Targeting plastic waste – how Intellectual Property can help

What innovators need to consider when developing recycling processes

There is less than a year to go until the Plastic Packaging Tax (PPT) comes into effect in April 2022. The tax is the latest in a long line of government incentives designed to encourage recycling and reduce single-use plastics. These incentives combined with consumer pressure are stimulating innovation at all stages of the recycling process.

Intellectual property (IP) rights can play an important role in protecting new technologies in this field and in this article we consider some of the practical issues that innovators should think about when building a patent portfolio.

The challenge

The new PPT will be applied to plastic packaging containing less than 30% recycled plastic. It currently also covers greener plastics such as biodegradable and compostable plastics although this is currently under review and may change.

30% may not sound like a large figure but recycling plastics is currently a very expensive and time consuming process. The waste plastic stream, particularly the domestic waste plastic stream, contains a variety of plastic items. Re-melting a mixture of waste polymers gives a recycled plastic with indeterminate properties, which is suitable only for making low-grade products.

For a truly circular economy, the quality of the recycled material should be equivalent to the quality of the primary material. For this to happen, the waste plastic must be sorted and separated into their individual types.

Plastics are currently sorted using a number of automated and manual processes. Sorting techniques include the use of near-infrared (NIR) radiation to identify resin types using the wavelength signature of reflected NIR radiation, as well as X-ray fluorescence used in a similar way primarily for identifying PVC. Plastics can also be sorted by density, using air streams or sink float tanks, or electrostatic properties.

The separation techniques discussed above are effective, but they can also be expensive and as such are often economically feasible only for higher value plastics such as PET or HDPE.

New recycling technologies

A lot of effort is going into improving sorting techniques, as evidenced by a recent steady increase in first filings relating to plastic separation technology (International Patent Classification code B29B 17/02).
In addition to improving the current techniques, companies are also getting creative. A UK consortium has developed fluorescent markers which can be incorporated into the printing ink on the packaging label and provide a unique signal identifying the polymer resin of the article. This provides all of the necessary information for sorting. It is particularly useful in the food industry which is subject to the European Food Safety Authority requirement that recycled HDPE plastic used for food applications contains greater than 99% packaging that was previously used for food applications. Fluorescent markers can be used to provide a unique signal to sorting equipment allowing for the identifying and separating of products such as a used milk bottle from a used bleach bottle, both of which may be made of the same polymer type but only the used milk bottle can be recycled into new food packaging.

Other technologies revolutionising this space include Polywaste’s recycling system, which uses frictional heating to sort low-grade and contaminated plastics and only requires broad segregation of the in-feed plastics, and Powder Impression Moulding which uses low value, highly diverse plastic blends to create moulded items. There is also Encapsulation which uses recycled plastic and encapsulates it in higher value plastic.

**Incentivising innovation through IP**

Whether your company is focussed on improvements to existing recycling technology or developing innovative methods and materials for the future, having a strong IP portfolio should not be overlooked. For start-ups, IP stimulates investment, providing reassurance for potential investors that the new technology has protection against copycats. For existing recycling technology, the exclusivity provided by IP rights can provide your company with a competitive edge on product purity and/or reducing manufacturing costs. And in all areas, the dissemination of knowledge through publication of patent applications spurs innovation still further.

Whether the incentive is found in IP, tax reduction through the PPT or consumer pressure, the heightened focus on recycling means that this industry is set to continue growing and new innovation is key to this.
IP considerations

From an IP perspective, completely new recyclable materials and new methods may be easily patented. However, patenting incremental changes to existing materials and methods can be more challenging.

For improved materials, it is necessary to carefully consider what features have given rise to the improvement and how these features can be characterised. Where possible, the advantageous features can be characterised structurally rather than in terms of their function. Although functional features are permitted in patent claims, they are more likely to face clarity issues than structural features.

When claiming a new or improved method, an important consideration is whether the product produced by that method is also new. If the product is new, how is it new? Is it more stable, stronger, more durable and how can this improvement be characterised in a patent claim? Similar considerations apply as those discussed above for new materials. Even if the product of a patented method is not new, UK patent law allows patentees to prevent the sale or use of products obtained directly by means of the patented method.

The modern throwaway culture has created a global crisis which requires a multi-faceted solution. One of those facets is recycling. Crisis-driven innovation means that we will continue to see many new developments in this area, and those with strong IP portfolios will be well placed for the future.

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