

Junk Collectors

A young boy grows up in a middle class family with many children. He wants a laptop for himself, but his dad tells him that if he wants a computer he is going to pay for it because the one the family has is older but still has the software to do many things such as word processing. But the boy insists on a faster computer because of the graphics that he wants to create. He wants a laptop so he can travel the neighborhood and still do his work. But his dad insists that he must work and get the money.

So the boy tries to decide on how he is going to make that amount of money. He tries many things at first. Other people already have business mowing lawns and planting flowers. It will be a while before winter so there isn't money shoveling snow. He needs a way to make money fast in the next couple of weeks so he can get his laptop and start using it.

The boy continues to use the old computer while thinking of the graphics that he could be drawing on the new computer. He new he could store his files and keep a journal. He wouldn't have to wait for his brothers or sisters to use the computer. But he needed the drawing programs for his art and little inventions he constructed. He knows many ways that he can use a laptop. He just doesn't know how he would earn the money to pay for it.

So, he decided to have a talk with his father. He asks his dad, "what job should I do to earn enough money to buy the computer?" His father tells him that "earning money it takes hard work and dedication."

Greg, the boy, then asks, "how his did your chose your job dad?"

The father tells him that, "it was a combination of the dreams and skills that I was good at combined with what jobs were available. I also had to figure what was best for the family. I chose to become a mechanic because of my talent at fixing things. And one day," noted the father, I want to own my own garage."

"I've got it," Greg replies. "I will start my own business."

"Wait a minute son," his father replies. "Starting a business is a lot of hard work and dedication. You have to have a product or service that someone wants and you have to run your business fairly and honestly."

"I can do it dad," Greg pleads. "I can start my own business and then I will have enough money to buy my own computer."

"Well if your ready to put in some hard work, I think a business is something that will be both fun and educational for you. There is only one problem what is your business going to do," the father asks?"

"I don't know what my business will do," the Greg admits. He

starts to sigh.

"Don't worry son a solution will present it self. I'm just sure you will come up with an idea. I can give you some ideas, but I think this should be your decision," the father explains. "Maybe the first place you should look is in the newspaper or Internet. See what kind of business there are and how they communicate with the people. Remember that a good product is worthless if people don't know about it."

"Thanks dad. I am going to the library the first chance I get," Greg answers.

Going to the library is something that Greg always does. He knew the librarians by name and searched the catalog to find his favorite book.

His favorite books were about drawing and computers. But of course he studied about plants and bugs. He would also go through the fiction to read the science fiction stories.

Today is different though. He is here to get information to start his business. But where should he start. He then searches the catalog on computer. He is tempted to look at computers on the Internet. He already has an idea of what kind of laptop that he wants, but if he wants the laptop to become his, he is going to have to make money to buy it. Then there will be time to return to the library and research his little projects.

He types in business in the subject and looks at the hundreds of books the search revealed. All the books seem to be advanced books on business theory and methods. All of these books are too hard for him to understand. He needs a book that will give him the basics and not take a long time to learn.

He searches the Internet in desperation but all searches reveal the same items. Every link is trying to teach you how to make money fast. The site doesn't tell you how until you place an order. Greg has heard about all of these scams that sell people basic knowledge and never explain how to properly set up your business and earn money.

It looks like poor Greg is not going to find information. He is feeling a little disappointed. All that searching turned up no solid results. He decides to give up for today and try to approach the situation from another angle. He is walking out of the library just as he sees the head librarian Mr. Isaac. The kids often joked and called him Newton after famous physicist because he has read a lot about many subjects. Information is Mr. Isaac's expertise. So if anyone knows how to start a business and what books to read, he will. So Greg turns around and walks to the other side of the library from the computers through the walkway with shelves on each side to the reference desk. It is about a good 50 feet to the reference desk.

Greg is approaching the desk steadily, but as he approaches the children's section he hears a young girl that appears to be 3 or 4 years old cry out: "Mommy, Mommy give me back my toy. Please mommy give me back my toy."

