graduated arms, a copy-plate secured upon the fixed plate in position to be engaged by said tracing-point, and link mechanism connecting the fixed and movable plates, and supporting the movable plate whereby the movable plate can be moved independently in all directions over the fixed plate, and a spring constructed and arranged to force said floating plate against the pin in said graduated arms, substantially as described.

Signed by me at Cleveland, Ohio, this 19th day of October, A. D. 1898.

ARTHUR E. JACOBS.

Witnesses:
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JOHN H. BEHR.