

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 29

UNITED STATES PATENT AND TRADEMARK OFFICE

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BOARD OF PATENT APPEALS
AND INTERFERENCES

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte WILLIAM B. HUGLE

Appeal No. 96-1954
Application 07/776,308¹

ON BRIEF

Before COHEN, MEISTER and FRANKFORT, Administrative Patent Judges.

MEISTER, Administrative Patent Judge.

DECISION ON APPEAL

William B. Hugle (the appellant) appeals from the final rejection of claims 1-5 and 7-9. Claim 6, the only other claim present in the application, has been indicated as being allowable

¹ Application for patent filed November 12, 1991.

Appeal No. 96-1954
Application 07/776,308

subject to the requirement that it be rewritten to include all the subject matter of the claim from which it depends. We affirm.

The appellant's invention pertains to a method of forming a flat panel display for use as flat TV, video or computer screens. Independent claim 1 is further illustrative of the appealed subject matter and reads as follows:

1. A method of forming a flat panel display, which includes forming a volume holographic image on a recording medium by interference between an object beam (OB) of coherent light after passage through a mask and a reference beam (RB1) of coherent light which is totally internally reflected at a surface on which the recording medium is disposed, then replacing the mask by a flat panel which has a coating (PC) of photosensitive substance and forming an image of the holographic recording on the photosensitive coating using a second reference beam (RB2) replayed in the opposite direction from the first reference beam (RB1).

The references of record relied on by the examiner are:

Mathisen	3,677,634	Jul. 18, 1972
Smith et al. (Smith)	4,200,395	Apr. 29, 1980
Ono	4,332,473	Jun. 1, 1982
Phillips	4,857,425	Aug. 15, 1989
Ishata et al. (Ishata)	4,878,086	Oct. 31, 1989
Lang et al. (Lang)	4,943,126	Jul. 24, 1990

Appeal No. 96-1954
Application 07/776,308

The answer states that the following rejections are applicable to the claims on appeal.²

Claims 1, 3-5, 7 and 9 stand rejected under 35 U.S.C. § 103 as being unpatentable over Phillips and Mathisen in view of Isohata. According to the examiner

Phillips teaches the formation of the holographic mask and the replay of that mask using piezoelectric spacers to form a corresponding image in the photosensitive medium. The information disclosed clearly meets the claimed invention, with the exception that the photosensitive medium is disposed upon a silicon wafer, rather than a flat panel display. Isohata et al. teach the use of stepping photolithography in the formation of flat panel displays, as well as the overlap of photolithographic methods of manufacturing flat panel displays and semiconductors, including the concerns of exposing a large pattern without loss of resolution. It would have been obvious to one skilled in the art to substitute the photosensitized substrate of Isohata et al. for that taught by Phillips with the benefit of forming a flat panel display using the improved exposure process. The benefit of substituting the exposure process of Phillips in the process disclosed by Isohata et al. is the high resolution obtainable, while allowing exposure of the entire wafer without

² The final rejection of claims 1-9 under the judicially created doctrine of obviousness-type double patenting was withdrawn by the examiner in the advisory action dated November 09, 1994 (Paper No. 21) in view of the terminal disclaimer filed on October 27, 1994 (Paper No. 20).

Appeal No. 96-1954
Application 07/776,308

stepping disclosed by Phillips and Isohata et al. as desirable and Phillips discloses as achievable with holographic masking he teaches as preferable over standard photolithographic masking techniques, including stepping.³ The ability of holographic masks to maintain high resolution over a wide width of field is supported by the teaching of Mathisen [see answer, page 5; emphasis in original; footnote added].

Claims 1 and 2 stand rejected under 35 U.S.C. § 103 as being unpatentable over Phillips and Mathisen in view of Isohata, as applied to claims 1, 3-5, 7 and 9 above, and further in view of Lang. The examiner is further of the opinion that it would have been obvious to replay the holographic recording in view of the teachings of Lang.⁴

Claims 1, 7 and 8 stand rejected under 35 U.S.C. § 103 as being unpatentable over Phillips and Mathisen in view of Isohata,

³ Although the examiner has styled the rejection as being "unpatentable over Phillips and Mathisen in view of Isohata," it is apparent from the latter two sentences that the rejection is, in reality, -- Isohata in view of Phillips and Mathisen --.

⁴ While the examiner has included claim 1 in the statement of the rejection, the examiner has relied upon Lang only for a teaching of replaying the holographic recording in a second apparatus, a feature which can only be found in dependent claim 2.

