W. E. SWALM AND W. C. BRYAN.

IMAGE PRODUCING OR RECORDING APPARATUS.

APPLICATION FILED DEC. 9, 1914. RENEWED JULY 20, 1921.

1,391,807. **Patented Sept. 27, 1921.**

2 SHEETS—SHEET 1.

Fig. 8.

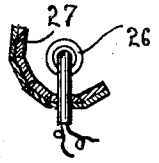


Fig. 7.

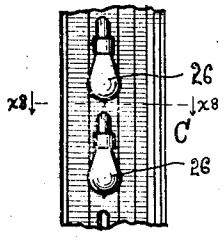
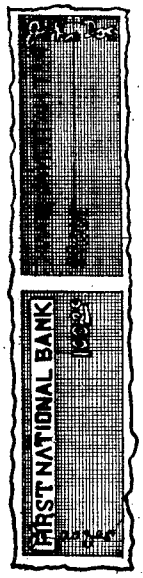


Fig. 11.



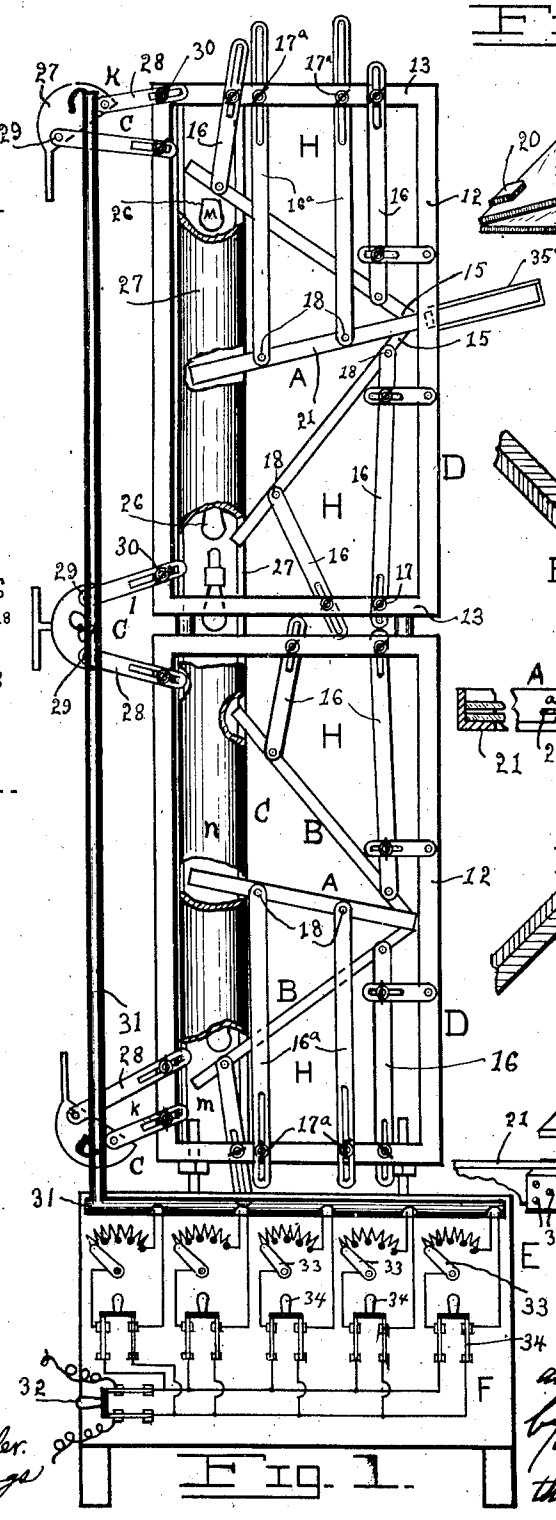


Fig. 1.