"No the mother says boldly. Your toy is broken. It is no good. I'm sorry but you can't have it back. We'll go to the store and get you another one," the mom says calmly.

"But I want this one. Waahh! I want my toy, the child cries as the mother hurries to take her outside the library. The two pass Greg and before the mother leaves through the door she takes the toy and throws it into the trash can. Everyone in the library watches as the mother and daughter finally exit the building.

This scene plays in Greg's mind. He is curious as to what the commotion was about. He decides it was just a little kid wanting her toy, so he continues on his journey to the reference desk.

As Mr. Isaac puts down his phone, Greg begins to ask him questions. "Hey Newton I need some help about starting a business," Greg says as Mr. Isaac looks up. Greg is a regular at the library and knows Mr. Isaac, also known as Newton, quite well.

"Oh hi Greg. So your thinking about becoming an business man and making profit and being your own boss. Can I ask what type of business?"

"That's the thing Newton, I don't know anything about business. I don't even know what kind of business I want to start," Greg states.

"Ah, I see. So you are looking for a starting point. While I will start with two basic types of businesses. One is selling a product and the other is selling a service. But since this is your first business endeavor, I think you should just keep it simple and find a service that you can do and find the best way to execute it. I mean find something fun or if your goal is to make money find a service like lawn and garden work."

"But that is why I'm here Newt. All the other kids already have started those kinds of businesses. I need to do something else," Greg pleads.

"Well this is a business idea you are going to have to discover for yourself. This isn't contained in any book. I don't have the answer. But don't be discouraged. You still might find the business idea yet that no one else has thought of. Maybe it has been thought of but you will find a new way of executing the idea."

"Well thanks for the advice, but I still don't have any ideas yet," Greg notes.

"Well then you are going to have to find a starting point," Newt explains. Why don't you start with what you like to do or things that you are skilled in and see if there is anyway that it can be turned into a service or product."

The conversation ends and Greg is trying to solve the problem of what business to run. He thinks to himself, "Hey I like science, art, design, sports, math, and building things." But on the way out he passes the trash can. His curiosity is getting the best of him. He remembers the little girl who had broken her toy. He looks around the library. There are people at the check out desk, and people at the computers, but no one is looking in his direction. He quietly inspects the trash can. He quietly tilts the cap back and examines the contents.

Past the papers and receipts, Greg sees the toy resting on top of some crumpled up papers. He picks it up and examines it with his two hands. It appears to be a small action figure. He examines it further to see the reason the mother threw it in the trash. He looks more closely into the garbage and sees the action figure's leg. He looks at the figure and sees that the leg just snaps into place and has a rubber band connecting it to the figure's body.

Greg had seen this type of toy before. It is a good thing the mother threw it away because it is really intended for an older child. This action figure could be a collectors item. Greg slips the leg back into place as he connects the rubber band. There its fixed! He places the toy into his backpack.

He leaves the library and starts walking home. You can tell spring has begun. It is near the end of April. The air is fresh and crisp. The temperature is cool and everyone is busy cleaning. While he is walking home he notices many people have started putting out garbage. Greg remembers that garbage pickup is in about 2 and a half weeks from today.

Greg's imagination gets the best of him. He starts to wonder what treasures could be found in those junk piles. After all they say that, "One man's junk is another man's treasure." Greg knew that most people didn't see the value of the things they sent for garbage. People would throw out old computers, old bicycles, motors, tools, and anything you can imagine.

He starts to look in the junk piles. He sees a broken bicycle and makes a fast examination of it. The front tire is bent and the gears are broken, but the frame is intact. It wouldn't take much for someone to fix it. He notes that this thing should have been in a garage sale and not the trash pile.

Under the bicycle lies a hammer. Greg thinks that there is so much

stuff he is going to find how will he carry all his findings back to the house. He thinks to himself, “ I really need dad’s van if I am going to carry all these little treasures. And once I get it all home how am I going to store it. I wonder if mom and dad will mind me bringing home all these great stuff.”