Appeal No. 96-1954
Application 07/776,308

as applied to claims 1, 3-5, 7 and 9 above, and further in view of Smith and/or Ono. The examiner also believes that it would have been obvious to align the flat panel relative to the image being replayed in view of the teachings of Smith and/or Ono.⁵

Rather than reiterate the arguments of the appellant and examiner in support of their respective positions, reference is made to the brief, reply briefs, answer and supplemental answer for the full exposition thereof.

OPINION

At the outset, we note that the appellant has stated on page 7 of the brief that claims 1-5 and 7-9 stand or fall together. Accordingly, all claims on appeal will stand or fall with representative claim 1.

We have carefully reviewed the appellant's invention as described in the specification, the appealed claims, the prior

⁵ Although the examiner has included claim 1 in the statement of the rejection, the examiner has relied upon Smith and/or Ono only for teachings of aligning a flat panel relative to the image being replayed, a feature which can be found only in dependent claims 7 and 8.

Appeal No. 96-1954
Application 07/776,308

art applied by the examiner and the respective positions advanced by the appellant in the brief and reply briefs and by the examiner in the answer and supplemental answer. This review leads us to conclude that the prior art relied on by the examiner establishes the obviousness of the subject matter defined by the claims on appeal within the meaning of 35 U.S.C. § 103. Accordingly, we will sustain the above-noted rejections.

The appellant does not argue that Phillips is nonanalogous art. Instead, the appellant urges that flat panel displays involve a substrate "very much larger" than the integrated circuits of Mathisen or the semiconductor of Phillips. This being the case, the appellant is of the opinion that "different considerations" are involved in the manufacture of flat panel displays as opposed to the manufacture of integrated circuits and that the artisan "would understand flat panel displays and integrated circuits to be distinct from one another and not merely alternative phraseology for the same device" (see page 2 of the reply brief filed May 15, 1995 (Paper No. 25)). This reply brief then goes on to urge

Appeal No. 96-1954
Application 07/776,308

Phillips '425 teaches a holographic technique for the manufacture of integrated circuits and teaches that a stepping procedure is undesirable. Phillips '425 makes no mention of producing flat panel displays. Isohata et al., on the other hand, teaches a method for forming a flat panel display, but does so only by utilizing a stepping technique, which Phillips '425 teaches should be avoided, if possible, in the production of integrated circuits.

Applicant submits that it would be inappropriate and require the use of hindsight for one to combine the teachings of Phillips '425 with those of Isohata et al. because: (a) Phillips '425 makes no mention of producing flat panel displays, which Isohata et al. is directed toward; and (b) Phillips '425 teaches the undesirability of a stepping procedure (in an unrelated method), which Isohata et al. affirmatively teaches should be utilized.

It is seen as being unreasonable - if at all possible - to read the combined teachings of Phillips '425 with those of Isohata et al. to conclude that the use of holographic methods, as an alternative to using a stepping technique, to produce flat panel displays is obvious. The teachings of Phillips '425 and Isohata et al. are inherently inconsistent with one another (see pages 5 and 6; emphasis in original).

We are unpersuaded by the appellant's arguments.

Admittedly, the method of Phillip is concerned with the production of semi-conductors and the method of Mathisen is concerned with the production of "integrated circuits" (which the

Appeal No. 96-1954
Application 07/776,308

artisan might arguably infer to also be semiconductors). It is also true that Isohata, while directed to a procedure for making either a large-diameter semiconductor wafer or flat display panel (see column 2, lines 59-62), teaches the desirability of "stepping" (i.e., imaging the pattern over the entire area of the semiconductor wafer or flat panel display in increments). We must point out, however, it not necessary that the cited references or prior art specifically suggest making the combination (see *In re Nilssen*, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988)). Rather the test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art. See *In re Young*, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991) and *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981).

Here, we see no need to resort to the appellant's own disclosure to combine the teachings of Isohata, Phillips and Mathisen. Isohata states that

[i]n the field of manufacture of semiconductor devices, enlargement of the semiconductor wafer (wafer diameter)

Appeal No. 96-1954
Application 07/776,308

has been desired in order to reduce the manufacturing cost per one chip (semiconductor chip). Also, in a field of display devices such as liquid crystal display devices, electroluminescence display devices, electrochromic display devices, plasma display devices, fluorescent display devices and the like, development of flat panel type large-size display devices has been desired.

In consideration of the above, it is desirable in the field of photolithographic exposure apparatuses to realize such an apparatus that is capable of transferring a large-area pattern onto a large-area substrate or base plate.