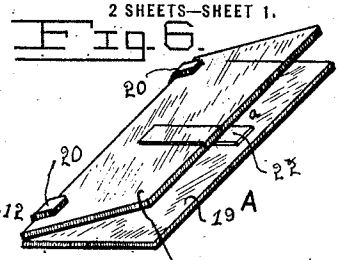


Fig. 6.

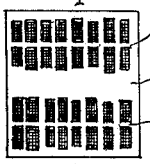


Fig. 10.

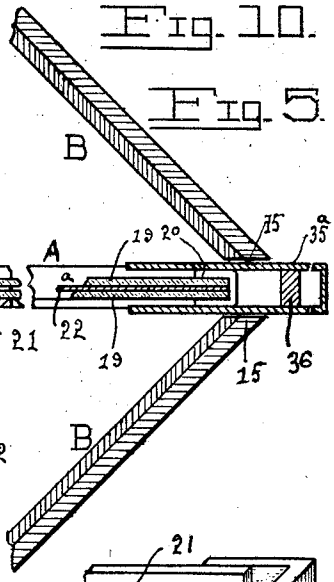


Fig. 5.

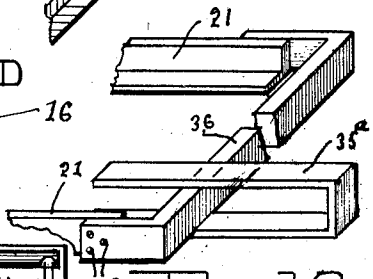


Fig. 12.

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2 SHEETS—SHEET 2.

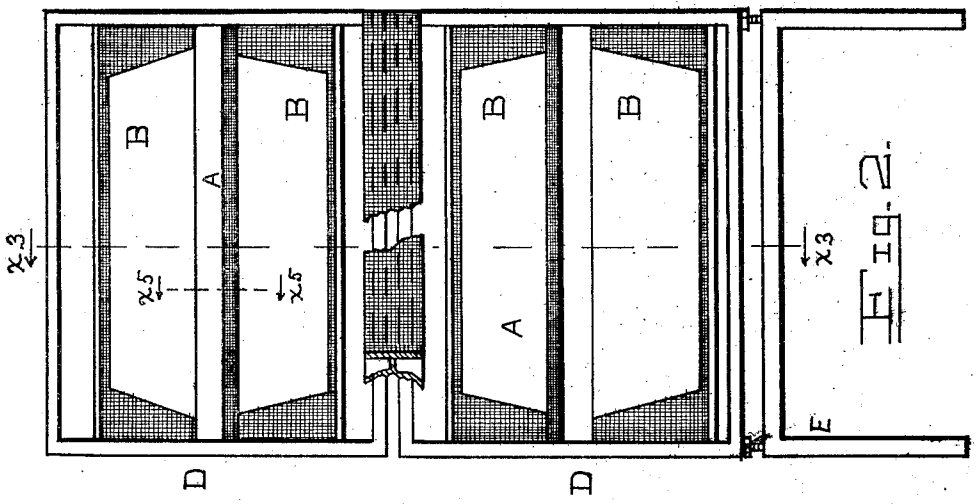


Fig. 2.

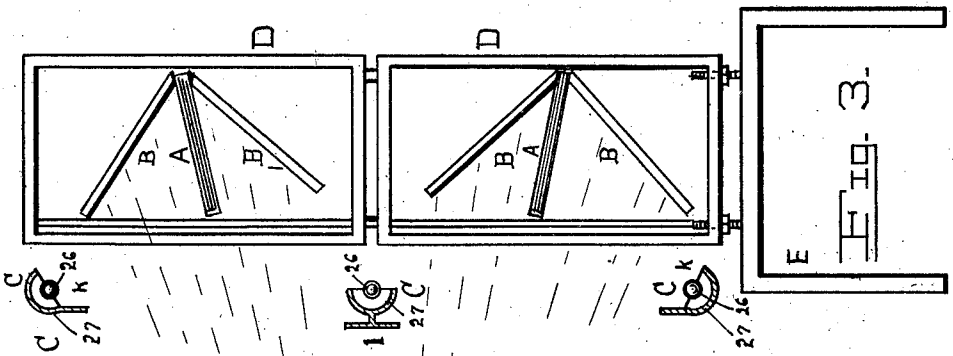


Fig. 3.

