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opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.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. 39

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ROBERT S. SPORZYNSKI and DEAN J. HARTFORD

Appeal No. 1997-3709
Application 08/582,034

HEARD: JANUARY 10, 2000

Before COHEN, STAAB and BAHR, *Administrative Patent Judges*.

STAAB, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal from the examiner's final rejection of claims 3-10, all the claims currently pending in the application.

Background

Appellants' invention pertains to a vented rotor for a vehicle disk brake wherein the rotor includes an improved vent design. Independent claim 3, a copy of which can be found in an appendix to appellants' brief, is illustrative of the appealed subject matter.

The references of record relied upon by the examiner in support of a rejection under 35 U.S.C. § 103 are:[1]

Herbulot et al. (Herbulot)	4,469,203	Sept. 4, 1984
Wirth	4,638,891	Jan. 27, 1987

A reference made of record by the examiner during prosecution and relied upon by this merits panel of the Board in support of new rejections under 35 U.S.C. § 102(b) and 35 U.S.C. § 103 is:

Solitis (British Patent Document)	2,057,609	Apr. 1, 1981

Claims 3-10 stand finally rejected under 35 U.S.C. § 103 as being unpatentable over Wirth in view of Herbulot.

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[1] On page 7 of the answer, the examiner also referred to British reference 1,325,646 and US Patent 4,083,435, but these references have been given no consideration since they were not positively included in the rejection. *Ex parte Raske,* 28 USPQ2d 1304, 1305 (Bd. Pat. App. & Int. 1993).

Reference is made to the main and reply briefs (Paper Nos. 25 and 27) and to the answer (Paper No. 26) for the respective positions of appellants and the examiner with regard to the merits of this rejection.

The Claimed Invention

The appealed claims include two independent claims, namely, claims 3 and 10. Each of these independent claims calls for a vented rotor comprising an annular friction plate having a radially oriented passageway extending therethrough from a radially inner end to a radially outer end. The radial outer end of the passageway defines a first center axially[2] extending dimension (A1)[3] and a first end axially extending dimension (A2) such that (A2) < (A1). The radial inner end of

[2] Throughout this decision, the terms "axial" and "axially" refer to the direction that is parallel to the axis of rotation of the rotor in use, and the terms "circumferential" and "circumferentially" refer to the direction parallel to the periphery of the rotor and transverse to the axis of rotation of the rotor in use.

[3] The designations (A1), (A2), etc. for the various axially extending dimensions and circumferentially extending dimensions of the outer and inner ends of the passageway are in accordance with the dimension labels found in Figures 1 and 2 of the application drawing figures.

the passageway defines a second center axially extending dimension (B1) and a second end axially extending dimension (B2) such that (B2) < (B1). In addition, the first center axially extending dimension (A1) and the second center axially extending dimension (B1) are related such that (B1) > (A1). Finally, the radial outer end of the passageway defines a first circumferentially extending dimension (A3) and the radial inner end of the passageway defines a second circumferentially extending dimension (B3) such that (B3) < (A3).

The Applied References

Wirth, the examiner's primary reference, discloses a vented rotor comprising an annular friction plate 3 having a radially oriented passageway 6 extending therethrough from a radially inner end to a radially outer end. Based on Wirth's drawing figures, it reasonably appears, and appellants do not dispute, that the radially oriented passageway 6 is shaped such that the center axially extending dimension of the inner end of the passageway is greater than the center axially extending dimension of the outer end of the passageway (i.e., (B1) > (A1)) and such that the circumferentially extending

dimension of the inner end of the passageway is less than the circumferentially extending dimension of the outer end of the passageway (i.e., (B3) < (A3)). It is not possible to determine the cross-sectional shape of Wirth's passageway. Thus, Wirth must be considered to be silent as to whether passageway 6 has outer and inner ends such that (A2) < (A1) and such that (B2) < (B1).