One way to meet this is use of a mask or photomask having a large size corresponding to the large-diameter wafer or a large-size glass plate constituting the flat panel display device, such that a large-size circuit pattern or a large-size picture-element pattern formed on the mask is transferred onto the wafer or large-size glass plate at once (see column 1, line 60 through column 2, line 12; emphasis ours).

While Isohata then goes on to state that due to problems such as the size of equipment necessary to image a large area in a single exposure that it is preferable to utilize a stepping procedure, the above-quoted portion of Isohata nevertheless not only expressly teaches that both large-diameter semiconductor wafers and large-size display panels may be imaged over the entire area of the wafers and panels in a single exposure, but also fairly

Appeal No. 96-1954
Application 07/776,308

suggests to the artisan that the same photolithographic exposure procedures are equally applicable to semiconductor wafers and large-size display panels. Indeed, as we have note above, Isohata expressly teaches that his procedure is equally applicable to large-size semiconductor wafers and flat panel displays (see column 2, lines 59-62). On the other hand, Phillips notes that the prior methods of manufacturing semiconductor chips included "stepping" wherein the image of one chip at a time was exposed on a given wafer (each wafer including a plurality of chips - see column 1, lines 24-43). After noting various problems of utilizing a stepping procedure, Phillips teaches that such problems can be overcome and resolution of the exposure improved by utilizing a holographic technique to image the entire area of a semiconductor wafer in a single exposure (see column 1, line 38 through column 2, line 68). To this end (as the examiner has generally explained on pages 3 and 4 of the answer), Phillips teaches that the same procedural steps set forth in lines 2-11 of independent claim 1 should be used to form the image (the only difference being that Phillips forms the

Appeal No. 96-1954
Application 07/776,308

image on a semiconductor wafer rather than on a flat panel display as set forth in independent claim 1). In our view, a combined consideration of Isohata and Phillips would have fairly suggested to the artisan to form a flat panel display such as that taught by Isohata by imaging the entire area of the panel in a single exposure by the holographic technique as taught by Phillips in order to achieve Phillips' expressly stated advantages of (1) avoiding the problems of utilizing a stepping procedure and (2) improving the resolution of the exposure. This is especially the case inasmuch as Mathisen indicates that it is well known to those skilled in the art of photolithograph processes (see column 1, lines 7-12) that holographic techniques provide a larger imaging area, while at the same time maintaining a higher degree of resolution than is possible through non-holographic techniques. In this regard, it should be noted Mathisen expressly states that

in accordance with well-known optic principles, known mask projections systems are required to sacrifice range or width of field for resolution. The art of holography possesses the general advantages of improving range or width of field while maintaining a

Appeal No. 96-1954
Application 07/776,308

higher degree of resolution otherwise impossible with a conventional non-holographic system having the same width of field (see column 1, lines 46-53).

Applying the test for obviousness⁶ as set forth in *In re Keller* at 642 F.2d 425, 208 USPQ 881, we are of the opinion that the subject matter defined by independent claim 1 is no more than what the combined teachings of the relied on prior art would have suggested to those of ordinary skill in this art. Accordingly, we will sustain the examiner's rejection of claim 1 (with which claims 2-5 and 7-9 fall) under 35 U.S.C. § 103 based on the combined disclosures of Isohata, Phillips and Mathisen.

In passing we note that the response after final rejection filed on September 29, 1994 (Paper No. 16) is entitled "Affidavit 37 C.F.R. § 1.132." This document, however, does not comply with the formal requirements of an affidavit (see M.P.E.P. § 715.04) and appears to be nothing more than a request for

⁶ The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.

Appeal No. 96-1954
Application 07/776,308

reconsideration. In any event, this document has not been referred to in either the brief or reply briefs (37 C.F.R. § 1.192(c)(8) requires that all arguments relied on be in the brief) and therefore is apparently not being relied on by the appellant.

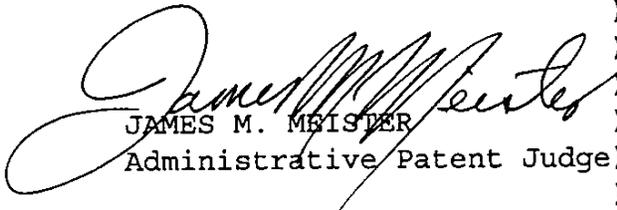
The decision of the examiner is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED



IRWIN CHARLES COHEN)
Administrative Patent Judge)



JAMES M. MEISTER)
Administrative Patent Judge)

BOARD OF PATENT
APPEALS AND
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CHARLES E. FRANKFORT)
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Appeal No: 96-1954
Application: 07/776,308

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