“I’ll store this stuff in the backyard until I repair it,” he thinks. “Now I have to bend the front bike tire straight in order to push the bike. Then I’ll set the stuff evenly across the bike so that I can push it home. Then I’ll talk dad into driving me around in the van to do some garbage picking. I now know what my business will do!”

By the time Greg gets home it is past dinner. He is walking up the road near his house dropping all kinds of gadgets and gizmos he found. He is out of breath by the time he reaches the top of the hill. His garage door is already open and he sees his father working on restoring the truck he had salvaged.

The truck is not in working condition, but Greg’s father saw it and new he could restore it to be an off-road vehicle. That was almost a year ago and in that time Greg and his father had spent their spare time working on repairing and tweaking the truck.

Greg drops his stuff in the driveway and approaches the truck. His dad is underneath the truck and Greg sees the truck is up on ramps. All of the sudden Greg hears a loud voice saying, “Uhhh... Ouch... Ow...”

“Dad what is a matter,” Greg asks? “Are you ok?”

“Yes Greg I’m alright,” his dad replies. I just hit my knuckles trying to get this bolt loose. The head is stripped and the socket won’t grip it. It keeps slipping off and I keep smashing my knuckles. But that’s not all. You were late for dinner without even calling. Where have you been? Your mother was going to have me search the neighbor hood, but I just figured you were taking some time at the library. I was just about to search for you in the next hour.”

“Not to worry about me dad,” Greg replied. “I found out what I am going to do as my business. But before I tell you I just wanted to remind you about that saying you taught me about ones man’s junk being another man’s treasure. And I also want you to think of the vision you had about this truck we are working on. So just keep an open mind when I reveal my business plan.”

“I think I know what you are trying to say,” his dad says. “Does it have anything to do with that bike and pile of garbage in the driveway?”

“That’s why I’m late,” Greg explains. “I made all these discoveries on the way home. And what is even better is that this stuff is only the

beginning. We still have 2 and a half weeks until garbage pick-up.”

“Where on earth are we going to put it son? We can’t be collecting other peoples junk. We hardly have room for the things we got,” Greg’s dad explains.

“Don’t worry dad, I got it all figured out. We’ll set up shop here in the garage. This is where we’ll make repairs to and build things using the junk, as you call it. We’ll store the extra in the back yard. And stuff that can’t be salvaged will be recycled at the scrap yard or disposed of at the garbage dump. Meanwhile we will be fixing this stuff and reselling it and building our inventions. Everything we get is free so we just have our time to factor into the cost. And what we recycle at the scrap yard is turned into cash.”

“Sounds like a solid plan, but we’ll have to convince your mother,” his dad remarks. “Tell you what I’ll make you a deal. I will help you with your business if you promise that you did not give up on the truck. And to prove you didn’t give up on the truck I want you to remove those two striped bolts underneath the truck. And once they are moved I promise to help you find your salvaged items and store and repair them.”

“It’s a deal,” Greg says. “I just know I can remove those bolts!”

“Alright,” his dad says. “You have one week. But first, go get some dinner and finish your homework.”

Greg returns to the truck after his meal and homework. He slides underneath the truck to see why his father couldn’t remove the bolt. He sees that is a hexagon head bolt. The six sides are no longer there though. They have been rusted and then striped away by someone trying to loosen them with tools. “Uh oh,” he thinks. “Dad knew that this would be a hard task. But I have a plan. I have a whole garage of tools, gadgets, and gizmos and my disposal. And I know how to just get this bolt loose.”

Greg sucks in his stomach with a deep breath and pulls himself from underneath the truck. He gets up and his feet and heads toward the tool chest. He pulls out one of the small plastic drawers. He finds just what he need. He grabs it and a small crescent wrench and is on his way back to the truck.

