To all whom it may concern:

Be it known that I, Albert E. Whiteside, a subject of His Majesty King George V of Great Britain, residing in the township of Guelph, in the county of Wellington and Province of Ontario, Dominion of Canada, have invented a new or improved Combined Huller, Scarifier, and Cleaner for Clover and other such like seeds, of which the following is a specification.

It is a well known fact that certain classes of seeds, more particularly those of the clover family and other such like seeds, have not only to be cleaned from the dust, dirt and hulls, but also have to be scarified so that the closely enveloping skin can be more readily penetrated by moisture and will allow a better germination. Herefore the cleaning and scarifying have been done in separate individual and independent machines of various characters, and the object of my invention is to provide for the efficient hulling, scarifying and cleaning of such seeds in one compact machine.

My invention consists of a new or improved hulling and scarifying apparatus in combination with screening and winnowing devices and the necessary elevators for passing the uncleaned seed through the machine and bagging the same.

I illustrate my invention by the accompanying drawings in which:

Fig. I is an elevation of my new or improved combined huller, scarifier and cleaner.

Fig. II is a sectional elevation of the same.

Fig. III is an end view.

Fig. IV is a detail or section of the elevating scarifier, and

Fig. V shows the construction of the scarifying elevator.

Similar letters of reference indicate similar parts in all the drawings.

A is the frame work carrying my new or improved combined huller, scarifier and cleaner.

B is the circular elevating scarifier, while

C is a centrifugal fan for propelling the uncleaned seeds through the elevating scarifier B.

D is the feeding hopper into which the bulk or uncleaned seeds are poured. They are then led through the opening (d) controlled by the sliding shutoff (d'), and 55 through the spout R and delivered through a side opening into the centrifugal fan C which propels them through the annular chamber from the huller and scarifier B.

This annular huller and scarifier consists of a trough shaped periphery as shown in section Fig. IV closed by means of a long flexible metallic plate (b) lined with a sandpaper sheet (b').

After the clover has been threshed by an ordinary grain thresher, the uncleaned seed is run through the machine to take off the outer hull. This is accomplished by means of forcing the seed against the rough surface inside the circle of the machine. Usually 80 per cent of the hull is removed in the first operation depending on the dryness and toughness of the hull. The 10 per cent of the seed not hulled is returned by means of the elevator during the operation and again forced against the rough surface.

As will readily be seen the uncleaned seed driven by the air blast from the fan C impinges against the sand paper inner surface of the outer cover of the annular huller and scarifier B which, while hulling the seed, also elevates the same and delivers it by means of the nozzle E, Fig. II, into the chamber F surmounted by a dust screen (f) and which delivers the mixed bulk or uncleaned seeds by means of the chute (f') to the upper of a series of superimposed inclined screens, G, H, and I, of different meshes rigidly secured in an oscillating shoe J operated by means of the shaker K in the usual manner.

The lower end of the top screen G overhangs the horizontally inclined trough (q) which discharges the dirt, straw and debris, which will not pass through said screen, out at the side of the machine. The mixed seed and the fine dust pass through said screen and the chaff and uncleaned seeds drop off its lower extremity into the horizontally inclined trough (h) which discharges the 100 uncleaned seed into an outside upwardly inclined elevator L which elevates and discharges the uncleaned seeds into the receiving hopper from whence it passes once more through the annular huller and scarifier. This completes the hulling and the cleaned seeds now pass once more through the first and second screens G, and H.
The third screen I simply separates the fine dust from the seed and passes the now fully separated seed over the opening (j) in the oscillating screen shoe J and through the orifice (j') into the ascending air flume M falling through the bottom of same into the inclined trough (m) which carries the hulled seed into the bagging elevator O at the side of the machine which elevates and sacks the same ready for further treatment.

While the stream of hulled seed is falling through the air flume M it is met, penetrated and agitated by a stream of air generated by the fan M which separates and blows the fine dust and chaff through the top opening of the air flume M.

The hulled seed is run through the second time to scratch it. The severity of the scarifying process depends upon the speed at which the blower is run, the extent of the scarifying surface over which the seed is forced, the roughness of the surface and the kind and hardness of the legume to be scarified. For seeds with softer coats than sweet clover the rate of speed must be reduced and a smooth surface substituted over a portion of the distance. For this purpose a partially worn or smoother strip of sand paper is inserted into the machine. When the proper speed is used, not more than two per cent of the seeds are broken.

After passing through the machine a second time the now hulled and scarified seed is finally discharged from the machine by the bagging elevator O which delivers the seed into bags by means of the usual chute P.

I claim:

1. A method of hulling, cleaning and scarifying clover and other seeds, which consists in first scarifying and loosening the hulls; second, removing foreign matter such as straw and débris from the mixed seed and fine dust; third, rehulling and rescarring the seed; and fourth, separating chaff and dust from the hulled and scarified seed.

2. An apparatus of the class described comprising a hopper, a flue of channel section associated with said hopper, abrasive means flexibly mounted in said flue, and means for driving material from said hopper through said flue.

3. An apparatus of the class described comprising a cabinet having a hopper and a chamber, a flue of channel shaped cross section associated with said hopper and said chamber and provided with scarifying elements; means for driving material from said hopper through said flue into said chamber to be hulled, other means in said chamber for separating the seed from foreign matter; an elevator adapted to return the first separated and hulled material from one of said screens to said hopper and said flue for rescarring, and a fan adapted to carry off dust from the scarified material after having passed through the last of the screens in the series.

ALBERT E. WHITESIDE.

Witnesses:

J. W. ALDERSON,
E. K. PATTERSON.