Herbulot relates to a vented brake disk comprising an annular friction plate having radially oriented ventilation channels. At column 1, lines 9-13, Herbulot states that conventional brake discs are delineated by ventilation channels each having a continuous inner wall. According to Herbulot, the cooling obtained by this arrangement is often not completely satisfactory. Accordingly, Herbulot proposes a brake disc

> characterised [sic, characterized] in that, as regards at least some of the ventilation channels, the channel is divided longitudinally into at least two portions separated by a step causing an abrupt discontinuity of cross-section.
>
> With such an arrangement, the aerodynamic conditions of flow of the air in the channels are doubtlessly less satisfactory than in the case where the inner wall delimiting the channel is continuous, but the effect of the turbulence generated by the

> presence of the at least one step is to promote heat exchange between the ventilation air and the rotating member. The result of this is, therefore, a poorer flow, but, as has been noted, paradoxically better cooling, this being the main purpose of the channels. [Column 1, lines 20-34.]

Herbulot discloses several embodiments of the invention. In Figures 1-5, the ventilation channel is divided into three portions. Referring to Figures 3 and 5, radially innermost portion 19 is elliptical in cross-section and has a major axis of dimension D oriented axially, intermediate portion 20 is circular in cross-section and has a diameter D, and radially outermost portion 21 is elliptical in cross-section and has a minor axis of dimension D oriented axially. The result is a longitudinally divided channel having abrupt discontinuities 22 and 23 of bi-lunular form. As can be seen in Figure 5, each of the portions 19, 20 and 21 have a common center axially extending dimension D.

In Figure 6, an alternative form of the invention is disclosed which is similar to that of Figures 1-5 except that instead of having circular or elliptical cross-sections, the portions 19, 20 and 21 “have a polygonal cross-section, for example hexagonal, as illustrated in FIG. 6, but this could

instead be square or another shape" (column 3, lines 25-27). As clearly seen in Figure 6, each of the portions 19, 20 and 21 once again have a common center axially extending dimension.

The Examiner's Position

In rejecting the appealed claims as being unpatentable over Wirth in view of Herbulot, the examiner considers that Wirth shows almost all of the features of the claims including passageways 6 having decreasing axial width (Figure 1) but increasing circumferential length (Figure 2) as seen from a radially inward to a radially outward direction. The examiner appreciates that Wirth is silent as to the cross-sectional shape of the passageway, but contends that "it is well known in the brake art to provide different cross-sectional shapes for passageways in vented rotor disks" (answer, page 3). The examiner further considers that Herbulot teaches "passageway cross-sectional shapes of many varieties, including circular, elliptical, polygonal, for example **hexagonal**, even square cross-sections or another shape" (answer, sentence bridging pages 3 and 4; emphasis in original). Based on the above, the

examiner considers that:

> It would have been obvious to have constructed the passageways of Wirth to have one of the numerous cross-sectional geometric shapes including **hexagonal**, as is well known and exemplified by Herbulot et al since such a choice of cross-sectional shape is well within the level of the ordinary skilled worker and is functionally equivalent to any other known geometric shape.
>
> Note that Herbulot et al is relied upon solely for the teaching of a specific shape, hexagonal . . . since Wirth discloses uninterrupted walls changing shape in two directions from an innermost to an outermost radius as described above.
>
> Thus, Wirth as modified meets the claimed dimensional relationships. [Answer, page 4; emphasis in original.]

Opinion

We appreciate that within the context of Herbulot's invention, Herbulot teaches that various cross-sections for the venting channels may be utilized. We also appreciate that at least the Figure 6 hexagonal channel of Herbulot satisfies the (A2) < (A1) and (B2) < (B1) claim limitations not taught by Wirth. Still further, we appreciate that if the Wirth vented rotor were to be provided with venting passageways of

hexagonal cross-section while retaining the passageway construction concept of Wirth that involves uniformly changing the shape of the passageway in two directions along its length, the subject matter of independent claims 3 and 10 would result. Notwithstanding the above, we are unable to agree with the examiner that the combined teachings of these two references would have suggested to one of ordinary skill in the art their combination in a manner that would have resulted in the claimed subject matter.

