

COMMISSIONER'S DECISION

OBVIOUSNESS: Threaded Fastener

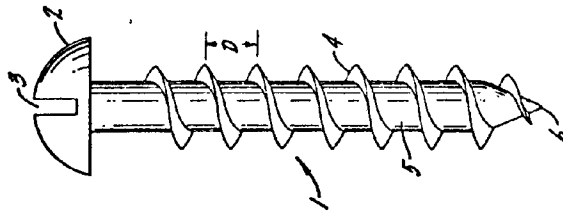
The application relates to an improved threaded screw fastener. It was found that the applicant has made a patentable advance in the art.

Final Action: Reversed - Suggested a claim for allowance.

This decision deals with a request for review by the Commissioner of Patents of the Examiner's Final Action dated June 25, 1975, on application 149,369 (Class 85-46). The application was filed on August 14, 1972, in the name of Geoffrey Dreger, and is entitled "Thread System."

The Patent Appeal Board conducted a Hearing on March 23, 1977, at which Mr. D.G. Finlayson represented the applicant. Also in attendance was the inventor, Mr. G. Dreger.

The application relates to a threaded member capable of being driven into low density materials. The member has a sharp thread with its leading angle substantially larger than its trailing angle. The following drawing from the application shows the threaded member:

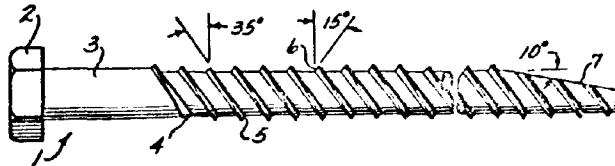


In the Final Action the examiner refused the application for failing to define a patentable invention over the following United States patents:

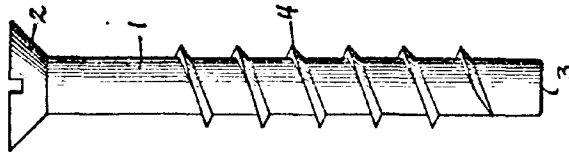
2,350,346	June 6, 1944	Gaskell
2,380,724	July 31, 1945	Crooks
2,742,074	April 17, 1956	Rosan

Claims 1 to 5 were withdrawn. Former claim 6, now claim 1, is the only claim before ^{US}USA.

The Gaskell patent discloses a threaded member having a thread with a leading angle of 35° and a trailing angle of 15° . Figure 1 of Gaskell, shown below, illustrates that invention



The Crooks patent relates to a wood screw retaining means. The thread of the screw having a steep pitch of approximately 4 to 8 threads per inch. That invention is illustrated by Figure 1 of that patent as shown below:



The Rosan patent is directed to a removable mounting insert member which is used in conjunction with a fastening member.

In the Final Action the examiner set forth his position (in part) as follows (we need only be concerned with the remarks as they apply to former claim 6, now claim 1):

...

Claim 6 recites in essence the features presented in claims 1-5. Claim 6 is therefore rejected for the same considerations as offered above.

The application is rejected as comprising no patentably novel subject matter in view of the cited art.

Regarding applicant's response of January 10, 1975 it is held that

the thread angle 30° - 15° as claimed as against Gaskell's angle of 35° - 15° is so close that the difference is insignificant for all practical purposes. Gaskell, moreover, offers solution to the same type of problem, as stated in column 2, lines 39 ff: "the front face of the thread being inclined to the vertical at a greater angle than conventional threads can be driven into the wood with the application of a small torque, while the rear face of the thread approaching a buttress thread provides adequate bearing on wood or similar materials, when tension loads are applied to the screws and eliminating the possibility of splitting." While the applicant's explanation is not so specific as that of Gaskell cited above, it is easy to see that the object is the same, and there is no significant deviation from the thread angles.

The self tapping characteristics of applicant's screw are well known and used in industry, and even if they had been claimed, they would have contributed nothing to the patentability of the device. Therefore applicant's argument that "Rosan never considered a self-tapping screw. This certainly removes Rosan as an anticipation of broad claim 1" does not apply.

Spacing between the threads has been dealt with in all three references. Thus Crooks recognizes that "the lesser number of threads per inch is a great factor in the holding power, in as much as the fibre of the wood adjacent the shank is cut or broken at fewer points." Crooks mentions further on Bakelite, fibre or metal heads to wooden or plastic barrels, though no specific ratio between thread height and pitch is given. Gaskell states: "The screw is provided with threads 4 having a pitch preferably of the order of eight threads per inch." Rosan specifies the thread pitch as 1.54 to 1.125 of the thread height as compared with applicant's pitch as being 2.2 to 3 of the thread height. Rosan, confronted essentially with applicant's problem, increases the height of the threads, and decreases the thread width, thus in effect increases the distance between the threads.

Since there is no subject matter in the disclosure that is unobvious and inventive over the prior art, this application is refused.