Five minutes pass and Greg comes from underneath the truck yelling, “dad, dad I’ve gotten the bolt loose! Dad, I got the bolt loose!”

His father hurries into the garage and says, “there is no way you’ve gotten those bolts off so fast. Let me see what you did.”

Greg points toward his open hand. His dad looks there and sees the bolt.

“How did you do it,” his father asks? “I worked for a half hour on

that bolt and I just striped the thing worse.”

“It’s a secret,” Greg replies. “If you pick the right hand I’ll tell you how I removed the bolt. So what is it? Will it be the left or right hand?”

“I chose the right,” his father says. “Am I right?”

Greg opens his right hand and it is empty. “I’m sorry he says, but you have picked the wrong hand. But since you are my future business partner I’ll show you any ways.”

Greg then opens his left hand to reveal a shiny washer. “I took this washer, which you can use two is you like, and used it to get a tight fit with the crescent wrench.”

“Ingenious son! So that when that washer moves it not only gives the wrench a tight fit, it acts as a lever to turn the bolt.”

“It was to easy,” Greg says.

“Ah but son, that next bolt will be the real challenge. I see that you didn’t look at it yet, because you won’t be able to use that crescent wrench or vise grips there. That bolt is inside an indentation of the part’s contour. There is other parts blocking the sides. You are forced to use the socket.”

“What? Let me see,” Greg says. He slides underneath the truck and inspects the bolt. “How in the world do you expect me to get this bolt off? I just have enough room to fit my hands up in there.”

“I don’t know of any easy way to get the bolt out by hand other then disassembling the part and cutting it with a torch. You’re the inventor try to see what you can come up with. I would start be seeing what tools are already in the garage and how you can improve upon them.”

“Dad it almost sounds like you given me an impossible task, but I am going to succeed and start my business,” Greg says. “I will build anything that is possible to remove that bolt.”

“Remember son that you’ve got one week. Let’s see what solution you devise.”

That was two days ago. Now Greg is in the library searching through books to see what different mechanical devices have already been invented. May be one of those will lead to a way of removing the bolt. He starts reading that there are three types of main mechanical devices: incline plane, lever, and spring. There are various subcategories such as wheel and screw. Greg found it hard to believe that there were only three main categories. The mechanical devices in this book looked like they were built on more that three machine parts. He decided to ask Newton.

So Greg heads towards the reference desk to find the answers to his many questions about mechanics and machines. “Hey Newton,” Greg says as he puts his on the desk. “I need some help about how to build

machines and more specifically tools.”

“Ok,” Mr. Isaac says. “It sounds like you need to know about mechanical design. What specifically are you trying to design?”

“I want to design a tool that will remove striped hexagon head bolts or maybe other types of bolts. I just need a starting point...a point to gather ideas.”

“Well I’ll give you a starting point,” Newton says. “All designers need a journal for a place to store and draw ideas. They use it to take notes. When you are designing something you go through a lot of thoughts. Those thoughts will be lost if you don’t record them. Second you need to know one rule that usually can’t be broken when building mechanical devices. A good machine or concept is simple yet effective, complex yet easily described. Do you understand? If you try to make the tool to complex it is to hard to build or manufacture. So you want the design simplified. But the machine or tool in your case, must do the job that it is designed for. But before you can even build the part it must be drawn and explained how it is to be made. So you are taking the complex part and turning it into a simple drawing,” Newton concluded. “Here take this bound notebook. I have plenty of them. There is no lines.”

“Thanks but I need a condensed course in mechanics because I only have 3 and a half more days to build my invention. You see my dad won’t let me start a salvage business until I find a way to remove that bolt,” Greg explains.

“You don’t have time to read these books on mechanics,” Newton explains. “You are going to have to come up with an original design and use the books as reference when you encounter a problem.”

“Ok, so I’m on my own. But is it true there are basically three types of machines,” Greg asks?