Where prior art references require a selective combination to render obvious a claimed invention, there must be some reason for the combination other than hindsight gleaned from the invention disclosure, *Interconnect Planning Corp. v. Feil,* 774 F.2d 1132, 1143, 227 USPQ 543, 551 (Fed. Cir. 1985). In the fact situation before us, when we forget about what appellants have done and focus only on the teachings of the applied references, we see no cogent reason for the examiner's proposed selective combination of Wirth and Herbulot. In particular, the examiner's rationale that the choice of cross-sectional shape "is well within the level of

the ordinary skilled worker and is functionally equivalent to any other known geometric shape" (answer, page 4) is insufficient.[4] Moreover, the examiner's attempt to ignore those portions of Herbulot that teach against the claimed invention[5] is not well taken. *See W. L. Gore and Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1550, 220 USPQ 303, 311 (Fed. Cir. 1983) (it is error to consider references in less than their entireties, disregarding disclosures therein that diverge from and teach away from the invention at hand).

In the present situation, the differences in construction and purpose of Wirth and Herbulot belie their combination in the manner proposed, and instead indicate to us that they

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[4] The test for obviousness under 35 U.S.C. § 103 in not what is "within the level of the ordinary skilled worker." Rather, the test for obviousness is what the combined teachings of the references would have suggested to those of ordinary skill in the art (*In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981)). Further, the mere existence of functional equivalency does not establish obviousness within the meaning of 35 U.S.C. § 103 (*In re Flint,* 330 F.2d 363, 367-68, 141 USPQ 299, 302 (CCPA 1964)).

[5] Namely, the circumstance that each of the portions 19, 20 and 21 of Herbulot's Figures 5 and 6 embodiments have a common center axially extending dimension.

simply represent alternative venting channel constructions. That is, when presented with their respective teachings, we believe one of ordinary skill in the art would simply choose one channel construction or the other, rather than attempt to selectively combine them in the manner that would produce the claimed invention.

In light of the foregoing, we conclude that the examiner has failed to establish a prima facie case of obviousness of claims 3-10. Accordingly, we need not consider the appellants' evidence of nonobviousness, i.e., the declaration under 37 CFR § 1.132 of coinventor Robert S. Sporzynski. *In re Fine*, 837 F.2d 1071, 1076, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988).

New Rejection Under 37 CFR § 1.196(b)

Pursuant to our authority under 37 CFR § 1.196(b), we enter the following new rejections.

Claims 3-6 are rejected under 35 U.S.C. § 102(b) as being anticipated by published UK patent application 2,057,609 to Soltis, made of record by the examiner during prosecution.[6]

[6] See Form PTO-892, Notice of References Cited, included as an attachment to the initial office action (Paper No. 3) in

Soltis pertains to a thermally balanced vented brake rotor 14. The thrust of Soltis is the provision of a rotor having a thickened wall portion at a radial outer location of the rotor which provides a heat sink that, in use, tends to counteract the uneven temperature distribution in the rotor caused by the heat-sink effect of the mounting portion (page 1, lines 62-73). This is shown in Figure 2 at wall 18 which increases in thickness with increasing distance from the center of the rotor.

Soltis recognizes (page 2, line 125 through page 3, line 14) that increasing the thickness of wall 18 of vented rotor 14 results in a corresponding reduction in the axially extending dimension of the air passageways. See, for example, Figure 2 where the axial dimension of the air passageway at radial outer end 54 is reduced relative to the axial dimension thereof at radial inner end 56. Soltis explains that unless compensated for, this reduction in axial dimension of the air passageways will cause outlets 54 to be smaller in cross-

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the parent application. We note in passing that Kelsey-Hayes Company, the real party in interest of the present application, is listed as the "applicant" of the UK patent application.

sectional area than inlets 56 so as to choke or impede the flow of air through the passageways. Soltis eliminates this potential problem by increasing the circumferential dimension of the air passageways with increasing distance from the center of the rotor such that the cross-sectional area of the air passageway outlets 54 is approximately equal to or greater than the cross-sectional area of the air passageway inlets 54. In this way, "a substantially constant or radially increasing cross-sectional area of the air passageways may be maintained. Thus, thermal balancing of the heat sink of the mounting structure and good air flow through the radial air passageways may both be achieved" (page 3, lines 9-14).