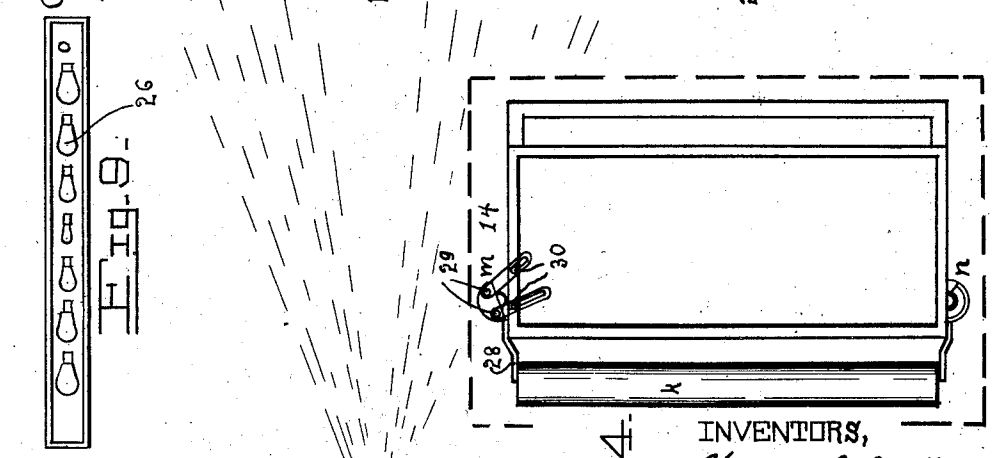
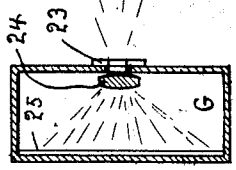


Fig. 9.

Fig. 4.



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IMAGE PRODUCING OR RECORDING APPARATUS.

1,391,807. Specification of Letters Patent. Patented Sept. 27, 1921.

Application filed December 9, 1914, Serial No. 876,219. Renewed July 20, 1921. Serial No. 486,187.

To all whom it may concern:

Be it known that we, WILLIAM E. SWALM and WILLIAM C. BRYAN, both citizens of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have jointly invented new and useful Improvements in Image Producing or Recording Apparatus, of which the following is a specification.

This invention relates to image producing or recording apparatus; and it has for its object to provide apparatus whereby simultaneously images of more than one face or side or field of an object, device or article may be presented at a common point for view, recordation or further projections. Such apparatus may be advantageously used for many purposes, in displaying goods or articles or making photographic records thereof. A particularly advantageous use of such apparatus concerns the simultaneous production and recordation of images of both the obverse and the reverse sides of written instruments, such as contracts, notes, bills of exchange, checks and the like, so that the matter of each side or face is coupled for identification or comparison with the matter of the other side or face thereof. The apparatus may likewise be employed for recording such images intermingled or blended so that the image composite of the matter of both sides or faces may be recorded, more closely associating the matter of each side or face with that of the other and thus perpetuating beyond dispute the superficial aspects of the writings or the like of both sides of a given instrument. In the latter case the very tissue, fiber or constitution of the material comprising the body of the instrument may, as to its image, be merged with or incorporated in the composite record of the superficial showings of the instrument, thus permitting the perpetuation of the document not only as to the matter upon its faces but as to the very particular fiber or weave or substance upon which the surface indications appear.