“Yes. That is true. But the main divisions have many subcategories. An incline plane makes a wheel and a screw. A wheel makes a gear and a cam and a pulley. A lever can be made by many devices. Most tools use lever action to turn. And lastly, a spring can be either in tension or compression causing a part to move or retract in ways that would be impossible without a spring,” Newton finishes.

“That’s it? You mean mechanics is that simple”, Greg asks?

“There are some very complex machines that can be built out of those parts. And there are other things to mechanics like vibration, heat transfer, forces, dynamics and many other complicated subjects. There is often a lot of math involved. Shape also determines a lot about the tool. It determines how it fits together and just so many other factors of the

design.”

“I don’t know much of the math,” Greg admits. “Do I still know enough about how to design a tool?”

“Of course! I know you will succeed in building your tool. But you need a creative inspiration if you are going to do it in 3 days. I’ll tell you what to do. Do worry about complicated math that you still have to learn yet. Start with the idea and take a whole evening after school and do nothing but draw in that notebook I gave you. Have reference books and maybe even tools and other gizmos that you think could help you make your invention. See the tool in your mind and picture how it is going to tighten around the bolt and then turn the bolt. Then draw what you have pictured. When you are finished, go back and look at all the possibilities and pick the ones you think will work. In essence, you are just brainstorming with drawings,” Newton explained.

“Thanks for all the help and support Newt. But now I’ve got to go to the garage and do some serious drawing,” Greg said with excitement.

Greg returns home to the garage. He spends almost an hour drawing and thoughts are rushing through his head. He is picturing a bunch of ways to grip a striped bolt or a new approach to turning it. The fact that it has to turn and still fit in a reasonably small area just made the design process that much harder.

It is now 10:30 and Greg still doesn’t have a solid answer to the design problem. But he isn’t even considering what would happen if he didn’t solve the problem. He is totally immersed in concentration. Creative thoughts fly through his head.

“The hexagon head on the bolt has to be designed that way for a reason,” Greg thinks as he recalls what Newton told him about the shape of a design and how a lever works. The hexagon is an ideal shape. Easy to mold the sockets. Six gives you the ability to turn perpendicular to the treads of the bolt creating a circular motion. But when the bolt’s head is striped the circular motion of the socket wrench causes the socket to spin around the bolt and slip off.

This is where Greg remembers what Newton had said about shape and levers to build a mechanical part. The bolt head is just a series of six levers which are revolved around a circle forming a hexagon shape.

“But why six sides and not four,” Greg thought? “You could use four but then you would need a longer lever to pull it. And also force would be wasted when it turns because you turn four sides at once. Six sides are used because more sides equal more force applied to turn the threads in a circle. Restated, it distributes the force in a different way.”

“You can’t use an odd number of sides because the bolt’s head wouldn’t be symmetrical and that would lead to problems placing the socket over the bolt. And you could distribute the turning force evenly across the bolt,” Greg continued to ponder.

“Why not an octagon head or a higher number even head,” Greg questions himself. “It is possible but it would be hard to fit the socket on and easier to strip. The lever that is one of the sides would be smaller and would apply less torque. But there would be more points turning at once. Basically it just complicates things while the hex head works just fine.”

“Just great,” Greg thinks. “These theories may not be right. They are just my thoughts on figuring out the bolt. But I don’t need to know every mathematical fact to build my tool. I just need to know the basics of levers and understand how a hex head bolt turns. And I know that.”

“That’s it,” Greg says. I need turning points on the striped bolt. I have to apply a circular turning force to the bolt at these points. All this occurs when these turning points resist moving without the bolt turning.”

“If I placed some cylinders against the bolt head and had a turning force at an angle I just might be able to turn the bolt,” Greg thinks. “This depends on how rusted the bolt threads are and the amount of force required to turn the bolt. So, if I turn the cylinders into the bolt pressing it hard against the striped bolt head and create a circular turning motion to turn the threads, I just might be able to remove that striped bolt in the truck!”