In response to that action the applicant presented his views (in part) as follows:

...

The applicant contends that the Examiner's rejection of the single claim retained herein is based upon combining details of several prior art disclosures, one of which Rosan, is not

directed to the subject matter of the two references of Crooks and Gaskell. Particularly, Rosan directs his device to a reduced diameter locking ring for an insert and the insert.

It also appears that despite the availability of the leading and trailing thread angle of Gaskell and the pitch of Crooks in the years 1944-45, there is no evidence or suggestion that these two isolated elements might be combined and some 10-12 years later there is no evidence that the thread depth of Rosan might be varied to incorporate the thread angles or the pitch dimension of the two prior art items. The applicant contends that this is a mistake on the part of the Examiner of isolated elements that were patented at widely spaced intervals of time and that a period of more than ten years elapsed from the last of the prior art items before the present invention which is directed to a specific combination was devised in response to an indicated demand in a number of industries directly related to the general subject matter area of the prior art references.

...

The applicant believes that the prima facie view of the Examiner of non-patentability must be displaced in the present application to conclude that sufficient is disclosed and claimed to support a patent in view of the experiments required, the expiry of more than ten years from the latest of the pertinent prior art references and the demonstrated need for the applicant's solution as supported by the approaches made to the applicant by skilled artisans in the use of threaded fastener means.

It is the applicant's contention that to deny it protection for the screw that is exactly and specifically and narrowly defined in the single claim retained is to contravene the general principles of a Letters Patent for limited monopoly and is contrary to all Canadian judicial pronouncements with respect to the granting of patents for worthwhile novel and utilitarian developments in response to indicated needs and requirements.

We have considered with care the able and informative arguments presented at the Hearing by Messrs. Finlayson and Dreger. They attempted to show that inventive ingenuity was required in developing the instant screw fastener. We might add that we have no quarrel with the rationale of the jurisprudence discussed by Mr. Finlayson. The line staff was equally spirited and firm in its attempt to show a lack of inventive ingenuity. We have also considered the points raised in the Affidavit by the inventor, Mr. Dreger, who is as a matter of interest, Vice-President, Research and

Development of the applicant (P.L. Robertson Manufacturing Company, Limited). Some of the points raised in the affidavit will be commented on later. The applicant also submitted a further brief and samples of the screw fasteners to the Board after the date of the Hearing.

The issue to be considered is whether the applicant has made a patentable advance in the art. We hasten to say that in the present situation such issue is a difficult one to solve. Claim 1 (former claim 6) reads as follows:

A screw threaded member for use with materials having a density in the range from about 15 to about 60 pounds per cubic foot comprising a root portion of predetermined diameter, a single continuous external sharp-edged thread portion having a leading angle of 30° and a trailing angle of 15°, the depth of said thread portion being from 30 to 40 percent of the diameter of said root portion, and the spacing between threads being from 2.2 to 3 times as great as said thread depth.

The applicant advanced the argument that the examiner was using a mosaic of patents to deny patentability. We are satisfied, however, that the cumulative effect of the prior art should be considered when deciding inventiveness (see DeFrees and Better Machine Co. v D.A. Acc. Ltd. 25 Fox P.C. 58 at 59).

It was made clear at the Hearing that there was indeed a problem to be solved by the inventor. This is well documented in the affidavit by Mr. Dreger. The problem was basically one of developing an improved screw fastener for use in low density materials. The basic question of course is whether or not the problem was solved in an inventive manner. As a result of this problem the inventor directed the research to design a screw fastener that would meet the following criteria:

1. A metal threaded fastener of a type similar to wood or tapping screws for use with applications using man-made, low-density materials, replacing such historically used materials such as wood or plywood.

2. A fastening means per above that can be used in low-density materials as well as in other historically used materials.
3. A fastening means not requiring predrilling of holes in any of the above materials.
4. A fastening means competitive with historically used fasteners but of superior holding power to same.
5. A fastener that can be produced on present equipment with modified tooling and at present day speeds.

In considering Rosan it is clear that the treads of the fastener could only feasibly be cut from a blank and are not normally within the scope of rolling capabilities. This type of fastener would also require a predrilled hole before application.

The Gaskell patent does show a threaded fastener where the front face of the threads is inclined to the vertical at an angle of thirty five degrees while the rear face of the thread is inclined at an angle of fifteen degrees to the vertical. This is substantially the same included angle as used by the applicant. One basic difference is that the applicant continues his thread to the tip of the screw ending in a sharp point. Gaskell on the other hand has a blunt end and requires a predrilled hole for application. No predrilled hole is required for the fastener of the present application.

It is fair to say that Crooks recognized that "the lesser number of threads per inch is a great factor in the holding power, in as much as the fibre of the wood adjacent the shank is cut or broken at fewer points." This is of course only one feature of the present alleged invention. Crooks requires a predrilled hole however, for application.