It will be manifest that the apparatus thus provides highly valuable means for perpetuating those commercial and legal instruments which have to pass through many hands and are transmitted from point to point and thus put out of the custody and protection of the maker or endorser of such document, or other person who has contributed to the issuance or utterance and execution thereof. When a bank check for instance is taken for collection by a bank remote from the bank upon which such check is drawn, it is customary for the bank making collection thereon to transmit the check to the bank upon which it is drawn or to a correspondent in the place in which the latter bank is located. In case such check is lost in the mails, or is destroyed in transit, or is altered in transit, ordinarily no complete legal evidence exists as to the body and substance of such instrument, and it can only be restored or reproduced, ordinarily, upon oral evidence as to original substance and contents, which often results in mistake, confusion, fraud and loss.

Continuing discussion of the utility of this apparatus along the same lines, or with respect to the same purposes of use, we wish to point out that the employment of apparatus embodying the invention enables the inexpensive and convenient recordation of the showings of such instruments or documents to be made by any person concerned or institution interested in perpetuation thereof, the record so obtained being shown peradventure accurate and true as a photographic record must be. Thus, a banking institution employing such apparatus can keep in its files a true, perfect and complete record of both obverse and reverse showings of all commercial paper, checks, drafts and the like which goes from its doors, thus affording undisputable evidence and proof as to the full nature and character and contents and substance of such instrument irrespective of what changes, damages or destroying agencies as may alter, obliterate, or destroy the original instrument. The apparatus produces simultaneously images true to the showing of both sides of such instrument, and simultaneously records the same, where desired, likewise simultaneously blending with the image of the matter of either face an image of the matter of the other face, in accordance with pre-selection.

It will be understood that no specific means of recordation enter into the present invention, but that the apparatus may even be complete in an embodiment of the invention when so organized as to project to a given point of vision or reprojection the images both direct and transfused as above set forth.

The invention has for a particular object the provision of apparatus of the character

disclosed which will be superior in point of relative simplicity, inexpensiveness of construction and organization, durability, facility in adjustment, adaptability to varying conditions and kinds of service, and relatively compact in form; and which will be generally superior in efficiency and serviceability.

With the above and other objects in view, the invention consists in the novel and useful provision, formation, construction, combination, association and relative arrangement of parts, members and features, all as hereinafter described, shown in the drawings, and finally pointed out in claims.

In the drawing:

Figure 1 is a side elevation, partly diagrammatic, of apparatus for producing and recording images embodying the invention, parts being broken away for clearness of illustration;

Fig. 2 is a front elevation of the same, likewise partly broken away, and upon a reduced scale;

Fig. 3 is a vertical central sectional view, partly diagrammatic, taken on the line x^3—x^3, Fig. 2, and looking in the direction of the appended arrows; photographic recordation means being likewise diagrammatically shown in association therewith;

Fig. 4 is a top plan view of the same;

Fig. 5 is an enlarged vertical transverse sectional view of details of the construction shown in the above figures, the same being taken upon the line x^5—x^5, Fig. 2;

Fig. 6 is an isometric view of features of the construction shown in the preceding figures in detached position;

Fig. 7 is a fragmentary inner face view of lighting means shown in several of the above figures;

Fig. 8 is a horizontal transverse sectional view of the same, taken upon the line x^8—x^8, Fig. 7;

Fig. 9 is in inner face view of a modified form of lighting means;

Fig. 10 is a diagrammatic face view of a record such as produced in the operation of apparatus embodying the invention;

Fig. 11 is an enlarged detail view of a form of record similar to parts of the plural record shown in Fig. 10; in Fig. 10 the record is indicated as that of separate images of obverse and reverse sides of an instrument, the showing in Fig. 11 being amplified by an inclusion in the record of each side or face of an incorporated record of the other side or face, all as above initially discussed; and

Fig. 12 is an isometric view of certain features of the invention shown in Figs. 1 and 5.

Corresponding parts in all the figures are designated by the same reference characters.