Greg decides to take some measurements of a regular hex head bolt before proceeding further. “Ah...the size of a hexagon bolt is given by measuring one of the three parallel sides. (Note, this is also known as across flats.)

Greg refers to one of his library books. It states, “that drawing six tangent lines to the circle.¹” It continued to say that this is the preferred method of drawing nuts and bolts. Greg sees from the diagrams that the hexagon has six equal sides and each of those sides is made up of an equilateral triangle. The outside edges are drawn by 60 and 30 degree angles on an inscribed circle. The book said that diagonals could be added to increase accuracy.

Greg now recalls his turning points idea and expands upon it. “What did I say about four turning points turning the bolt,” he thinks. “Maybe I need eight or even more points. For now to keep things simple, I’ll start with six or less points. I’ll call them torque points. These special points are where I will apply a circular force.”

“These points will be placed around the outside circle of the bolt

head. Still, there has to be a force that pulls these points into the bolt. So a 45 degree angle might be ideal for the direction of the force. But the torque points can not always be placed in ideal points so the points need to be adjustable. That way the placement balances the force on the bolt head to the force on the threads. It needs to be adjustable so that the forces can be applied where needed and be placed at points that allow the bolt head to turn with the torque points,” Greg continues to form a mental picture of the tool in his mind.

Greg reviews his notes, “needs to be small, has to be adjustable, must apply circular force or torque, needs to turn bolt, must be easy to build, and lastly and most important it must do what it was invented for. It must remove the striped bolt off the truck.”

Greg starts to draw out shapes on paper. “It doesn’t have to be neat yet. It just has to help me picture the tool better.” He draws a circle to represent the striped bolt. This is an “infinitely striped” bolt. Normally, some of the hexagon shape would remain. He then draws six small circles around the bolt. These are the torque points. He draws the little hooks where a tool attaches to turn the points.

Now there is a problem, Greg discovers. How do you make it easy to build this tool and still have it be adjustable. His work on this project would be more useful if he could get the tool to work on many sizes of bolts.

The problem is to connect the torque points and still have everything be adjustable. “Is there any possible way to do that,” Greg thought. “Nuts! I just don’t know. What am I going to do?”

“I need something that tightens like a rope but has a fastener that keeps the connector tight. This time I’m going to search the garage until I find something in all these gadgets we got here.

Greg starts to search the garage for parts to build his gadget. “I might as well find all the parts needed to build the prototype. The only thing that I can think of now that is adjustable is removable links, but there has to be an easier solution.”

And if there is a solution Greg is determined to find it. He opens the tool chest and pulls out some tools. Hammer, pliers, vise-grips, and sockets. He turns to the shelf that had little plastic drawers. He pulls them out one by one and finds something that may solve his design problem. “Could this be it,” he thought? “Will this one tool used with my invention remove the bolt?”

Greg gathers various other gadgets he needs to build his prototype. He grabs some small bolts, an old watch band, a handful of paper clips,

some epoxy, and some strong circular hooks.

He has these tools along with the secret weapon in the arsenal. It is a cable tie. It is a plastic cable having little ramps that lock when the cord is pulled into a loop. This cable tie gives the torque points the ability to be adjusted anywhere across the bolt. They are separate but still held together to turn as a unit. “At least in theory,” Greg think. “This invention is brilliant,” he says to himself as he works on constructing a prototype.

He disconnects the links of the watch band. He breaks the watch band into three pieces. He wraps the paper clip around the middle of the bolt and through a hole in the watch band were his twists it tight. The spacing of the small bolts and hooks is determined by measurements that he had made earlier of the bolt head. The hooks are then attached to the watch band with bent paper clips. He takes a flexible spring and epoxies some of it to the center of the watch band. This will make a loop that the flex tie will go through as the segments of the watch band are tightened together.

The prototype is now complete. The epoxy just has to dry. Greg is almost finished when he encounters a problem. No tool in the garage will turn this contraption. You would almost need a rod for every hook somehow or some type of clap. That is difficult to build.