At the Hearing it was stated that the instant fasteners greatly resist splitting and especially when used in the end grain of hardwoods, and without the necessity and expense of a predrilled hole. This was considered by the inventor and his industrial informants as an unexpected plus of the

instant screw fastener. Our attention was also directed to the commercial success of the instant fastener, with one company alone "purchasing approximately one million LO-ROOT [instant fastener] screws per month." This may be of interest, but not necessarily conclusive as the requirement of inventive ingenuity.

At first blush one might consider that the fastener as disclosed is obvious in view of the prior art. We are not persuaded in the present circumstance however, that it would be obvious to a skilled artisan in the fastener art to consider combining the isolated elements of the three prior art patents to arrive at the design of the instant (LO-ROOT) screw fastener, which can be manufactured by present day rolling techniques, that do not require any predrilling of holes, and that can be used in a wide range and variety of materials. These elements are: the sharp included angle of the asymmetric thread, the relatively small root diameter, and the distance between the threads relative to the thread depth. The asymmetric thread is also continued to the extreme point of the present fastener. It is also of interest to note that what might be considered as the two basic references were issued to patents in 1944 and 1945, whereas the filing date of this application is 1972. The applicant also maintains that "the invention resulted from extensive experiments and field tests of prototype fastening members which were all produced within the scope of rolling capabilities and also covered several angles of threads and spacing of threads."

In our view the examiner capably and fairly set forth his position, and we agree that the cited art is closely allied to the point in question. The examiner however, did not have the advantage of some of the points which were brought out and discussed at great length at the Hearing. In any event we observe that the applicant cancelled five of the six claims refused by the examiner after the Final Action. This alone, at least in part, indicates the correctness of the Final Action. At the onset we mentioned that the issue before us was a difficult one, partly because the prior art cited by the examiner was indeed pertinent and generally seemed

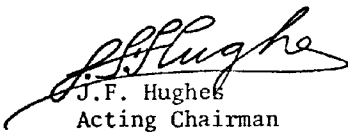
to teach the basic features in separate patents, and partly because of the apparent difficulty in expecting to find a patentable advance in a screw fastener. We hasten to add however, that without a Hearing a recommendation to the Commissioner of Patents on this issue would have been much more difficult.

Having considered all the arguments and points brought to the Board's attention we are constrained to conclude, but not without some hesitation, that the applicant has made a patentable advance in the art. We agree with the applicant that the advance in the art is centered around the sharp included angle of the asymmetric thread on the shank portion of the self-drilling and self-tapping fastener. This thread must, of necessity, be continued to the point thereof, in conjunction with a specified depth of thread in relation to a set spacing of threads and the diameter of the screw fastener. In addition we note that the root diameter of the instant screw fastener is only slightly smaller than the unthreaded shank portion, thus little if any additional wedging action occurs on a work piece as the screw advances into a work piece beyond the thread. This characteristic, we believe, is part of the merit in the present screw fastener being suitable for use in, for example, the end grain of hardwoods.

Considerable discussion took place at the Hearing as to whether or not claim 1 (previous claim 6) clearly sets forth what the applicant alleged was the advance in the art. We suggest that it does not, and should be amended to state that the fastener is self-drilling and self-tapping. More important it is essential to make it clear that the sharp included angle of the single continuous asymmetric thread extends along at least a portion of the shank of the screw member and to the extreme point thereof. This claim should also refer to the diameter of the shank above the thread as being substantially the same^{or} (or only slightly larger than) the root diameter.

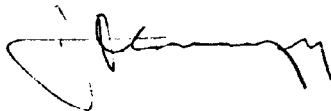
In summary, we are satisfied that the applicant has made a patentable advance in the art. There is, in our view, sufficient ingenuity that the Commissioner ought not to refuse a patent (cf Crosley Radio Corporation v. Canadian General Electric (1936) S.C.R. 551 at 560).

We recommend therefore that the decision of the examiner in the Final Action to refuse the claims be affirmed, but that the decision to refuse the application be withdrawn. We also recommend that claim 1 (former claim 6) be accepted when amended, as suggested above.


J.F. Hughes
Acting Chairman
Patent Appeal Board, Canada

I have studied the prosecution of this application and have carefully reviewed the recommendation of the Patent Appeal Board. In the circumstance I have decided beyond reasonable doubt that the applicant has made a patentable advance in the art. I withdraw the Final Action as it pertains to the refusal of the application, and I will accept claim 1 (former claim 6) when amended along the guidelines set out by the Board. The applicant has six months within which to submit the proposed amendment, or to appeal this decision under the provision of Section 44 of the Patent Act.

J.H.A. Gariepy
Commissioner of Patents



Dated at Hull, Quebec

this 27th. day of May, 1977

Agent for Applicant

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