Figure 3 shows a first form of the Soltis invention wherein the cross-sectional shape of the air passageways is generally rectangular. Another form of the Soltis invention is shown in Figure 4. Soltis explains the Figure 4 embodiment as follows:

> Referring now to Figure 4, . . . the second form of rotor 60 includes . . . air passageways 66 having a generally elliptical cross-section. The major axes of the elliptical passageways 66 at the outer surface of the rotor 60 are aligned circumferentially about the periphery of the rotor 60. The major axes of the elliptical passageways 66

> at the inner surface of the rotor 60 are parallel to the axis of the rotor 60 and thus at right angles to the major axes of the elliptical passageways 66 at the outer surface of the rotor 60. It should be noted that such a configuration may also have air passageways of constant or radially increasing cross-sectional area in addition to the heat sinking mass and can also achieve very low radial temperature gradients in the wall of the rotor 60 nearer to the mounting structure while maintaining good air flow in the elliptical passageways 66. [Page 3, lines 15-40.]

Considering first independent claim 3, as a preliminary matter, we again observe that this claim calls for (1) the radially outer end of the passageway to define "a first center axially extending dimension [and] a first end axially extending dimension" and (2) the radially inner end of the passageway to define "a second center axially extending dimension . . . [and] a second end axially extending dimension." In appellants' drawing figures, the first and second center axially extending dimensions are denominated by dimension lines A1 and B1, respectively, while the first and second end axially extending dimensions are denominated by dimension lines labeled A2 and B2, respectively. It is noted that each of the dimension lines for the end axially extending dimensions are located near, but not at, the edge of the

respective passageway end.[7] Furthermore, the explanation on page 8, lines 15-31, of appellants' specification of the significance of the relationship between the end axially extending dimensions ((A2), (B2)) and the center axially extending dimensions ((A1), (B1)) is consistent with the measurement of the end axially extending dimensions as shown in appellants' drawings, and in fact would appear to allow for measurement of the end axially extending dimension at any location circumferentially offset from the center axially extending dimension and near the edge of the respective passageway end. Consistent with appellants' disclosure, and bearing in mind that claims must be given their broadest reasonable interpretation consistent with the specification (*In re Prater*, 415 F.2d 1393, 1404, 162 USPQ 541, 550 (CCPA 1969)) and that limitations will not be read into the claims from the specification (*Sjolund v. Musland*, 847 F.2d 1573, 1582, 6 USPQ2d 2020, 2027 (Fed. Cir. 1988)), we interpret the claim terminology "a first axially extending dimension" and "a

[7] Indeed, the exact location of appellants' dimension lines A2 and B2 relative to the edge of the passageway ends appears to be somewhat arbitrary.

second axially extending dimension" as including any axially extending measurement of the passageway end taken near the edge of the passageway end opening.

Reading independent claim 3 on the Figure 4 brake rotor of Soltis, we find that the Figure 4 brake rotor comprises an annular mounting flange and an annular friction disk having a generally elliptical air passageway extending radially therethrough. The outer end of the passageway has a first center axially extending dimension (A1) and a first circumferentially extending dimension (A3), and the inner end of the passageway has a second center axially extending dimension (B1) and a second circumferentially extending dimension (B3) such that (B1) > (A1) and (B3) < (A3), as required by claim 3. Moreover, based on our above interpretation of the claim terminology "a first axially extending dimension" and "a second axially extending dimension," we find that the Figure 4 passageway of Soltis has a first axially extending dimension (A2) as measured near the edge of the outer end of the passageway and a second axially extending dimension (B2) as measured near the edge of the inner end of the passageway, such that (A2) < (A1) and (B2) <

(B1). Accordingly we hold that the Figure 4 embodiment of Soltis anticipates claim 3.