Greg relies on the stuff in the garage to help him in his invention. He scans the room and sees coffee cans, wrenches, soup cans, jars, nuts, bolts, screw, a tennis racket a bicycle, and the truck. He thinks, “which of these gadgets can I use to make this tool. I need to complete my invention.”

“Think of the device in simple terms,” he thought. “I need to use three rods to turn three hooks. I need something to support the rods as they turn. Think. Think. Alright, I got it. I’ll cut holes in the soup can lids and use them as a brace every so distance along the rods. In other words, I’ll stick the rods through the holes and place the lids at different heights.”

It’s the next day and Greg rushes home to show his dad the new tool he invented. “Dad, Dad were are you? I’m home. Get ready to go garbage picking. I’m a few days behind schedule. That means we’ll have to work late.”

“What’s that,” his dad said. “I don’t see the second bolt. You got lucky with the first one. I must have loosened it for you.”

“Well, the cool thing is not that I removed the bolt. Even though, that is nice. The cool thing is the tool and the process that I remove the bolt. Observe.”

“What is that,” Greg’s dad asks!

“I call it the “Strip Gripper.” This is just a prototype built out of available parts from here in the garage.”

“Does it work,” his dad asks?

“That is what we are here to see. This is the moment of truth. Either I remove the bolt and get my business and you as a partner or I return to help you fixing the truck and going to the library for the computers,” Greg says calmly.

“Let’s see,” says his dad. “I hope that you can do it.”

Greg slides under the truck and feels for the bolt. As soon as finds it, he sticks the cable tie through each of the loops of each of the watch bands. He then holds it in place as he tightens the cable tie. As soon as it is tight. He plays with the rods to get them in place. The rods almost touch the garage floor.

“How do you intend to turn the rods,” his dad asks.

Greg grabs the last two soup can lids. These are the same sized, but each on is fitted on the side of a tennis racket. “This is my wrench,” Greg laughs.

“This is it,” Greg says as he twists the racket. The rods begin to bend slightly resisting the pull. But Greg used many soup can lids when creating the braces. He turns harder. He feels the tension start to release. “It’s working! It’s working, Greg yells. But the shear force just sends the rods flying.

“Oh no,” Greg says. “It didn’t work”

“What,” his father says? Don’t give up yet. I think you just got the bolt started. You just broke it loose.”

Greg looks at the bolt. The hooks just broke sending the rods flying. That is because the prototype is just made out of available parts. The whole thing was built by improvising. Greg looks at the bolt. His gripper is still in place with one missing hook. The bolt has turned through the strongest part. Now when he puts the remaining two rods on, it should turn. He sprays the bolt with oil and turns it slowly. It works.

“It works! It works! My invention works. Not only did the theory work, but the prototype I built worked. Dad I’ve got the bolt! I’ve got the bolt!”

“First we start the business and make money then we buy a computer,” Greg says.

“Hold on son. I said I’d be your partner, but there are some rules. I would stand behind you if you want to help fix the truck or if you wanted to run a junk business instead. I just wanted to see if you were still committed to working on the truck. And you proved that you were. You

accepted a challenge and worked hard through to the end,” Greg’s dad explained.

“But there are some rules,” his dad explained. “First you wear the right protection. That is safety glasses, gloves, boots, and thick clothing. Don’t reach into the garbage. Make sure you can see what you pick up. Basically just use common sense. Secondly, I want this stuff to be organized. Your mother is not going to let us fill the backyard full of junk.”

“Sounds fair,” Greg agrees. “But what should we do with my invention. I mean should we start building and selling these?”

“We could try it. We need to patent it first. I’ve got to admit this is a pretty cool invention. You really have shown your creative side. I think by the end of summer we’ll have that laptop and you and me can design and build even more things. Now lets go get some dinner before we cruise the neighborhood going garbage picking.

References:

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