Referring with particularity to the drawings, the apparatus shown therein as embodying the invention includes primarily an object displaying or holding member A, means B for directing images of the object to a point of observation or recordation or further projection, and lighting means C for illuminating the object *a* and producing images thereof for reflection by the means B. In the form of construction shown in the drawings, the means A and B, and the adjuncts and attendant features hereinafter described, are shown duplicated in installation, in superposed relation, providing for increase of capacity or service of a given apparatus; and it is to be understood that as many sets or groups of these essential elements and their attendant features as desired may be combined together, all in response to the conditions or requirements of service to be met with. Each of such groups or sets is shown as accommodated or mounted in a frame D, which may be mounted upon any suitable base or support E. F designates controlling means for the illuminating means C. G in Fig. 3 designates recording means, photographic as shown, whereby the images of the objects *a*, or of a plurality of such objects *a*, are perpetuated upon a suitable light-sensitive surface or plurality of such surfaces. H designates adjusting means for the means A and B, whereby such two last named means may be relatively positioned in order that the reflection of images by the means B may be controlled.

A more detailed description will now be given of the construction and inter-relation of parts and features entering into the apparatus, the organization of which has been above briefly outlined; and it will be understood that this description pertains to each of the groups or sets of members A, B and C, without the necessity of repetition or specific application of descriptive language to each set or group. To support and accommodate the various members and elements of the apparatus we provide a suitable frame which comprises uprights 12 joined by cross members 13 at top and bottom, the resultant frame being open at the front, or open upon all sides as well as the front unless an inclosing curtain or cabinet such as indicated in dotted lines at 14 in Fig. 4 is provided, whereby the light rays are confined substantially within the frame D for reflection therefrom only at the open front thereof. The means B are shown as consisting of mirrors or reflectors, ranging transversely of the frame D and having matched beveled edges 15, which permit of variation of angular relation between the mirrors, such mirrors being suspended at their ends by the adjusting means H which comprise a plurality of links or arms 16 adjustably connected with the frame by thumb nuts 17 and

pivotally connected with such mirrors, as at 18. The holding and displaying member or means A is disposed between the mirrors B, ranging transversely of the frame D, and includes two transparent plates 19, of glass or the like, which are flexibly hinged together at their rearward edges, as at 20, namely at the edges which are disposed at the angle formed by the meeting edges of the mirrors. The plates 19 of the member A rest in a skeleton frame 21 which ranges transversely of the frame D and is suspended at its sides by other links or arms 16^a connected adjustably with the frame D by thumb screws 17^a and with the member A as at 18^a. The manipulation of the links 16 and 16^a permits the relative angularity of the mirrors B to be predetermined, as well as the relative angularity of said mirrors and the displaying member A. Between the plates 19 of the latter is or are placed the articles or devices 22 images of which are to be produced by the lighting means C and reflected by the mirrors B to the point of vision or recordation or further projection. Such article or device 22 is shown in the drawing as consisting of a bank check, upon which it is to be understood representations or wordings or writings appear upon both the reverse and obverse faces or sides. The image-carrying light rays are directed at the diaphragm 23 of photographic means G, by the lens 24 of which such light rays are spread over the light sensitive surface refracted for proper distribution over the light sensitive surface 25 where the images carried by such light rays are recorded, to produce such a record as shown in Fig. 10 the upper group of record portions being the front and back showings of a plurality of checks in the upper apparatus unit, and the lower set or bank of such record in Fig. 10 being the images of the obverse and reverse sides of another set of checks 22 displayed by the member A of the lower apparatus unit.