Claim 4 depends from claim 3 and adds that (A2) > (B2). The Figure 4 embodiment of Soltis includes a multitude of first axially extending dimensions (A2) and a multitude of second axially extending dimensions (B2) such that for selected pairs of (A2) and (B2), the additional requirement of claim 4 is satisfied. Accordingly, claim 4 "reads on"[8] the Figure 4 embodiment of Soltis. It follows that the Figure 4 embodiment of Soltis anticipates claim 4.

Claim 5 depends from claim 3 and adds that the passageway defines a generally uniform cross-sectional area throughout its radial length. Claim 6 depends from claim 3 and adds that the disk includes a plurality of passageways. These limitations are clearly met by the Figure 4 embodiment of Soltis.

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[8] The law of anticipation does not require that the reference teach specifically what an appellant has disclosed and is claiming but only that the claims on appeal "read on" something disclosed in the reference, i.e., all limitations of the claim are found in the reference. *See Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983), *cert. denied*, 465 U.S. 1026 (1984).

Having concluded that claims 3-6 are anticipated by the Figure 4 embodiment of Soltis, appellants' evidence of nonobviousness is to no avail since, no matter how striking, it cannot overcome a rejection based on lack of novelty. *See In re Malagari*, 499 F.2d 1297, 1302, 182 USPQ 549, 553 (CCPA 1974); *In re Wiggins*, 488 F.2d 538, 543, 179 USPQ 421, 425 (CCPA 1973).

Claims 7-10 are rejected under 35 U.S.C. § 103 as being unpatentable over Soltis in view of Wirth.

Claim 7 depends from claim 6 and adds that the friction disk includes a pair of spaced apart brake friction plates, with each of the plates including an inner surface that is tapered radially inwardly to define a cross-sectional thickness at the radial outer end of plate that is greater than the cross-sectional thickness at the radial inner end of the plate. Independent claim 10 contains similar limitations.

In the Figure 4 embodiment of Soltis, the friction disk includes a pair of spaced apart brake friction plates, but the plates define an asymmetric disk structure in the sense that only the plate 18 attached to the hat section 22 of the rotor

body is tapered in the manner claimed. However, Soltis expressly recognizes at page 3, lines 48-54, that the invention is not limited to the air passageway shapes shown in Figures 3 and 4, but that

> any configuration of the walls of a rotor or disk which provides a heat sinking mass for balancing the mass and heat sinking effect of the rotor or disk mounting structure in order to reduce radial temperature gradients within the rotor or disk falls within the ambit of the invention.

Consistent with the above, Soltis discloses at Figures 6-9 several embodiments of solid (unvented) brake rotors. These include (1) a non-uniformly thermally balanced version (Figure 7) wherein the added mass at the radial outer location of the rotor that counteracts uneven temperature distribution is provided only on the side of the rotor nearer to the hat section 82, and (2) a uniformly thermally balanced version (Figure 8) wherein the added mass at the radial outer location of the rotor that counteracts uneven temperature distribution is provided on both sides of the rotor. As explained by Soltis at page 4, lines 92 through page 5, line 2, one of the reasons for uniformly thermally balancing the Figure 8 version is that the rotor thereof is a more symmetric structure

because of its planar style mounting structure.[9]

Wirth discloses a vented brake disk wherein the rotor is substantially symmetric in the sense that the friction disk 3 is symmetrically mounted to the rotor hub 1. Moreover, the friction disk of Wirth includes a pair of spaced apart brake friction plates 5, each of which include an inner surface that is tapered radially inwardly to define a cross-sectional thickness at the radial outer end of the plate that is greater than the cross-sectional thickness at the radial inner end of the plate.