The lighting means C are shown as subdivided into a plurality of units or banks of electric lights, an upper horizontal bank *k*, a lower horizontal bank *l*, with respect to the upper apparatus unit, and an upper horizontal bank *l* and a lower horizontal bank *k* with respect to the lower apparatus unit, the bank *l* being common to both units; and vertical lateral banks *m* and *n* which may be common to both apparatus units. Such horizontal banks are ranged slightly forwardly of the frames D; and the vertical banks are preferably ranged slightly rearward of the front portions of the frames D. Each of such banks of lights contains a plurality of electric lamps 26, which are partially housed in and mounted upon a reflector 27 which is surfaced to properly distribute the light of the lamps upon the objects in the holding member A. Each of these reflectors may be mounted upon the frame D by means of adjustable links 28, each being pivoted as at 29 to the reflector at one end and held in position by means of a thumb nut 30 applied to the frame D. The electrical circuits of all of the banks of light may be led through a conduit or conduits 31 to the base or support E upon which is installed the light controlling means F, consisting of a main electrical switch 32 which receives electrical supply from line wires, and a plurality of rheostats, dimmers or the like 33, one for each electrical circuit, and each separately controlled by a knife switch or the like 34.

In Fig. 9 we have shown lighting means including a bank *o* which contains a plurality of electric lamps 26 the candle powers of which vary, increasing in strength from the central lamp outwardly to the ends of the bank, such bank being adapted for substitution for the horizontal banks *k* and *l* if it is desired to eliminate the vertical lateral banks *m* and *n*, which, if installed are for the purpose of more effectively illuminating the lateral portions of the displaying member A and the articles 22 therein, in order that the image records may be uniform in intensity, in that respect compensating for the shading off of images toward the margins of the recording or light sensitive surface, due to the unequal distribution of light rays following the refractory action of the lens. Between the groups and subgroups of image records such as shown in Figs. 10 and 11 transverse plain spaces 35 occur, being produced respectively by the forwardly presented edge of the holding and displaying member A and the forwardly presented reflector back of the common bank of lights *l*. Within these spaces may be entered such memoranda of identification as pertain to the various images and sets of images recorded, so that the record when filed away will be complete in its showing of the object or device exhibited and pictured and the identification thereof.

To enable a photographic record of papers, checks or other objects of different colors or shades to be made on the same light sensitive surface 25, we may provide one or a plurality of ray filters or shields 35^a, of plain or colored, transparent or opaque material, each adapted to be applied over the paper, check or the like to be screened. A convenient form of such ray filter or shield 35^a is shown in Figs. 5 and 12, as being of U-shape and slidably mounted upon a transverse bar 36 extending across the back of the frame D, which may be conveniently attached to the frame 21 of the object holding means A as by screws or the like 37, shown in Fig. 12. It will be understood that a filter or shield 35^a may be drawn forwardly

over the object to be screened, the U-shaped formation of the shield 35ª adapting it to cover both sides of the object to be screened. Complete exposure of the light sensitive surfaces may be made with the shield in position, or partial exposure may be made, the shield removed, and further exposure be made, all in accordance with the particular requirements of any case.

The operation, method of use and advantages of the apparatus for producing and recording images constituting the invention and as hereinabove set forth with respect to one embodiment thereof, will be readily understood from the foregoing description, taken in connection with the accompanying drawing and the following statement:

When the object or objects *a* is or are in position supported by the holding and displaying means A, and the reflectors or projecting means B are properly angularly related, and the lighting means C supplied with energy through the controlling means F, images of both sides or faces of the article, such as the bank *c*, will be reflected from the mirrors B to a point of observation, recordation or further disposition, as at or beyond the diaphragm 23 of the photographic recording means G. Thus at a given point both sides or faces of the article or object may be viewed simultaneously, and it is manifest that by a further provision of mirrors more than two sides of an object may thus be viewed. This may be of utility in displaying goods and merchandise and for many other purposes which will readily suggest themselves. When a lens such as 24 is used, the image-carrying rays indicated in Fig. 3 will be by reflection distributed over the light sensitive surface 25 so as to produce, in the use of two sets or units of the apparatus, a record such as that indicated in Fig. 10, both sides of each check held by the means A being reproduced by light action upon the sensitive surface resulting in such record. If the lighting means is of low enough potential each side or face of the check will have a separate record and nothing more. If the light be of sufficiently greater strength certain of the rays will pass through the check or the like, and will produce an image reflected by the proper mirror which will be recorded as incorporated in the image recorded of the matter on the side of the check presented directly to such mirror. Thus, each image produced would comprise a reproduction of the matter on that face in the record. Thus, the record may consist merely of a showing of the matter on the separate faces of the check; or of a showing of the matter on one face of the check commingled with the matter on the other face of the check alone; or of the matter of each face of the check commingled in each instance with the matter of the other face of the check. This latter record is indicated in Fig. 11. In either of these three cases positive evidence is obtained of what the check shows upon both faces, and in order that the two faces may be inter-related as to their subjects-matter in the record, the record of either one or both faces may show intermingled therewith the matter, in reversed reading, of the other face. Against such evidence there can be no defense as to complete identification of the subject-matter of the entire check, and even any peculiar tissue or fiber or substance of the paper or other body itself will show in such record. The relative potentials of the lighting means and of the banks of lights *k*, *l*, *m* and *n* thereof may be varied by means of the dimmers or rheostats or the like 33, and the switches 34 controlling the circuits to the several separate banks of such light. The provision of the vertical lateral banks of lights *m* and *n* provides for a suitable illumination at the sides of the field of image production which otherwise, as above stated, might be but dimly reproduced upon the recording surface. This same provision may be made by substituting the bank *o* of lights of graduated intensity for the horizontal banks *k* and *l*. The adjusting means H permit the relative angularity of the holding means *a* and the mirrors or reflectors of the like B to be predetermined, all with respect to the range of projection from such mirrors.

It is manifest that the invention provides for most accurate comparison of two or more sides of a given object, and for recordation of such manifestations or subject-matter as may appear respectively thereupon, and also provides, where translucent articles or bodies are being inspected or recorded, of the production of a record in which the manifestations or subjects-matter on the several sides or faces may be caused to show in registration or intermingled, thus producing more absolute proof of the physical and superficial constitution of the object or document.

It is manifest that many changes and variations may be made with respect to the specific construction and inter-relation of parts and features shown in the drawings and above described, all without departing from the spirit of the invention and a fair interpretation thereof.

Having thus described our invention, we claim and desire to secure by Letters Patent:

1. The combination with angularly-related image reflecting members, of an approximately transparent object adapted to be reflected, means for holding the object in position to be reflected, and means for illuminating the object causing light rays to pass therethrough.

2. Apparatus of the character disclosed,

comprising angularly - related reflecting members and transparent members between which an object to be reflected is placed; means for adjustably supporting said last named members, and means for adjusting supporting the reflecting members.

3. In apparatus of the character disclosed, relatively angularly-related image reflecting means, and means for supporting and securing an object between said image reflecting means in such manner that both sides of the object are reflected from the image reflecting means; means being provided for illuminating an object when held by said supporting means; and an image reflection modifying device coöperating with the object supporting means.

4. In apparatus of the character disclosed, relatively angularly-related image reflecting members, means for relatively adjustably supporting said members, and transparent object supporting members disposed between the image reflecting members and adapted to support and hold therebetween an object to be reflected, the opposed faces of said members being adapted to engage the object; means for adjustably supporting said last named members, and illuminating means disposed to cast light rays upon an object held by said members in order that both sides of the object are illuminated.

5. The combination with a lens, means for supporting an object of a transparent nature to be reflected at a point remote from the lens, of illuminating means located so as to cast light rays upon and through an object held by said supporting means, and image reflecting means arranged with relation to the lens, illuminating means, and object to be reflected, so that both the obverse and reverse sides of the object are reflected from the same reflecting means and projected to the lens.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM E. SWALM.
WILLIAM C. BRYAN.

Witnesses:
ALFRED H. DAEHLER,
A. E. SEXTON.