Based on our review of Soltis and Wirth, we consider that the collective teachings of these references are sufficient to establish a prima facie case of obviousness of claims 7-10. Specifically, we consider that it would have been prima facie obvious to one of ordinary skill in the art to construct the Figure 4 embodiment of Soltis as a symmetrically mounted, uniformly thermally balanced structure as an alternative to the illustrated non-symmetrically mounted, non-uniformly

[9] This can be appreciated by comparing the hat style mounting section 82 of the Figure 7 version to the planar style mounting section 92 of the Figure 8 version.

thermally balanced structure. In so doing, we consider that the ordinarily skilled artisan would appreciate from a full understanding of Wirth's teachings that thermally balancing the brake rotor of the modified Figure 4 brake rotor of Soltis may be realized by tapering the inside surface of each of the plates of the friction disk, thereby resulting in the subject matter of claims 7-10.

Having concluded that the collective teachings of Soltis and Wirth are sufficient to establish a prima facie case of obviousness, we recognize that appellants' evidence of nonobviousness, i.e., the declaration under 37 CFR § 1.132 of coinventor Robert S. Sporzynski, must be considered en route to a final determination of obviousness/nonobviousness under 35 U.S.C. 103. *See Stratoflex Inc. v. Aeroquip Corp.*,713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983).

The Sporzynski declaration is for the most part directed to declarant's opinions regarding the examiner's obviousness rejection based on Wirth and Herbulot. Accordingly, these opinions are simply not relevant to our new § 103 rejection based on Soltis and Wirth. The only parts of the Sporzynski declaration that possibly relate our new § 103 rejection are

paragraphs 7 and 10. In paragraph 7, declarant voices his opinions regarding the "criticality" of the claimed shape of the passageways. However, in that the Figure 4 embodiment of Soltis corresponds to the shape of the passageways as broadly claimed, it is reasonable of presume that the passageways of the Figure 4 embodiment of Soltis would function in the same way as the claimed passageways. In paragraph 10, declarant states that he "believes" that the claimed brake structure has several advantages (minimized "coning", more uniform temperature distribution, less tendency to fade, etc.) over prior art brake rotors. However, in that appellants have provided no objective evidence (i.e., comparative tests of the claimed brake disk versus the closest prior art) in support of their "belief," appellants' opinions in this regard are entitled to relatively little weight.

When all the evidence and arguments are considered anew it is our conclusion that, on balance, the evidence and arguments presented by appellants fails to outweigh the evidence of obviousness established by the prior art. *See Newell Companies Inc. v. Kenney Manufacturing Co.*, 864 F.2d

757, 9 USPQ2d 1417 (Fed. Cir. 1988), *Ryko Manufacturing Co. v. Nu-Star Inc.*, 950 F.2d 714, 21 USPQ2d 1053 (Fed. Cir. 1991) and *In re Beattie*, 974 F.2d 1309, 1313, 24 USPQ2d 1040, 1043 (Fed. Cir. 1992). We therefore conclude that our new rejection of claims 7-10 as being unpatentable over Soltis in view of Wirth is sound.

Summary

The examiner's rejection of the appealed claims as being unpatentable over Wirth in view of Herbulot is reversed.

New rejections of claims 3-10 pursuant to our authority under 37 CFR § 1.196(b) have been entered.

The decision of the examiner is reversed.

This decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b)(amended effective Dec. 1, 1997, by final rule notice, 62 Fed. Reg. 53,131, 53,197 (Oct. 10, 1997), 1203 Off. Gaz. Pat. & Trademark Office 63, 122 (Oct. 21, 1997)). 37 CFR § 1.196(b) provides that, "A new ground of rejection shall not be considered final for purposes of judicial review."

37 CFR § 1.196(b) also provides that the appellant,

WITHIN TWO MONTHS FROM THE DATE OF THE DECISION, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of proceedings (§ 1.197(c)) as to the rejected claims:

> (1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .
>
> (2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .

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

REVERSED; 37 CFR § 1.196(b)

IRWIN CHARLES COHEN Administrative Patent Judge	)	
LAWRENCE J. STAAB Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES

)
)
JENNIFER D. BAHR)
Administrative Patent Judge)

ljs/ki

MacMillan Sobanski & Todd
One Maritime Plaza
Fourth Floor
720 Water Street
Toledo, OH 43604